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THE UNIVERSITY OF OKLAHOMA
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AN ENGLISH TRANSLATION OF OLIVIER MESSIAEN'S
TRAITÉ DE RYTHME, DE COULEUR, ET D'ORNITHOLOGIE
VOLUME I

A Document
SUBMITTED TO THE GRADUATE FACULTY OF THE SCHOOL OF MUSIC
in partial fulfillment of the requirements for the
degree of
Doctor of Musical Arts

By
MELODY BAGGECH
Norman, Oklahoma
1998

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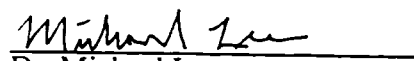
AN ENGLISH TRANSLATION OF OLIVIER MESSIAEN'S
TRAITÉ DE RYTHME, DE COULEUR, ET D'ORNITHOLOGIE
VOLUME I

A Document

APPROVED FOR THE SCHOOL OF MUSIC

By


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ACKNOWLEDGEMENTS

Throughout the course of translating this volume, I have had the benefit of drawing on the knowledge and expertise of not only the individual members of my committee, but of experts outside the field of music as well. Their help has been vital to the success of this project. In particular, I would like to thank ornithologists Howard F. Towner, Russ Collins, Denis Lepage, and René Babineau for their help in translating the names of specific French and Canadian birds; scientist Judith Howcroft and zoologist Dr. Ari Berkowitz for their help in identifying obscure animal species; Dr. Patrick Riley from the Department of Modern Languages; Alan Marshall, for his assistance with notating musical examples; and musicologists Philippe Mercier of the Université Catholique de Louvain and Nicolas Meeus of the Université de Sorbonne in Paris for their help with unfamiliar French musical terminology.

Most importantly, I thank Alphonse Leduc for allowing me to translate this volume and the publishers who have authorized the inclusion of excerpts from musical works: Alphonse Leduc & Cie publishers and owners, Boosey & Hawkes, Inc., G. Schirmer, Inc. (ASCAP)/Chester Music Ltd., Éditions Durand, and Éditions Salabert.

Finally, I would like to thank the members of my committee, Distinguished Regents Professor Thomas Carey, Dr. Michael Rogers, and in particular, Drs. Pamela Genova, Michael Lee, and Meryl Mantione for their tireless encouragement and support in this endeavor.

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ABSTRACT

An English Translation of Traité de Rythme, de Couleur, et d'Ornithologie, volume I, by Olivier Messiaen is a translation of the first volume of Messiaen's important treatise on rhythm, color and ornithology (original French publication by Leduc). Where possible, all musical examples have been reproduced in their entirety. This volume addresses several of Messiaen's ideas on musical as well as non-musical rhythm. Messiaen discusses Time, Rhythm, Greek Metrics, Hindu Rhythms, and analyzes the 39 choruses of *Le Printemps* by Claude Le Jeune.

TRANSLATOR'S NOTE

Because of the inherent differences between language and music, it is often difficult for composers to articulate their thoughts about the music which they write. Although many composers have attempted to do so, few have achieved the level of success that Olivier Messiaen has in cataloguing his musical ideas. Not only has he succeeded in putting musical thoughts into words, but he has done so in a seven volume treatise, *Traité de Rythme, de Couleur, et d'Ornithologie*, which covers every aspect of his aesthetic from the importance of rhythm and time in his music to bird song, plainchant, and his unique ideas about sound-color.

Begun in 1948,¹ the treatise contains the most comprehensive account of these theories and practices. The first four volumes, though completed before 1980, were not published until 1994, 1995, 1996 and 1997, respectively. The entire series was prepared for publication by Messiaen's wife, Yvonne Loriod. Excepting the addition of certain musical examples in volume V, Loriod has remained faithful to her husband's original manuscript, even to the point of retaining his orthographical errors.² Publication of the entire series will be completed in the year 2000.

Translating the first volume of *Traité de Rythme* seemed a natural choice as a dissertation topic because of my personal interests in both translation and contemporary musical thought, and because of the importance of the treatise. After an initial reading, it

¹*Die Musik in Geschichte und Gegenwart*, vol. 9, ed. Friedrich Blume. (Basel: Bärenreiter Kassel, 1961), s.v. "Messiaen."

²Jean Leduc, Paris, France, to [the author, Norman, Oklahoma], letter, October 10, 1997, Alphonse LEDUC & Cie Editeurs de Musique.

also became apparent that the breadth of subject matter in this volume would require research of appropriate complexity. Additionally, the prose of the treatise is unedited and often in colloquial language rather than academic prose. This unusual writing style presented intriguing challenges for translation.

Importance of the treatise

Messiaen's importance as a composer and theorist has been attested to in numerous sources. Several of these sources state that Messiaen's theories and practices are unique. Harry Halbreich, for instance, calls Messiaen "completely original."³ Because many of Messiaen's compositional techniques were not used by other composers, they cannot be studied directly through the works of his contemporaries. Messiaen himself attested to his originality in an interview with Claude Samuel stating that his music employs "several personal rhythmic techniques such as rhythmic characters, non-retrogradable rhythms, and symmetrical permutations."⁴ These rhythmic techniques are among his most important innovations and are a part of the reason that he has labeled himself a rhythmicist.⁵

The importance of rhythm in his compositions has been the subject of much discussion among those who have studied his music. According to Anthony Pole, Messiaen regarded his rhythmic innovations as his "most far-reaching contribution to Western music."⁶ Their significance is attested to in each volume of the treatise which contains the most systematic and detailed account available of Messiaen's ideas about rhythm in his own music, and includes analyses of similar rhythmic techniques used by other composers such as Le Jeune, Stravinsky, and Beethoven. The first volume alone contains four separate chapters: Time, Rhythm, Greek Metrics, and Hindu Rhythms. Volumes II and III also deal solely with the topic of rhythm. The discussion of other musical topics in subsequent volumes is

³Harry Halbreich, *Olivier Messiaen*, trans. by author. (Paris: Librairie Arthème Fayard, Fondation SACEM, 1980), 9.

⁴Claude Samuel, *Olivier Messiaen*. trans. E. Thomas Glasgow, (Portland: Amadeus Press, 1994), 21.

⁵Olivier Messiaen, *Traité de Rythme, de Couleur, et d'Ornithologie*, vol. 1. (Paris: Alphonse Leduc, Editions Musicales, 1994),

⁶Anthony Pole, "Messiaen's Musical Language: an Introduction." *The Messiaen Companion*. Peter Hill, ed. (Portland: Amadeus Press, 1995), 32.

ultimately based upon rhythm as a foundation. All of these topics, which have been touched upon in other sources, are explained in detail by Messiaen.

Because *Traité de Rythme* was written in an attempt to clarify Messiaen's ideas about composition, it contains analyses of his own works and works by other composers, as well as detailed descriptions of his compositional techniques. (See page 2.) In addition, the first volume contains many of Messiaen's philosophical principles which provide an excellent introduction not only to the treatise and to his music, but also to the thought processes behind the creation of that music.

This translation helps to further clarify Messiaen's wide-ranging historical impact. During his lifetime, this impact stemmed in part from his teaching career, which began in 1936 when he joined the faculties of the École Normale de Musique, and the Schola Cantorum, in Paris. He was later appointed professor of harmony at the Paris Conservatoire and participated in the International Summer Courses for New Music in Darmstadt. At the Conservatoire, his teaching "went beyond the traditional Conservatoire courses, ranging from Greek metres and Hindu rhythms to birdsong."⁷ Teaching at these institutions afforded him the opportunity to express his ideas to other talented composers, most notably his students Pierre Boulez (b.1925), Karlheinz Stockhausen (b.1928), Iannis Xenakis (b.1922), and Luigi Nono (b.1924). These composers have each made a significant contribution to contemporary vocal literature. They have also become well known for their own innovations which were inspired, in part, by Messiaen's influence. Stockhausen's permuted rows in *Kreuzspiel*, are one example of this influence as is the "intricate rhythmic idiom" found in the music of Boulez.⁸

Traité de Rythme is the result of a lifetime of choices, compositional and otherwise, and represents the apex of those choices; but it is more than just a prosaic list of compositional choices. It contains an intimate grasp of the inward nature of music on a

⁷*The New Grove Dictionary of Music and Musicians*, s.v. "Messiaen," by André Boucourechliev, 205.

⁸Bryan R. Simms, *Music of the Twentieth Century: Style and Structure*. (New York: Schirmer Books, 1986), 347-8.

level far beyond the confines of what one man could compose. Chapter 1 of volume I, for example, contains descriptions of rhythm in its purest sense – as a temporal element related to the sciences (such as biology, physics, astronomy) – which serve as an introduction to what is stated in subsequent chapters about musical rhythm. (See pages 8-9.) Chapter 2 of the same volume begins by citing some definitions and sources of rhythm and includes detailed information on the origins of the words "music" and "rhythm." It also contains a section on extra-musical rhythms and their effect on musical rhythms. All of these ideas are important facets of Messiaen's compositional theories and practices.

The ongoing publication of this treatise suggests that Messiaen's impact on the musical world did not end with his death in 1992. Although his work as a composer has come to an end, his influence as an aesthete has not. Because of this influence, it is important that an English translation of this treatise be made available for non French-speaking Anglophones.

Since its publication in 1994, however, the treatise has seemingly been overlooked. Even among the most recent source materials on Messiaen, no thorough analysis concerning its content has been undertaken. Paul Griffiths mentions the treatise as a work in progress in his book *Olivier Messiaen and the Music of Time*.⁹ More often, however, reference to this treatise can be found only in bibliographic listings which, again, do not deal with its content.

The treatise, which Griffiths refers to as "teaching material,"¹⁰ addresses Messiaen's compositional practices in a way that no other source does. Although *Technique de mon langage musical* expresses some similar ideas, this older account had become outdated.¹¹ In *Technique de mon langage musicale*, a 1944 two-volume publication, Messiaen attempted to explain some of the processes that led him to compose many of his earlier works. *Technique*, however, was not intended as a treatise on composition; "neither is it an

⁹Paul Griffiths, *Olivier Messiaen and the Music of Time*. (New York: Cornell University Press, 1985), 152.

¹⁰Griffiths, 152.

¹¹Griffiths, 152.

analysis.... It is, rather, an attempt to establish general rules from particular instances of creative process, and as such it carries no special authority: it cannot tell us how Messiaen's music works, but only how in the early 1940s he thought it had been composed."¹²

Traité de Rythme, on the other hand, is not only more recent, it is more complete. It contains a much more detailed account of Messiaen's compositional theories and practices than any previously existing publication. Volume VII was completed in 1992, the year of its author's death and, as such, it provides the most current documentation of Messiaen's musical ideas. Since "his treatment of rhythm and meter [is] one of the most distinctive aspects of his music,"¹³ and since such a comprehensive account cannot be found elsewhere, this translation of volume I will serve to clarify further Messiaen's ideas on composition for those who do not understand French.

Perhaps the most obvious force which necessitates this translation is the present limitation of the treatise's availability. Since no translation of the treatise currently exists in any language, it has been accessible only to those who understand French. Although English source materials on Messiaen exist, at present, to an extent that would allow for detailed study of his music, a detailed account of the underlying theories for his compositional practices can only be found in *Traité de Rythme*.

This treatise constitutes an important contribution to scholarship of music of this century. Harry Halbreich, in his book *Olivier Messiaen*, refers to it as "the highest and most vast project of Messiaen's creative life... which will have, according to its own right, the scope of material of *Parsifal*." ¹⁴ Indeed, Messiaen's life and work have been called "a 'goldmine' for all musicologists."¹⁵ *Traité de Rythme, de Couleur, et d'Ornithologie* constitutes a large part of that goldmine and will help to assure his place in the history of twentieth-century music. His musical language, which is explained in detail throughout the

¹²Griffiths, 93.

¹³Simms, 401.

¹⁴"le projet le plus haut et le plus vaste de toute sa vie créatrice...et qui aura, selon ses propres dires, l'envergure matérielle de *Parsifal*." Harry Halbreich, *Olivier Messiaen*, trans. by author. (Paris: Librairie Arthème Fayard, Fondation SACEM, 1980), 505.

¹⁵Halbreich, 9.

treatise, will be clarified through this translation in a way that has not been previously achieved.

Personal interest

Messiaen's use of language to communicate complex, abstract musical concepts is of interest to me for several reasons. First, deciphering these concepts in relation to Messiaen's music, and the music of other twentieth-century composers who have used similar techniques, provides specific insights not only into Messiaen's particular creative process, but also, more generally, into contemporary musical thought.

Second, and more important to the nature of this particular study, was the idea of translating these concepts from French to English. Such an undertaking has allowed musical and linguistic skills to merge into a single task. Translation, though helpful for all musicians, is an indispensable skill for singers because we are often required to sing in languages other than our own. It would be impossible to interpret a foreign text without some knowledge of its meaning. Of course, there are many published books of song translations whose sole purpose is to provide the meaning of foreign texts, and one can always consult a dictionary for specific denotations of words, but the process of translating requires more than simply reading someone else's translation or substituting words in one language for those in another. To render an effective translation of any work requires an intimate understanding of both the original language of the work and the language of translation. My background as a singer has often required translation of texts for performance. Since singers deal most often with short poetic texts and theatrical works such as opera libretti, translating a volume of prose which discusses mostly musicological topics may at first seem unrelated. The process of translating, however, whether it be a short poem full of abstract imagery or a lengthy work containing specialized technical jargon, remains the same. It is this process that fascinates me, both as a singer and as a student of linguistics. I feel that the ability to translate with a thorough understanding of a

foreign text can be applied to singing and can lead directly to an improvement in artistry in the interpretation of vocal music.

The third and final reason that this translation interests me is also related to vocal music; but more specifically, to contemporary vocal music. Not only did Messiaen compose a substantial repertory of music for voice, but the composers most directly influenced by him, in particular his students, have also produced a sizable body of works for voice. The idea of gaining a more intimate understanding of these works is appealing, not only as a performer, but also as an aid for teaching other interested musicians. Virtually anything revealed in this volume about Messiaen's compositional process will be helpful in interpreting his music and the music of those he influenced. In chapter 2 for example, Messiaen states, "I can affirm that all I know about melody has been taught to me by birds." Knowing that his melodies originate with bird song provides specific insight into interpretation.

Special challenges presented by the text

Among the initial decisions in translating *Traité de Rythme* were the choices to limit the study to the first volume, to follow the format of the original publication as closely as possible, and, wherever possible, to reproduce and include all musical examples and illustrations as they appear in the original document.

Then, as I began to read the volume, I became aware of Messiaen's seemingly unlimited range of knowledge on subjects other than music. Aside from obscure musical terminology, he discusses intricate scientific phenomena, obscure plant and animal species and exotic birds (along with the specific sounds they make), theories of Hinduism, and ancient Greek and Latin poetic concepts, often without any explanation of where these terms come from or how they were used. In order to accurately translate this vast array of specialized terminology, I have consulted quite an eclectic range of sources including books, encyclopedias, dictionaries, internet sites, and personal correspondences with

experts in the fields of ornithology, zoology, physics, poetry, and other non-musical topics.

The entire treatise is set up in such a way that it provides not only an easily used quick-reference tool for anyone looking for specific information, but also an in-depth account of how he composed. Each chapter constitutes a complete and independent section on a particular topic (for example, Greek Metrics, Analysis of the *Turangalila-Symphonie*, Accentuation in Mozart). Because of this catalogue layout, I have chosen, in the interest of clarity, to restart my footnote numbers at the beginning of each chapter or section.

In spite of the many orthographical errors and the obvious lack of editing by Messiaen, which is attested to in Alain Louvier's "Avant-Propos," I have chosen not to edit or correct the text. I find it a matter of some curiosity that neither Loriod nor the editors at Alphonse Leduc saw fit to make these corrections. It is almost as if this text were so revered that any such corrections would have been considered disrespectful. It seems evident, however, that this text was more of a rough draft than the final copy. Even a quick scan would have revealed at least some of these errors. There are, for example, several instances in which a phrase or sentence is repeated verbatim throughout a section. One specific example of this occurs in the second half of chapter 4, where almost every occurrence of the Hindu term "shakti" is accompanied by its definition, "power of manifestation." Grammatical errors such as sentence fragments abound. Most commonly, these fragments lack only an implied verb. Since they consistently occur at the beginnings of paragraphs or sub-sections, they seem almost as if they were intended as headings. I felt it necessary, however, in the spirit of rendering a faithful translation, to retain these errors in English as Loriod and the French editors retained them in French.

Nevertheless, I felt that some minor editing was necessary to avoid confusion for English-speaking readers. First, where it was necessary to change punctuation to retain correct grammar in English, I have done so and view it as simply part of the translation process. Second, in the case of Messiaen's inconsistent and somewhat confusing heading

style, I have chosen a consistent hierarchy suggested by Kate L. Turabian's *A Manual for Writers*. Third, I have omitted superfluous punctuation such as periods following parenthetical references and dashes at the beginnings of sentences. None of the aforementioned changes affect the content of the volume. They were made for the sole purpose of clarifying the text.

All other clarifications to Messiaen's original text are included in the form of footnotes. First, and most commonly, I have footnoted English translations of French titles found in parenthetical references. Sources which are either originally in English, such as *The Time Machine*, or that have become standardized in English translation, such as biblical verses, have been changed to English within the parenthetical reference to accommodate English-speaking readers. In cases where Messiaen quotes a source originally in a language other than French or English, such as Einstein's theories on Relativity and Mechanical Undulatory or Rilke's poetry, I have consulted the original source, and English translation of the original source, or both in order to render the translation accurately. In these cases, I have also left the title within the parenthetical reference as it appears in Messiaen's original text. Additionally, I have footnoted inconsistencies in the text that might be confusing to the reader. For example, at one point in chapter 2 Messiaen begins enumerating with a, but does not follow with b. Third, I have explained specialized terminology with which the average musician might not be familiar.

Because Messiaen has been recognized as a catalyst for musical evolution in this century, his treatise constitutes a monumental contribution to musicological study. Thus the value of its translation into any language would seem self-evident. With this English translation, I hope to have provided a means of imparting Messiaen's ideas to a larger audience.

OLIVIER MESSIAEN

**TREATISE ON RHYTHM, COLOR,
AND ORNITHOLOGY**

(1949-1992)

in seven volumes

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VOLUME VII	Genesis of Modes – Sound-Color – Analysis of color chords – Tables of Modes and various chords employed by Olivier Messiaen – Succinct analysis of <i>Trois petites Liturgies</i>

PREFACE
by
Pierre Boulez

Olivier Messiaen's recent death has indicated, as if it were necessary, the capital position that he held during his musical life, on both a national and international scale: as composer, quite evidently; as pedagogue of choice; and finally, as organist.

This last activity was the least known, confined as it was to La Trinité church in Paris. Messiaen rarely composed elsewhere, if only to play his own works. However, one can say that this activity has been one of the most solidly anchored points in his musical thought. In his composer's profile, organist is an essential element because it isolates him: one can not see the player, one can only listen. Such is, perhaps, the symbolic image of a Messiaen intervening a little, or not at all, in daily musical life, but offering to us his sonorous world: a world that he has ceased to invent. The isolation to which he was very attached, gave him the necessary distance to reflect and meditate on the essential problems of his art.

The work of a pedagogue, for its part, has always been much more tangible: it was Messiaen's contact with the world. It seems that he had a veritable passion for teaching. He became a professor very early, and remained one for the rest of his life, well beyond the material demands that could at first explain such an ordinary activity. Obviously, right away he smelled the sulfur, and the Messiaen class - a simple class in harmony - at the Conservatoire de Paris in June of 1941, was an exception. I have, personally, never forgotten two lessons: the indispensable historic perspective used to situate musical

language, and the provisional temporal validity of all stages in the evolution of this language. This was discussed and applied to works in an essentially practical fashion, but these two lessons were totally explicit. Furthermore, one does not content oneself with writing a work of harmony, one must compose a work which implies an original idea, a creative evolution.

This action gave meaning to Messiaen the pedagogue. In his analysis classes he attributed a sense of "inventor" to each work. What in traditional pedagogy is often the only accountable activity became here an incitement for discovery. The work studied had less to reveal to the student, than the student had to reveal to himself. It was less an object of entomology than a magic mirror of his future. It is thus that Messiaen, having begun quite modestly – a very small group of students in which I was happy to have taken part – has seen this activity extend far beyond the institution where it was conceived. After the Second World War, the reputation of the pedagogue spread rapidly throughout the world, and invitations came from the most prestigious organizations. Messiaen had formed a large group of composers in whom he had solicited a desire for self-expression and for discovering their own individuality, not a propensity to blindly follow tradition. For this reason, it could sometimes be said, without benevolence, that the pedagogue was more important than the composer.

This, evidently, was not the case. On the contrary, the task of the pedagogue has held the composer in a state of alarm and has kept him in contact with generations more and more distanced from his own, without giving him an opportunity for the ultimate cure, a treatment for rejuvenation. If there were anyone who has obstinately followed his own individual path, it was Messiaen. His work simultaneously manifests a very sensible evolution and a very strong permanence. Like every composer, he was born of history, and his father, whose influence is visible in his early works, was the Debussy of *Pelléas*. His second father was the young Stravinsky of the three grand ballets. Thus already the circumstances from which he was taken were extremely personal. It is impossible to

confound his modal and rhythmic language with that of anyone else. The principal traits are there, and will be forever. One can observe a sort of mutation around the late 1940s and early 1950s. This was, without a doubt, the most experimental period in Messiaen's music. His rhythmic research in particular, which became more and more audacious, and his polyphony – *l'Epode de Chronochromie* – became adventurous and extreme. It was also at this time that bird song affirmed itself as a fundamental component in his musical inspiration. In a period that was behind its time, one can establish a synthesis, voluntary, I think, of different stages of his language. He had then at his disposal varied registers which he served with a flexibility that followed the expressive texture.

Messiaen represents, of course, the French tradition, as much as there is one: harmonic comprehensibility and formal detachment. But, at the same time, this is a very eratic phenomenon in comparison with the clichés that symbolize and limit this tradition. His language has many symbols that converge, thanks to him alone: Greek metrics, Gregorian chant, non-European music, and the aforementioned bird songs. "Pure" sources, "impure" sources, deliberately foreign to a selective aesthetic choice? It would be vain to pose the question in these terms. Messiaen's purpose was to ignore the restrictions of any single culture or material that would be improper for composition. He opened his inspiration to all sonorous events – cultural or not – that could enrich his vocabulary. He surrendered to the most abstract speculations – on time, on duration – at the same time that he observed nature – landscapes, birds – and transmuted this material into an elaborate language. He researched diverse cultures – in time, in space – not to discredit them, but to disengage the traits that could be integrated into his mode of musical expression. Messiaen is a gatherer of very diverse elements, drawn from sources without any connection, and he arrives at giving them the visage of his personality. He does not like restriction; instead he manifests unity.

Writing about Messiaen, I think, at this exact moment, that he has not left many reflections on his compositional method. He published *Technique de mon langage musical*

but, apart from his teaching, he has not exposed his point of view, nor has he commented on his thoughts or works. It is quite astonishing that such a pedagogue has left nothing about himself and his evolution. All this happened, undoubtedly, in direct communication with his students; he found it essentially useless to repeat it in writing. It is with great curiosity that we await this treatise on rhythm about which he has thought for so long, and which he was still writing in the last months of his life; because his reflection on time and duration is one of the most original of our time.

Messiaen the man has left us; but he has left behind a strong, varied body of works that will remain one of the capital landmarks of the second half of the century. The man kept his secret; his work, henceforth, shall proclaim it.

AVANT-PROPOS

by

Alain LOUVIER

Never, perhaps, in the history of Music, has a treatise been so impatiently and so long awaited.

Olivier Messiaen has left us before completely editing his monumental *Traité de Rythme, de Couleur et d'Ornithologie*, his life's work.

His classes in Musical Analysis, for which he achieved worldwide recognition, have certainly contributed greatly – for forty years – to diffusing a large part of his research and theories.

Many of us have noted – as exactly as possible – his "masterful courses": faithful reflections of previously drafted chapters of the future Treatise (which Messiaen ornamented, often at the piano, with brilliant and improvised digressions).

But as strong as our respect, as faithful as our memory, the filter of the oral tradition often alters the original thought. For this reason, there was the great danger of adding our own research to his message.

A rare example of a capital theoretic work, already well known, evolving even before having been published...

Providence guarded (Messiaen believed...). Her name was Yvonne Loriod, his wife and irreplaceable interpreter, who had been one of his first students and had assisted him on innumerable occasions.

Thus, when Messiaen notated bird songs (directly into musical notation...), Yvonne Loriod accompanied him while transcribing them, permitting thus a second notation, more

precise, but perhaps less poetic, without the landscapes, flowers, colors, or indeed the smells noted by Messiaen in Nature.

Yvonne Loriod was among his early followers (who named themselves "les flèches")¹ who took his private course in Musical Analysis from 1945 to 1948. The class was taught in the parlor of a "companion of captivity," the egyptologist Guy-Bernard Delapierre. Soon after, Claude Delvincourt officially entrusted the already celebrated Olivier Messiaen with a class in Analysis at the Paris Conservatory (which, by the way, became a class in Composition)...

We know the international consequences of this "Messiaen class" that decided on the vocation, the trajectory, and sometimes even the language of so many composers of all generations...

The influence of composer-theorist Messiaen on the Music of the second half of the twentieth-century, is today solidly established. It has entered into History.

Since *Technique de mon langage musical* (1943) Messiaen had not published any theoretic writings, with the possible exceptions of "Conference in Brussels" (1958), "Conference in Notre-Dame" (1977), and the "Conference in Kyoto," written for Kyoto in 1985 when he declined the Prix Inamori.

Another exception is his analysis of the Mozart piano concertos (which will be included in Volume IV of the treatise) and the well known analyses of his own works that he edited for record jackets.

Out of respect for her husband, the treatise, which was written between 1948 and 1992, has been put in order by Yvonne Loriod. She has rigorously followed the seven volume format indicated by Messiaen in 1991. Assembling the chapters which were drafted during very diverse periods of Messiaen's life, she has even remained faithful to the presentation of the manuscript (paragraphs, sub-chapters, underlined terms, etc...). She wanted neither to compile nor to summarize, preferring to risk certain repetitions.

¹ the arrows

We can only approve and thank her, in the name of future generations, for this task which only she could accomplish.

Upon reading this Treatise, one can only marvel at the genius of Olivier Messiaen. He was a universal spirit, curious about everything, who brings to our ending century a great breath of the Divine.

This work contains the spirit of the Renaissance, of a Leonardo da Vinci freed from the worries of pleasing Princes, and of rhythmic inventions that disdain passing fancies in favor of glorifying God, Nature, Time, and Space.

A Leonardo da Vinci having banished warlike inventions, where birds have replaced flying machines, and the subtle mystery of sound-colors that of an enigmatic smile... Olivier Messiaen's universalism was admired by all his students. Not only did he open doors – as far as they were obstinately closed in official programs – on the Middle Ages, Antiquity, India, and Japan, but he created a new place for Music within the confluence of a new *Quadrivium*, at the center of a constellation of the Arts and Sciences of Knowledge: Mathematics, Physics, Cosmology, Acoustics, human and animal Physiology (of which Ornithology is the crux), but also of Poetry, Philosophy, theories of Movement, and of Color, etc...

These innumerable sciences are such that no man today can embrace them all. Messiaen wanted to know them in order to establish a correspondence with his Music: a correspondence that can be found often in surprising, strange and genial bridges that pass our habitual intuitions.

In this constellation where Music (the most excellent Art/Science) is the natural gravitational center, Messiaen alternately throws multiple glances at the Humanist and the Believer, asking such a Saint as Thomas d'Aquin with amazed sincerity, for Time and Space to meet the Seal of God: supreme light, inexpressible colors and sounds.

But now, for the first time in the history of Western Music, he affirms with conviction:

"in the Beginning there was Rhythm"

VOLUME I

At the beginning of all Music, Rhythm.

The first volume, then and there, states the essence of the Treatise.

Beyond his admirable research on Greek and Hindu rhythms, Messiaen shares with us, throughout the entire first volume, his "Rhythmic uneasiness" which became contagious in all of his students. But, doubtlessly, what he must have admired most is the intrusion of notions as extraordinary as Eternity itself into his musical thought: "uncreated present" in opposition with "created Time," or again the "rhythmic orders" defined in chapter 2, that derive all other musical parameters from rhythm.

Time is the essential framework that Messiaen fills with a thousand colors (*Chronochromie* is a revealing title...) or bird songs.

How can we not admire this strange correspondence with Çarngadeva, the author of the *Deçi-Tâlas* and of *Samgita-Ratnakara*, *Océan de la Musique*... Messiaen, who declares that he intuitively used the principles of Hindu rhythm before even knowing them, speaks, beyond the centuries with Çarngadeva, *poet-musician-rhythmicist-theorist*.... a universal spirit that could not be qualified in a single word.

Beyond the fascinating modernism of these ideas, the reader will appreciate the elegance of style, uniting poetry with exactitude... The work of a man with an immensely cultural background, son of a writer and a poetess, this *Traité de Rythme, de Couleur et d'Ornithologie* unites scientific precision with the sometimes surrealistic fantasy of the author of *Cinq Rechants*.

Alain LOUVIER

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- N. B. Olivier Messiaen has taken examples only from certain works. So as not to extend this first volume, his wife has only given a few discrete passages even though O. Messiaen used Hindu rhythms in all of his works. Complete analyses by the Author are included in the treatise: *TURANGALILÂ-SYMPHONIE* (volume II) – *QUATRE ÉTUDES DE RYTHME, LIVRE D'ORGUE, CHRONOCHROMIE* (volume III) – *MESSE DE LA PENTECÔTE* (volume IV) – *SEPT HAÏKAÏ* (volume V).

CHAPTER I

TIME

- A) Time and Eternity
- B) Philosophy of duration: true duration, structured time
- C) The Facts of Science: biological time, relative time
- D) Superimposed Time:
 - 1) Time and change
 - 2) The expansion of the universe
 - 3) Time and the stars
 - 4) Distance of the stars in relation to the earth
 - 5) Movement of the stars
 - 6) Relativity of stellar events
 - 7) Time and mountains
 - 8) Time and man
 - 9) Time and microphysics
 - Intermittance by varied rotation
- E) Bergsonian Time, and musical rhythm

A) TIME AND ETERNITY

"Eternity is all-encompassing simultaneity, and in time there is a before and an after." (Saint Thomas, *Somme Théologique*, "De l'éternité de Dieu," article 4.)¹

Time is not, as we have come to believe, a part of Eternity; Time neither includes nor extends Eternity. Time and eternity are two completely different measures of duration. "Suffice it to recognize," says Saint Thomas, "what time and eternity measure." (Saint Thomas, "De l'éternité de Dieu," *Somme Théologique*, article 4.) Time is the measure of creation, eternity is God himself. Eternity is indivisible like God is indivisible. Time is not a finite length that enters into an infinite length (eternity): it is continuous in the face of the indivisible (God). "Time responds to movement and eternity stays the same." (id.) A moment in time offers itself to the spirit like a numbered movement: eternity conceives itself as the unity of an immutable Being." (St Thomas, *Commentaires sur la Physique d'Aristote*.)² Moreover, "time measures not only that which effectively changes, but also repose: the state of a being that is born to move but does not." (Saint Thomas, "De l'éternité de Dieu," *Somme Théologique*, article 4.)

"It is manifest," Saint Thomas states again, "that time and eternity are not the same thing. Some have claimed that the cause for this difference lies in the idea that eternity has neither a beginning nor an end, whereas time has both a beginning and an end. Therefore,

¹*Theological Sum*, "Of God's eternity."

²*Commentary on the Physics of Aristotle*.

this difference is accidental and non-essential; because, to suppose that time has always been and that it must have always been, there would no longer be a difference between time and eternity. Eternity is simultaneity. That which does not agree with time (eternity) is the measure of a permanent being. Time is the measure of movement itself."

One thing remains as far as being is concerned. Alone, God is identical to his being, and by the same token, identical to his eternity. To speak of an immutable and indivisible present is to speak of Eternity, and to speak of Eternity is to affirm the existence of God. Again Saint Thomas states,

The notion of eternity follows the notion of immutability, as the notion of time follows that of movement. Just as God is sovereignly immutable, he also sovereignly belongs to eternity. But he is not only eternal, he is his own eternity, so that nothing else can share his endurance, because there is nothing else that can be him. God, on the contrary, is his permanent and uniform being; and this is why, as he is his own essence, he is also his own eternity. (Saint Thomas, "De l'éternité et Dieu," *Somme Théologique*, article 2.)

We know that the angels live in the aevum, that is the intermediary between time and eternity. Time – aevum – eternity: Saint Thomas distinguishes them and situates them very neatly: "Time implies a succession of before and after; the aevum has no before and after, but it does have the condition of successive duration which can be joined to the same succession implied by time. Eternity has no succession and serves neither time nor the aevum nor anything else." (id. article 5) Anteriority and posteriority are the essential conditions of time; they can exist in the aevum. They do not exist in that which is stable, uniform, indivisible. This is to say, they do not exist in eternity: "*eternity is all-encompassing simultaneity.*" (id. article 4)

Periodic changes, through the alternation of two events, (the first never being identical, but similar) characterize human time. Ecclesiastes explains this change in a gripping fashion:

For everything there is a season, and a time for every matter under heaven: a time to be born, and a time to die; a time to plant, and a time to pluck up what is planted; a time to kill, and a time to heal, a time to break down, and a time to build up; a time to weep, and a time to laugh; a time to mourn, and a time to dance; a time to cast away stones, and a time to gather stones together; a time to embrace, and a time to refrain from embracing; a time to seek, and a time to lose; a time to keep, and a time to cast

away; a time to rend and a time sew; a time to keep silence, and a time to speak; a time to love, and a time to hate; a time for war, and a time for peace. (Eccles. 3: 1-8.)

This time, in which we live, must one day come to an end. At this terrible, unheard-of moment, the chosen ones – as the angels – will be able to participate, to a certain extent, in eternity. Saint John has described to us the announcement of the end of Time, in one of the most marvelous visions of his Revelation:

I saw a mighty angel coming down from heaven, enveloped by a cloud, with a rainbow over his head; his face was like the sun, and his legs like fiery pillars. Having set his right foot on the sea and his left foot on the land, he cried forth in a voice as strong as a lion's roar. And when he had finished his cry, the seven thunders were made to sound their voices. And the angel who I saw standing on the sea and the earth, lifted up his right hand to heaven, and swore by Him who lives for ever and ever, who created the heavens and all things therein, the earth and all things therein, the sea and all things therein, saying: *There will no longer be Time* – but on the day when the seventh angel will sound the trumpet call, the mystery of God will be fulfilled. (Rev. 10: 1-7.)

In conclusion, several Biblical Texts that deal with eternity:

Before the mountains were brought forth, or the earth and the world were formed, from everlasting to everlasting thou art God. Thou turnest man back to dust and sayest, "Turn back, O children of men!" For a thousand years in thy sight are but as yesterday when it is past, or as a watch in the night. (Psalm 90: 1-4.)

"From everlasting to everlasting" is a poetic way of expressing that which has no beginning and no end. It is in the same vein that Saint John writes: "In the beginning was the Word," signifying the Divine Word where the Son of God exists eternally because the Father has created him above all beginning, outside of all beginning. On the subject of this beginning without beginning, one can again cite a verse from the sacerdotal Prayer of Christ, one of the most solemn of all the Saints Writings: "And now Father, glorify thou me in thine own presence with the glory which I had with thee before the world was made." (Jn 17: 5.)

Essentially, it is necessary to remember that the absence of beginning and end, as evident as it may be, is not the highest priority of Eternity. Saint Thomas taught us this right from the beginning: eternity knows not before and after, it is immutable, indivisible, all encompassing simultaneity. Eternity is God himself. The "Book of Wisdom," speaking of the Wisdom that is the Son and God, says quite rightly: "Staying the same, it renews all

things." (Book of Wisdom 8: 27) And Christ, the incarnate Son of God, affirms his divinity again with more force, in attributing a present with neither past nor future, a unique present that belongs only to God: "Truly, truly, I say to you, before Abraham was, *I am*." (Jn 8: 58.)

B) PHILOSOPHY OF DURATION (True Duration, Structured Time)

Time and Space are intimately linked. Their perception is of considerable importance to the formation of the human spirit. They are both intellectual instruments which allow us a sensible construction of the world. For the musician and the rhythmicist, the perception of time is the source of all music and of all rhythm. A musician is inevitably a rhythmicist; if not he does not merit the title of musician. If he is a rhythmicist, he must refine his sense of rhythm by a more intimate knowledge of true time, by the study of different concepts of time and of different rhythmic styles. Bergson pretends that duration is an "inherent trait of consciousness;" it is the title of his first book. In fact, duration presents itself to us with fluctuations of tempo, changes of rapidity: it is true duration, heterogeneous duration, of which appreciation depends essentially on the number of exterior and interior events that are fulfilled for each one of us, in the present and in the past. Abstract time or structured time arises in the face of true duration. True duration is not measurable. True duration is changing. All perception remains, but this first duration is so far from time in its literal sense that it can not acquaint us with its true nature. True time is confused with the succession of our states of consciousness.

Pure consciousness does not perceive time as a sum of durational unities; but a sentiment that would last half as long, for example, would not be the same sentiment. It would lack, at this state of consciousness, a multitude of impressions that have come to enrich and modify its nature. Pure duration is only a succession of qualitative changes that establish, penetrate, without precise contours, without any tendency to reveal them to each other, without any relationship with the number: it is pure heterogeneity. (Bergson. *Données immédiates*. 147, 77)³

³Messiaen abbreviates this title in its first appearance. The full title, *Donnés immédiates de la conscience (Inherent Traits of Consciousness)* appears later.

True time depends also on biological time. The rhythms of our organic life – heartbeats, respiration, chemical reactions of the human body – influence our sense of duration. Finally, our appreciation of duration depends essentially upon the number of physiological events that are desired and executed by us (actions), and the exterior events acting on us (shocks). The tempo of duration changes as long as these events are anterior or actual. Consequence: two laws that perfectly summarize true time:

- a) *Sense of present duration* Law: in the present, the more time is filled with events, the shorter it seems to us – the more it is void of events, the longer it seems to us.
- b) *Retrospective appreciation of the past* Inverse of the preceding law: in the past, the more time was filled with events, the longer it seems to us now – the more it was void of events, the shorter it seems to us now.

If we address the present, it is evident that waiting and inaction create a void which slows the passage of time. On the contrary, joy, work, and all that occupies us and captivates our attention speeds the passage of time. If we address the past, the memory creates a mirror and reverses this sense of speed – an empty period only leaves in us a vague memory, without particulars, without images that invade thought, a memory without interest. Even if, according to the clock, it has been very long, retrospectively, it seems short to us. On the contrary, a period filled with events of all kinds (physical and psychological labors, emotional shocks, aesthetic shocks, accomplished or avoided actions), seems long and even very long if these events have been numerous, and its rate of time expands or contracts in proportion to the number of memories that it leaves with us.

I will resume and comment in more detail on these two laws in the paragraph on "Superimposed time," and will rely on the authority of Doctor Alexis Carrel on the subject of physiological and psychological time. I will give them a corollary in musical time: *the law of the attack-duration rapport*, relying again on the experience of two eminent philosopher-musicologists: André Souris and Gisèle Brelet.

For each child, the construction of time is a slow and progressive task. (Each child constructs time slowly and progressively.) Little by little it orders his own actions. Then it orders the actions of others, and the exterior events of his short history and small universe. Much later, he will be able to represent a succession of events which he could not at first directly perceive, and which are situated very far from him in time and space, or are completely foreign to him.

We divide time into three moments: past, present, future. It is almost impossible to divine the present: each punctual instant is charged with past and future: a succession of punctual instants is a perpetual mix of past and future. "The limits of the present are very uncertain," says Armand Cuvillier. "It envelops at once an echo of what has just occurred and an announcement or expectation of what is to come." It returns almost to say that the present does not exist. With the consequences of past experience, however, the punctual instant offers value to our action – a possible surprise at or resistance of the future. Armand Cuvillier distinguishes three pasts and three futures: the recent past, the immediate future, the distant past and the distant future, and the very distant past and future. The recent past is differentiated from the other past forms by its emotional character. The distant past is the true past; one can qualify it with Cuvillier's "hardened reality," we reconstruct it with the help of memories, but it is impossible for us to ever change it: what has been has been. If we have played a guilty role therein, it remains with us in the form of remorse. Most often, it appears to us in a halo of sweet light in which we evolve transfigured and idealized. It incites in us a nostalgic memory or a regret of that which no longer exists.

We are detached from the very distant past in the form of a falling corpse: we quite justly speak of extinct civilizations and of dead languages. The immediate future is a continuation of present action or actual desire. The distant future is the true future. The past incites regret or remorse; the future creates expectation. But because we often ignore that which will be, this future allows for all the fantasies of imagination.

Such intense pleasure comes from hope because the future appears to us at the same time in a multitude of equally smiling, equally possible forms. Even if the most desired

of these forms is realized, we must sacrifice the others, and we will have lost much. The idea of the future, filled with infinite possibilities, is then more fertile than the future itself, and this is why we find more charm in hope than in possession, in dream than in reality. (Bergson, 7.)

We cannot change the past: we have some power over the future. Guyau has said (with much exaggeration): "The future does not comes to us; we go toward it." (Guyau, "La genèse de l'idée de temps")⁴ Of the three moments of time, the future is certainly the most important because it is the future that clarifies and explains the other two. It is the future that directs the present; it is the future that excuses or approves the past. As for the very distant future, we either absolutely ignore it, or it comes in the form of pure knowledge as a given of science or Faith: the end of our planet, the life of the glorious corpse, or quite simply the hour of our death.

To terminate this brief study of Time and Duration, here is a synoptic table containing the different qualities of each. I am borrowing the terms from the philosopher Armand Cuvillier. To the left are the qualities of true time; to the right are the qualities of abstract time or structured time. Time and Duration: two synonymous words, often used in place of one another. Philosophers quite violently oppose this by establishing structured time as almost the opposite of True Duration. The table below eloquently manifests this opposition.

<u>True Duration</u>	<u>Structured Time</u>
<i>Duration is concrete.</i> (evaluated by its relation to us – it becomes confused with the succession of our states of consciousness)	<i>Time is abstract.</i> (an empty framework, in which we reenter the world and ourselves)
<i>Duration is heterogeneous.</i> (sometimes fast, sometimes slow – with a thousand nuances of tempo, a prodigious variety of slows and fasts)	<i>Time is homogenous.</i> (all its parts are identical)
<i>Duration is qualitative.</i> (dependent upon our nature – immeasurable)	<i>Time is quantitative.</i> (measurable, numbered – relative to the phenomena which serve its measure: if these phenomena change, our structuring of tempo changes with them)

⁴The Genesis of the Idea of Time.

Duration is subjective.
(within us)

Time is objective.
(outside of us)

C) GIVENS OF SCIENCE (Biological Time, Relative Time)

1) Biological Time

A child of 10 heals a 20 square cm wound in 20 days; a man of 20 will heal a similarly sized wound in 31 days; a man of 30, in 41 days; a man of 40, in 55 days; a man of 50, in 78 days; a man of 60, in 100 days. A wounded 50 year old heals then almost twice as slowly as a wounded 20 year old, and a 10 year old child heals five times more quickly than a 60 year old man. Now, what happens to a wound that heals? It effects a change. Just as a mason fills a hole in a wall, nature will repair a hole in our organism. When we measure the speed at which this task is accomplished in stellar time, we observe that it is quite fast in childhood, and slower in the middle and at the end of life. Therefore, at different ages, time must be different to accomplish the same task – the healing of a similarly sized wound... Aside from this, aging introduces chemical modifications into our organism which, in effect, progressively increase the toxicity of our blood – a mirror of our physiological reactions. Thus aging produces an accumulation of toxic elements in our moods. The more toxic the blood becomes within the tissues, the more we age, and the more slowly we heal. This biological fact indicates that the passing of each year leaves its indelible mark, just as each turn of an automobile's wheel registers a sum which equals the addition of all past sums. The recording of elapsed time is made by a passive, subconscious, physio-chemical, or chemical memory that is merely a different expression of our aging and constitutes the basis for our notion of duration. (Lecompte du Noüy, *Le Temps et la Vie*, 232-234, 240, 246-248.)⁵

Now, what does our subconscious tell us? The older we become, the more quickly time passes. And it is not an illusion: the passage of physiological time is slower in children than it is in the elderly. There is, then, an inverse relationship between the speed of healing wounds and the awareness of elapsed time: elapsed time appears to be as much slower as the organic task is faster, as much faster as the organic task is slower. In effect, in the course of the same stellar duration, there is much more organic work in the child than in the elderly person, thus his own time is longer than that of the elderly person. If we consider the child and the elderly person in the same cosmic time, their blood heals the wound at a rapid tempo in the former, a slow tempo in the latter. If we consider the child and the elderly person in their own interior times, their blood heals the wound at the same tempo, but the interior time of the child is longer than that of the elderly person. The rhythm is the same in both, but is executed in a different tempo within the same cosmic time, in the same

⁵Time and Life.

tempo within a different interior time. This is why young and old, living side by side, understand each other so poorly: on the outside, by the same clock hour, they do not obey the same orchestra conductor (the same blood) – on the inside, they live in closed worlds, each one possessing a particular time, regulated by a biological clock (changes in the blood).

2) Relative Time

The classic notions of Space and Time can be outlined as follows: a) space is a homogenous middle ground, infinite, in three dimensions: it is absolute space, Euclidean Space – b) time, or the rapidity of movements, passes uniformly, and it would pass that way even if there were not any movement: it is absolute time, Newtonian time. The theory of Relativity has substituted for these two notions of *Space-Time*. Space-Time is a quadridimensional middle ground, a *field* where the coordinates of space and time are interdependent. The field is "the set of physical properties which characterize, at each instant, the diverse points of space, and which expresses itself by the functions of these coordinates of space and time." (Louis de Broglie)

The whole theory of Relativity is derived from the following principal, posed by Einstein in 1905:

Principal of limited Relativity: "In relation to one another, physical phenomena moving at equal velocity have the same duration for observers." In 1911, Einstein enlarged his original conception by extending it to uniformly varied movement, and created, in the same stroke, *General relativity*.

Let us situate an event: we must have four parameters: on the one hand the three dimensions of space, on the other hand, time (noting that time is not a fourth dimension of space). "The projector is filled with events, and to fix an event, it is necessary to know four quantities: three spatial coordinates (for example at what distances the walls of this room cross each other, in three perpendicular directions) and a fourth coordinate, the *instant* when it crosses itself." (Langevin) Between two events, there is an absolute spatio-

temporal relationship. The event situates itself at a point in space-time, in other words, "in a determined location at a determined instant." (Eddington) In space-time, there is a *generalized distance* between two events, of which the spatial and temporal distances are particular components. This spatio-temporal distance is the *interval* between the two events.

Space-Time carries our attention to the events in the middle of four coordinates: three of space and one of time. Space-time does not decompose in an absolute fashion in space and time: the appearances vary with the point of observation just as the perspective of a countryside varies according to one's point of view. The observer, at each instant of his own time, makes a pocket of space in space-time. Two events that figure in the same pocket are simultaneous for him. But these events no longer figure in the same pocket for a second observer having his own separate time: for this last observer, they are not simultaneous. (Paul Couderc, *la Relativité*, 44.)⁶

Relativity has shown that our measures of time and space are not independent: time is not absolute, its measure depends upon the relative movements in space, just as, to the observer, measures of distance depend on their own times. Relativity ends in an intimate fusion of space and time, Space-Time, of which the components are relative to space and relative to time. (id. 17.)

In addition, "in Space-Time, the *speed of invariant light* (300,000 km per second), plays a fundamental role; this is a new absolute." (id. 18.)

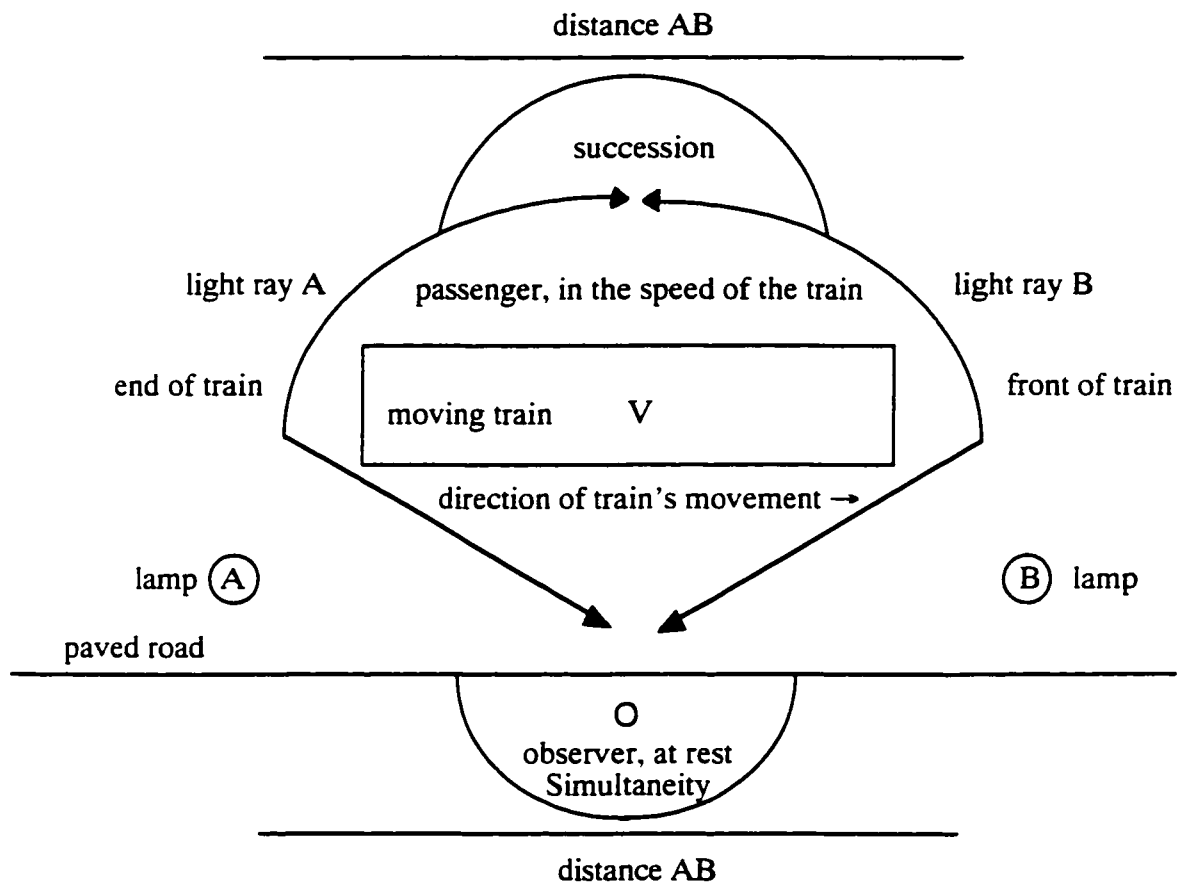
I am borrowing this first example of Relative Time from Einstein himself. This example has been reproduced with diverse arguments among those who popularized the theory of Relativity. The best and the simplest of these presentations is that of Paul Couderc. Here it is:

Let us consider a Universe opposed to instantaneous transmissions, where light would be the quickest agent of information. Event A will be the emission of a brief luminous signal from lamp A. Lamp B, situated at the distance AB from the first, is also able to emit brief flashes. Observer O is placed in the middle of AB and looks at both lamps at once, in two facing mirrors for example. If he perceives the flashes from both A and B together, he declares them simultaneous. This means of establishing simultaneity constitutes the definition itself of simultaneity in the observable Universe. Lamps A and B, at the edge of a railroad line, are lighted by the train's passing: B lights when the train engine arrives at B, while A lights when the train line passes A. In our experience, observer O, installed at the edge of the line, perceives the two lights simultaneously. Incidentally, he is going to conclude that the length of the moving train is equal to the distance AB of the two fixed lamps. Let us now consider a traveler V, equipped also with a double mirror, and seated in the middle of the train. The lights are placed at the head of and in line with his train, he is in the middle: his mirror is going to show him if A and B are simultaneous. Now the train brings V to meet the light issued from B, while

⁶*Relativity*.

he moves away from the light which came from A. The traveler sees at first light B, then light A. For him, B precedes A: the events are not simultaneous. Traveler V will otherwise maintain that the length of his train is greater than the distance AB of the fixed lamps (since the head of his train has passed B before the line had crossed A). Conclusion: in a Universe deprived of infinite speeds, simultaneity is not absolute, therefore time is not absolute. Observers moving in relation to each other attribute the different durations to a same phenomena, otherwise their measures of length will be discordant. Time and space in this Universe have a relative character. (Paul Couderc, *la Relativité*, 41,42.)

A little drawing will facilitate comprehension of this first example:



One of my students, to whom I was explaining this example said to me naïvely, "I understand perfectly. There are two times: that of observer O and that of traveler V. Which one of these two times is real time?"

"There," I responded, "is the question that must not be asked. O and V are not going the same speed: they measure the times that are real for them. There is no real time: there is a plurality of proper times."

"The definition of time, or more exactly of the simultaneity of the diverse points of space, is thus *relative*. " (Emile Borel, *L'Espace et le Temps*, 134.)⁷

A second example that is as celebrated as the first, the story of Langevin's traveler:

This traveler leaves the earth at a speed slower than the speed of light by a ratio of 1/20,000. He journeys for one year, turns around, and returns at the end of *two years* in his own time, time measured by the clocks in his machine. Upon landing, he finds the earth aged by *two centuries*, inhabited by generations unknown at the time of his departure. (Paul Couderc, *La Relativité*, 64.)

Langevin's traveler's machine contains excellent clocks that all work as well as earth's clocks: I have said *in relation*. In classic physics it was thought that clocks have the same tempo as the speed of the mobile unit on which they were placed. "If the speed of light is the same in all the systems of coordinates, we must sacrifice this supposition." (Albert Einstein and Léopold Infeld, *L'Evolution des idées en physique*, p. 183)⁸ By adding once again that the change of tempo exists only in comparing the speed of the mobile units: the differences of tempo are *relative*.

If we compare the two examples above, we find that in the first (Einstein's two observers, one on the paved road, the other in the moving train), a slightly greater speed (that of the train) has slowly lengthened time for the one situated in the mobile unit. In the second (Langevin's traveler), a much greater speed (that of a machine almost as fast as light) has shortened time considerably for the one situated in the mobile unit. This comparison seems full of diverse and abundant instructions and discoveries for the musician-rhythmicist... Let us repeat again that the lengthening or the shortening of time itself is relative... There is no real time. It is the comparison of true time itself with the true time of our terrestrial clocks that leads us to utilize the terms lengthening and shortening: they remain relative to each other.

⁷*Space and Time.*

⁸*The Evolution of Ideas in Physics.*

D) SUPERIMPOSED TIMES

1) Time and Change

Three notions: movement, space, time

The notion of space cannot be isolated from the other two, and the notion of movement is equally inseparable from the notions of space and time. We know space only by measuring it; it is by movement that we make this measurement; and we use time and space to measure movement. We can, however, define time outside of the space and abstraction found with movement, we can elevate ourselves to the conception of absolute time. Time measures the duration of all that is changing; *it implies only change*. For us, a practical evaluation would involve the movement of the stars. But it would still exist if there were no longer stars, nor even space: provided that some changeable being existed. (The geologist Pierre Termier, *A la Gloire de la Terre*, 409, 410.)⁹

2) The Expansion of the Universe

Only intergalactic distances are capable of expansion. The galaxies are unaltered, and all the lesser systems – star clusters, single stars, human observers, atoms – completely escape expansion. If the Universe were as condensed as imagination deems possible, in other words, if the protons that compose it were touching each other, its total volume would hardly extend beyond Mars' orbit. It is this state that invokes the Lenàître Canon in his last works and, for him, this uniquely condensed state would be analogous to the super-radioactivity that causes expansion in a neutron. If the existence of a hyperdense state in the Universe's past were to become more and more certain, it would be very difficult to describe this state where the notions of space, time, and matter change position in a worthwhile fashion. (Paul Couderc, *Expansion de l'Univers*, 178, 179.)¹⁰

3) Stellar Time

If it is true to say that there is not a common measure between historic or prehistoric durations and geological durations, it is even truer when it is a question of comparing cosmic durations to these others!... When we arrive at forming an idea of antiquity concerning our little solar system from its origin up to the present, we find ourselves again powerless when faced with the problem of the antiquity of the stars. Perhaps there is the same rapport between the age of the sun and the age of the Big Dipper that enters into the duration of an insect, a flower, or the mountains. (Termier, *À la gloire de la Terre*, 440, 441.)

4) Distance of the Stars from the Earth

A spaceship traveling at a speed of 15 kilometers per second, would reach the star Proxima Centauri (which orbits at 3.66 light-years from our solar system) at the end of 73,000 years!... Sirius¹¹ is at a distance of 81 trillion kilometers. The light takes more than 29 years to travel the 280 trillion kilometers that separate us from Vega, the brightest star of the Lyra constellation. Aldebaran orbits at 46 light-years. (Abbé Moreux, *A travers les espaces célestes*, 55.)¹²

⁹*For the Glory of the Earth.*

¹⁰*The Expansion of the Universe.*

¹¹Sirius, or Sirius du Grand Chien, is also known as the Dog Star in English.

¹²*Through Celestial Space.*

5) Movements of the Stars Themselves

The average speed of the stars is close to 35 kilometers per second. Certain stars travel at fantastic speeds: let us cite 1830 from the catalogue of Groombridge (241 km/sec.); 15290 Lalande (331 km.) and finally, *Arcturus*: this sun, situated approximately 125 light-years away, travels at a frightening speed of 413 kilometers per second! (Moreux, 73, 74.)

Age of the Stars:

Shapley considers two extreme global masses – the nearest to us, at 20,000 light-years – and the farthest, at approximately a million light-years, and finds no difference in their stellar composition: same proportion of different types of giants, same concentration. As a result, they are at nearly the same stage of their evolution, the same age. And yet one is close to a million years older than the other. This proves that the lapse of a million years time is relatively negligible to the duration of stellar evolution. (Téo Varlet, *Astronomie*, 235.)

6) Relativity of Stellar Events

That which we see (in our Universe) does not correspond at all to reality. The phenomena that we observe are not at all contemporary in much the same way that the stars do not occupy the reciprocal positions where they appear to be situated in relation to each other: for each one of them, in effect, their image is brought to us by light that has not existed for a very long time. Thus the luminous rays that our eyes are exposed to today are in motion, some for several years, others for several centuries, or even longer. The sudden burst of a star in time that will brighten this evening, tomorrow, or after, is an event much older than any other phenomenon contemplated at the end of the last century! (Rudaux, *Astronomie*, 241.)

7) Geological Time

It is important to remark that in geology the words *slow* and *fast*, do not have precise significance; they simply indicate the disproportionate speeds of the flux that measures duration. In the formation of the Alps, for example, which embraced several geological periods and which is comprised of a chain of unimaginably long mutations, there has almost certainly been the intervention of rapid episodes, which, by contrast, we are tempted to call fast and that appear to us to have the allures of catastrophe. Many of these episodes have perhaps endured, all in all, as long as humanity will have endured. Another, more rapid still, and that seems to us like lightning, will be contained in the same interval of time as a human life. These are fugitive scenes, angrily played in an enormous drama, monotonous and interminable. (Termier, *À la gloire de la Terre*, 428.)

8) Human Time (Physiological Time – Psychological Time)

The lifetime of a human being, just like his size, varies according to the unit that measures him. It is very long if we compare ourselves to mice or butterflies, very short in relation to the life of an oak, and insignificant when it is placed within the historical framework of the earth. We measure it by the movement of clock hands on the surface of its dial. It is then evaluated in units of solar time; and it encompasses approximately twenty-five thousand days. (Doctor Alexis Carrel, *L'homme, cet inconnu*, 189.)¹³

¹³Man, that unknown.

Man is an average being, he is situated midway between the atom and the star. Here is a table of the scale of durations, going from extremely long to extremely short: it begins with the age of the galaxies (immense, frightful duration, so extended that we must make a great effort to think and express it), passes through the life of thorium, the solidification of the earth, the rotation of the milky way, human life, the perception threshold of durations and sounds, the life of an active atom, to end at the wave associated with the proton (a duration so infinitesimal that it may no longer even be possible to apply the notion of time). (See Marcel Boll, *The Two Infinities*, 17.) In principle, the threshold of the temporal perceptions of man is close to a tenth of a second, if the duration reaches us by way of sound. The eye perceives intense light fifty times more quickly because our minds cannot evaluate their real duration.

Time, even though distinct from space, is inseparable from it, on the surface of the earth as in the rest of the Universe, for the biologist as well as for the physician. In nature, in effect, time is always observed as unified with space. No concrete thing possesses only three spatial dimensions. A rock, a tree, a man can not be instantaneous. (Carrel, 190-191.)

There is no difference between Time and any of the three dimensions of Space, except that our consciousness moves along this fourth dimension (Time), from the beginning to the end of our lives....Here is a portrait of a man at eight years old, another at fifteen, another at seventeen, another at twenty-three, and so on. All these are evidently sections, as it were, Three-Dimensional representations of his Four-Dimensional being, which is a fixed and unalterable thing. (H.G. Wells, *The Time Machine*, 10-11.)

I must cite, parenthetically, a curious episode from *The Time Machine*, the novel by Wells from which the preceding lines were extracted. I am sure it will interest all musicians, all rhythmicists, and all those who are passionate for the fourth dimension. The explorer of Time, the hero of the book, has created a machine that permits him to travel through Time. He leaves for the future, where he lives out mysterious adventures, horrible or touching, in the middle of a degenerated humanity, divided into two races: the puerile and charming Eloïs, who weave garlands of flowers to the sun and the foul and subterranean Morlocks, ancient slaves, who eat the Eloïs during the night. The story is happily brightened by the love-friendship of Weena, a fragile and touching woman-child.

After the death of Weena, he goes even farther into the future, and stops on a deserted beach. Earth is at rest, in continual twilight. The tideless ocean resurfaces on the banks of a thick incrustation of salt. Let us now listen to the Time traveler:

I felt a tickling on my cheek as though a fly had lighted there. I tried to brush it away with my hand, but in a moment it returned, and almost immediately came another by my ear. I struck at this, and caught something threadlike. It was drawn swiftly out of my hand. With a frightful qualm, I turned, and saw that I had grasped the antenna of another monster crab that stood just behind me. Its evil eyes were wriggling under their stalks, its mouth was all alive with appetite, and its vast ungainly claws, smeared with an algal slime, were descending upon me. In a moment, my hand was on the lever and *I had placed a month between myself and these monsters.* (H. G. Wells, *The Time Machine*, 83.)

This nightmare vision, and this duel between two excerpts of time, has always seemed very instructive to me. For the musician too duration is an arm by which he attacks and convinces his listener – and the singular power that he has to devise many different styles remains, to my eyes, the highest prerogative.

Interior time is the expression of the body's activities and changes during the course of life. It is equivalent to the uninterrupted succession of structural, humorous, physiological and mental states that constitute our personality.... We are then obliged to divide interior time into the physiological and the psychological. (Carrel, *L'homme, cet inconnu*, 194.)

a) Physiological Time

Physiological time is a fixed dimension, made up of the series of all the organic modifications that occur in the human body, from the moment of conception until death. It can also be thought of as a movement, like the successive states that construct our fourth dimension under the eyes of the observer. Among these states, some are rhythmic and reversible, such as the pulsations of the heart, the contraction of muscles, the movements of the stomach and intestines, and the secretions of digestive glands. Others are progressive and irreversible, such as the loss of elasticity in the skin, the graying of hair, the increase of red blood cells and the hardening of tissues and arteries. The rhythmic and reversible movements are equally altered during the course of life. They also undergo, a progressive and irreversible change. And at the same time, the constitution of moods and tissues changes. It is this complex movement that is physiological time. (id. 194, 195.)

b) Psychological Time

The other aspect of interior time is psychological time. Our consciousness registers not physical time, but its own movement, the series of its conscious states, under the influence of the stimuli that come to it from the outside world. Time is the fabric itself of psychological life. Mental duration is not an instant that replaces an instant. It is the continual progression of the past. Thanks to memory, the past piles up on itself. It automatically conserves itself. All-inclusive, it follows us at each instant. Undoubtedly, we only think with a small part of our past. But it is with our all-inclusive past that we desire, want, act. We are a history. And the richness of that history expresses the richness of our interior life before we die. We sense obscurely that we are not identical today to what we were yesterday. It seems to us also that the days pass more and more quickly. But none of these changes is precise enough, nor constant enough to be measured. The intrinsic movement of our conscience is indefinable. Otherwise, we would say that it does not interest all mental functions. There are some that are not modified by duration. (id. 195, 196.)

Different Perceptions of Time Following Age

The minutes, the hours, the years are different for each individual and for each period in the life of the individual. One year is longer during childhood, much shorter during old age. It has a different value for a child than for his parents. It is much more precious for him than for them, because it contains more temporal unity with his own life... The days of our childhood seem to us to be very slow. Those of our maturity are disconcertingly rapid... Physical time passes at a uniform speed, while our own speed diminishes ceaselessly. It is like a great river that runs in the plains. At the dawn of his day, man marches cheerfully along its bank. And the waters seem lazy to him. But their course accelerates little by little. Around noon, they no longer allow man to surpass them. When night approaches, they again increase their speed. And man stops forever, while the river continues relentlessly on its route. In reality, the river has never changed its speed. But the speed of our march diminishes...Obscurely, we perceive that the ceaseless march of our inferior time slows, in other words, of our psychological process. Each one of us is the man who runs along the bank, and is astonished to see the passage of the water accelerate. (id. 221, 222.)

Such events furnish the life of a child! Some physiological, others psychological: skeletal formation, formation of physical and mental personality, metabolic intensity (transformations provoked by nutritive movement), continual changes in the blood plasma – coordination of vision and motor skills, and *construction of space* – organization of exterior facts, representation of the succession and *construction of time* – awareness of relationships or formation of intelligence, study of language (passing from monologue to dialogue), formation of judgement, of will, formation of a moral conscience – formation of the self.

If childhood includes an enormous number of physiological and psychological events, adulthood includes fewer and old age very few. This is why, despite a number of years inferior to the rest of life, childhood seems to us, and *is really longer*.

Let us restate the two laws of *True duration*:

a) Sense of Present Duration. Law:

"The more time is filled (with events), the shorter it seems to us – the more it is empty (of events), the longer it seems. (Cullivier)

b) Retrospective Appreciation of Past Time. Inverse laws:

"The more time was full (of events), the longer it seems to us now – the more it was empty (of events), the shorter it seems to us now." (Cullivier)

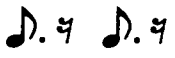

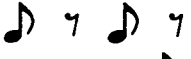

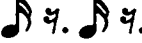

The second law seems to me much more evident than the first. Initially because the first addresses the present and the present is not easily appreciable, completely charged, as it is, with echoes of the past and anticipations of the future. Secondly, because the second law perfectly sums up the sentiment of our own duration: my childhood has lasted longer than all the rest of my life.

To our retrospective appreciation of past time, and to the laws that engender it, is attached one law which is particular to musical time: the *law of the attack-duration rapport*, that conditions quantitative order by phonetic order.

Law Of The Attack-Duration Rapport

At equal duration, a brief sound followed by a silence seems longer than a prolonged sound. A few examples.

To better understand this, one must bear in mind that a sound prepared by silence is a utopia, that the isolated silence is an exception of dramatic order, and that the vast majority of silences attach themselves to the sound that precedes them (as is the case here).

a) 2 dotted-eighth notes and sixteenth rests:		b) 2 quarter-notes:	
a) eighth-note and eighth rest twice:		b) 2 quarter-notes:	
a) sixteenth-notes and dotted-eighth rests twice:		b) 2 quarter-notes:	

All the examples marked a are executed in the same tempo as the examples marked b. All the examples marked a are more or less heavy staccatos or are drier than the legato durations of the examples marked b. Chronometrically, metronomically, the examples marked a are exactly the same value and duration as those marked b. Moreover, the examples marked a seem longer than those marked b. Why?

Answer: Two cases. First case: sound and silence – second case: sound alone. In the first case (sound and silence), two events: sound and silence. In the second case, a single event: sound. All the examples marked a include four events: two sounds, two silences. All the examples marked b include two events: two sounds. Result: all the examples marked a seem longer. We know that with regard to musical time, memory and anticipation play a large role. As a result, memory and intuition have as much as, and perhaps more importance than the immediate and direct auditory response.

Every sound-duration that I perceive is linked in my mind to the preceding sound-duration (that I know already), and thus to the following sound-duration (that I do not yet know). In applying the attack-duration rapport, the mind preserves the memory of a certain number of events, and it is this number that influences appreciation of the durations.

André Souris goes much further than this. I quote: "One common opinion assigns a predominant rhythmic value to percussion instruments, and in general, to all music that is dry and disconnected, in opposition to sustained music, which is called more 'melodic.'" This illusion is doubly instructive. It permits us to prove the validity of the principle that confers an absolute value to rhythm, as much as it organizes duration.

Imagine a relatively slow melody, performed on a xylophone and followed by a violin. In what way can the first duration be called more rhythmic than the second? In each instance, the same "rhythmic scheme" organizes the unfolding of intervals and the chronometric time of the melody. If it is true that rhythm has an absolute value, here the two would remain identical to each other. And all that we can say is that the melody has

been executed staccato and then legato, in other words, the same rhythm has organized the different games and sonorous qualities inherent to the xylophone and the violin.

But this proof, for what it is worth, reminds us that it is still incomplete. It only takes into account the differences pertaining to the single sonorous matter. If we report to ourselves the total impression produced by each of these two executions, we can observe that it is not only the games of the instruments and their perceptible qualities that transform matter, the "body" of the melody, but also that the very nature of time, of its unfolding, is affected. *When played on the xylophone, the melody unfolds in a qualitatively longer duration than when it is accompanied on the violin.* We prove by this that musical duration is not chronometric duration and, in conclusion, that music does not unfold in a previous time, in a "physical" time, but that it creates its own time that expands, contracts, colors and qualifies.

A concrete rhythm, or an executed rhythm, possesses then in its own right an organic time, independent of metronomic time, that confers upon it the sum of the conditions of its execution. To prove the elasticity of this time, it suffices to modify the different factors that create it. We find, at this point, that the organic duration of a melody, executed in the same metronomic tempo, can modify itself according to its expression:

1) by diverse modes of attack (struck, plucked, sustained); 2) in different nuances; 3) in the treble or in the bass; and 4) on diverse instruments. In general, it can be said that this duration will stretch itself proportionally to the brevity of the sounds, to the force of the intensity, to the height of the registration, (as for the variations of diverse instruments, they are too numerous and subtle to be generalized).

The interpretation of the performer furnishes the counter-proof of this organic stretching: to qualitatively maintain a more or less equal duration, they must inversely modify the metronomic tempo of the variations of internal duration. If it decelerates, they accelerate (in detached, forte, and treble), if it accelerates, they decelerate (in legato, soft, and in the bass). To unify the musical tempo, their physical tempo must be modified. It is thus that a certain rubato arrives (in relation to the metronome) giving the impression of a rigorous tempo, so that the execution would produce a rubato in accordance with the metronome. (André Souris, *Polyphonie*, "Le rythme concret.")¹⁴

¹⁴ "Concrete rhythm," *Polyphony*.

To close this dissertation on human time and its repercussions on musical tempo, I cite again several penetrating lines by Gisèle Belet on *memory* and *anticipation* in music, that cast new light on the subject.

Memory, instead of being incurably fixed, participates in the creative mobility of time, in the variability of our anticipations to the light of our actual wishes, the past endlessly changes significance...Waiting and remembering are intimately linked to one another: I wait the return of the theme in the measure where I remember it and I can predict the future of the work according to its past. And the memory of past melodic sonorities makes a determined anticipation surge invincibly within me, oriented around certain privileged sonorities, that I "recognize" the moment I hear them. In musical duration as in real duration, there is a prevalence of anticipation on memory, if memory rules anticipation: the musical work, like our life itself, is oriented toward the future, and memory has a sense in only one or the other by the anticipation which it rouses. Also, anticipation is the formal principal and central sense that continually sustains the sonorous form. It creates pleasure in playing and regulates the technique itself. (Gisèle Brelet, *Le temps musical*, "Les sentiments temporels," 572, vol. 2.)¹⁵

9) Time and Microphysics

It is impossible to attribute a rigorous determinism to the succession of phenomena on the corpuscular scale. The apparent determinism of macroscopic scales must surrender their positions to smaller scales with a probability of calculating all the possible consequences and their respective probabilities. Certainly, a "weak" causality remains in Physics in the sense that every effect always has a cause and that the suppression of the cause always entails the disappearance of the effect: but we no longer succeed in retrieving the "strong" causality where the effect necessarily results in the cause and is linked to it by a rigorous determinism. The weak causality permits supposing that a single cause could produce one or the other of several possible effects, with only a certain probability that such a cause produces that effect and not any other. (Louis de Broglie, *Physique et microphysique*, 294, 295.)

Analogy: the musician-rhythmicist can partially deceive the listener's anticipation in choosing the least expected among several possible effects. Example taken from classic harmony: the old procedure of the broken cadence – there can also be broken cadences in the rhythm or any number of other effects which are difficult to foresee, or which are completely unforeseen. The melodico-rhythmic procedure of development by elimination, dear to Beethoven, becomes replaced by the harmonico-rhythmic procedure of Stravinsky's rhythmic characters which allows for a little more of the unforeseen, or by the purely rhythmic procedure of rhythmic characters independent of the music to which they are

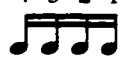
¹⁵"Temporal Sentiments," *Musical Time*.

linked (see my *Turungalila-Symphonie* or my *Livre d'Orgue*) that allows for much of the unforeseen.

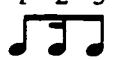
In Mechanical undulatory, it is generally impossible, when one has an ensemble of particles of the same physical nature, to attribute to each one an individuality that affects it with a permanent numerotation. The profound reason for this is that particles of the same physical type, having identical properties, can be distinguished only by their different positions in space: now, in Mechanical undulatory, one cannot generally attribute well defined positions in space to the particles and these particles *can* be found in an entire extended region of space. If their regions of possible presence encroach or cover themselves, which occurs most often, how could one again follow their individuality?... In Mechanical undulatory, the possibility for two particles to find each other at the same point in space drives to extenuate the old notion of the impenetrability of matter. This notion is obscured then at the same time that the permanent numerotation of particles becomes impossible. (Louis de Broglie, *Physique et microphysique*, 207, 208.)

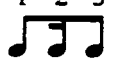
Analogy: Two particles meeting at the same point in space can be compared to a unison duration (a frequent case in Polyrhythm or superimposition of different rhythms). As for the impossibility of affecting a permanent numerotation of particles of the same nature, if we do not know their exact position in space, we can assimilate it into a succession of exactly similar durations that could be permuted. Using four sixteenth-notes:

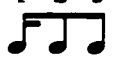
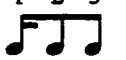
1 2 3 4
 | If I read them in retrograde, my eye will have changed their respective places:


4 3 2 1
 | but the listener will know nothing. This is why *non-retrogradable* rhythms

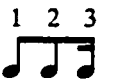
exist, such as the Denkhî of the Hindus:

1 2 3
 || we read from left to right, then from right to left, it is always:

1 2 3
 || This is why rhythms exist that cannot be transformed into a particular permutation (other than retrogradation), such as the Bacchius of the Greeks:

1 2 3
 || reading it from the extremes to the center:  || the result is

the same. In the case of the Antibacchius of the Greeks:  || reading it

from the center to the extremes:  || the result is the same.

"*Le Problème du Temps*" (taken from *Vie et Transmutation des Atomes*, by Jean Thibaud, 226-230)¹⁶

Stops in Time

Over the course of individual events concerning atoms, time proceeds by leaps; in the infinitely small, temporal evolution is as discontinuous as the spatial distribution of atomic grains can be. We can never seize such an irregular progression in ongoing life: Only an appropriated laboratory experience can reveal it to us: beginning with the augmentation of the number of considered *points in time*, the chain of events recovers itself: we obtain an aspect of temporal continuity.

Inverse Determinism

Without the future being narrowly determined, it would be surprising if, in the material world, the present does not already potentially contain something of future events. I make allusion here to a possible alteration of present events by those that must happen *later*. When we admit that the present is partially able to condition the future but that the inverse is impossible, we accept an uncompromising irreversibility of the sense of temporal evolution which is difficult to justify in the domain of micromechanisms. On the contrary, the law of temporal symmetry seems perfectly plausible, if it would become possible to admit that the chain of successive events of a material system could be described as well in one sense as in the other, that which drives us to suppose *a certain conditioning of the present by the future* as well as the contrary.

These two texts by Jean Thibaud are particularly disquieting. The first, on stops in time, violently shocks our good sense. This time that brusquely ceases to move, and resumes no less brusquely, appears almost inconceivable. This temporal void, these "stationary states," as says Louis de Broglie, jolt our weak reason. How can one not be reminded of the Angel of the Apocalypse announcing "that there will no longer be Time"? an expression so terrifying that several commentators have sought to minimize it by a weakened and ludicrous translation, saying: there will no longer be periods of time!... Nevertheless the Saints' writings are always right, and science rejoins it once again...

Analogy: the musician-rhythmicist will find here again the famous silences of Pierre Boulez, so totally opposed to sounds, that they belong neither to the preceding nor to the subsequent sound. In this conception, silence is a cessation, an absence, a negation, it is the opposite of sound like night is the opposite of day, it is the very short Silence, with a capital S.

¹⁶ "The Problem of Time," *The Life and transmutations of atoms*.

Second text on Inverse Determinism. The influence of the present on the future and of the future on the present, determinism in both senses! Let us first remark that this theory does not touch man's freedom and does nothing to invalidate free will: it consists of a double determinism, forward only, not retrograde, acting solely on the scale of the infinitely small. This text is perhaps distracting to practical intelligence... despite the prudence of expression and all the precautions of terminology taken by the author... It seems quite simple when transferred to the rhythmico-musical domain. Is not the composer-rhythmicist a little demiurge, having all power over the work that is his creation, his microcosm, his child, his thing? He knows in advance all the pasts and all the futures (of the work), they are all present in his mind. At will he can transform the present so that it touches the past or the future, and make corrections to the before and the after, with this or that change. He has the possibility of writing the same text in forward motion or in retrograde, and even of superimposing the two forms (retrograde rhythmic canons); better still, he can push his research in all the possible forms offered by inversions or permutations of duration: forward motion, retrograde motion, movement from the center to the extremes, movement from the extremes to the center, and a multitude of other movements that would appear to the old Chronos a horrible surgery practiced on his empire, an unaesthetic mutilation of time in the past and in the future, to animate these scraps of future and past while conferring upon them a new identity! He can even voluntarily apply the same order of permutation to what has already been permuted a first time, and begin again the same operation until finding the durations once again in their original positions: this is the case of "limited symmetric reinversions"! ...

Recurrence by varied alternation

The different activities of man all carry the mark of a periodic variation. From political activity to artistic activity, from sexual activity to spiritual and religious activity, the process remains the same. There is alternation of the same and of the other, the same never being *identical* but *similar*.

"All the history of the world is composed of these alternations of liberty and authority, of a thirst for innovations and of will and stability." (Jean Chevalier, *Les Rythmes de la Vie*, "Les rythmes du monde économique.")¹⁷

Many creative spirits are affected by crises over the course of which all their conceptions and their previous creations appear to them to be nothing but ashes: everything is disarranged, they question what they thought they understood and loved. Of such phenomena belonging to the shedding or dissolution of organic tissue: they generally create a new belief in genius, the accession to a superior plane of knowing and of love: before savoring the sweetness of the ripe fruit, it is necessary to assist the withering of the flower... (Gustave Thibon, *Les Rythmes et la Vie*, "Les rythmes dans la vie spirituelle.")¹⁸

"The functions of the human organism are marked by rhythmic imprints, but it is essentially in the domain of sexuality that this reveals itself further." (Doctor René Biot, "L'activité sexuelle," *Les Rythmes et la Vie*.)¹⁹

When, according to increasingly ample oscillations between hope and despair, the descending contour of spiritual rhythm directs the soul into nothingness, the next ascending contour elevates it to the absolute. (Gustave Thibon, *Les Rythmes et la Vie*, "Les rythmes dans la vie spirituelle.")

In mechanical order, phenomena submitted to measurement reproduce with a regularity and an absolute precision, while in the domain of life, none of these phenomena (the law of rhythm being the leader of indefinite repetition), is absolutely identical to the phenomenon that preceded it. Mechanical alternance brings back *identical* alternance and living alternance brings back *similar*. The measure repeats, the rhythm renews itself. (Gustave Thibon, id.)

This is why the Indo-European root of the word rhythm is: sreū = to run. From the Sanskrit: srāvati, it runs – the Greek: rheō, to run, and rhuthmos, the movement of waves. From the English: stream – and German: Strom, running water. From the French: rythme. And quite justly have we compared rhythm to the recurrence of ocean waves: because all waves rise and descend, but none with the same volume, the same force, the same duration.

We have seen that the universe and the human being were facts of superimposed time. The universe and the human being are both facts of superimposed rhythms. One cannot move without the other. The substance of the world is thus polyrhythm. What a lesson for

¹⁷"Rhythms of the Economic World," *The Rhythms of Life*.

¹⁸"Rhythms in spiritual life."

¹⁹"Sexual activity."

the musician! All musicians must be rhythmicists and polyrhythmicists! Are they really? The Orientals are all rhythmicists, Hindus more than all the others put together. Westerners are more harmonists than rhythmicists. As for polyrhythm, it is little known, much less practiced in the Orient, almost nonexistent in the West. Its usage presents a great difficulty: its almost total destruction by its worst enemies: the *factors of cohesion*.

Polyrhythm and the factors of cohesion

As soon as the composer tries to superimpose several rhythms, he comes up against neutralizing forces that hinder a clear perception of them. These are the *factors of cohesion*. André Souris recognizes four principals therein: *the resemblance of timbres*, *isochronality (equality of duration)*, *tonality*, and *unity of register* – to which I add *unity of tempo*, *unison durations*, *unity of intensity*, and perhaps *unity of attack*.

It is evident that several superimposed rhythms cannot be followed if the voices that execute them all have the same timbre. If one adds different timbres or indeterminate percussion sounds, the differences in timbre are the first condition of clarity. Difference of register can add to the clarity, but if unity of register is linked to the difference in timbre, cohesion is weakened just as much, and the rhythms can be perceived.

Isochronality is the most terrible of all the factors of cohesion. A single isochronal voice is sufficient to destroy an entire scaffolding of rhythms, so free, so diverse are they! Just as the different existing modes and the dodecaphonic series have the same cohesive force, tonality is an equally frightening adversary. It would be preferable for polyrhythm to go along with polytonality, polymodality, or a deliberately measured mix of tone, mode and series. Music that is rigorously serial does not accommodate well to polyrhythm because the cohesive force of serialism pulls all other parameters into it. A banal succession of chromatic sets, spread throughout all voices, presents almost the same inconvenience. The modes of limited transposition are especially dangerous

because of their singular color. Their use in polyrhythm absolutely necessitates a different mode for each rhythm.

I have tried to destroy dynamic unity of intensity and unity of attack in my *Mode de valeurs et d'intensités* for piano. Unity of intensity, or dynamic unity, is generally instinctively avoided by composers – otherwise, like registral differences, dynamic differences can be replaced by timbral differences. Differences of attack are rarer and are often confused with timbral differences, both participating in phonetic order.

In a less complicated polyrhythm, unison durations are difficult to avoid. One would have to avoid them like the plague, however, to prove the same terror that twelve-tone composers have for the interval of an octave! Their cohesive force is immense. They completely scramble the rhythmic path: just one unison duration and the listener has completely lost the sense of the polyrhythm! He returns to zero for a new combination, the unison duration having partitioned, compartmentalized the polyrhythm.

Unity of tempo is not as bad: its danger is quite dependent upon the chosen values. I have attempted to destroy it in my *Mode de valeurs et d'intensités* by dividing my polyrhythm into three parts, or a graduated series of superimposed durations, each series of durations being based on a different unified value. A superior division: 12 graduated durations, from a value of one thirty-second note to a value of 12 thirty-second notes – median division: 12 graduated durations, from a value of one sixteenth-note to a value of 12 sixteenth-notes – inferior division: 12 graduated durations, from a value of one eighth-note to a value of 12 eighth-notes.

This "method of values and intensities," part of my *Quatre Etudes de Rythme*, will be analyzed in Volume III.

E) Bergsonian Time And Musical Rhythm

Essay on the "Données immédiates de la conscience" The idea of duration from the multiplicity of states of consciousness

"Every number is one; but this unity is the result of a sum" p. 56.

"The idea of numbers implies the simple intuition of a multiplicity of parts or of unities, absolutely similar to one another." p. 57.

To appreciate a long duration, one must know in advance a unity of value that can divide it into equal parts, and be aware of these possible divisions. There is also the possibility of retrospective appreciation of the long duration if it is followed by unities of short values.

The intellectual pleasure of numbers

In the case of a listener at a concert: the appreciation of duration mixes mathematical time with psychological time. The written score, allowing for the possibility of a recapitulation and of textual repetition, suppresses all difficulty. Third case: durations thought and appreciated by an individual – and incommunicable, like an internal prayer without words is incommunicable.

"Let us imagine a flock of identical sheep: they are different at least by the position they occupy in space" (p. 57) There is no absolute recurrence in the repetition of the same rhythmic formula, since each element is not in the same place: the second coming after the first and before the third, and so on.



We know time by movement, which is a division of space. All our thoughts happen by spatial representations. Can a sense of rhythmic number also be perceived through spatial representations?

"No doubt it is possible to conceive successive moments of time independently from space, but when what precedes it is added to the actual instant as occurs when unities are added, we do not operate on these instances themselves, since they are forever vanishing,


but instead on the durable trace that they appear to have left in space. It is true that we will most often resort to this image, and that after having used it for the first two or three numbers, we will be satisfied with the knowledge that, if needed, it will serve to represent others as well."

"There are two types of multiplicity: that of material objects, which immediately form a number, and that of the facts of consciousness, which would comprise the aspect of a number without means of some symbolic representation where space necessarily intervenes."

The notion of short and long is influenced by space. But there is an entire hierarchy of shorts and longs which includes variations of length in each, and which theoretically contain the possibility of divisions or multiplications. These possible divisions or multiplications are quantitative and spatial when we evaluate them numerically. They become quantitative to the point where numeric evaluation ceases. Are we perhaps then pure duration?...

 In this example, I view the whole note in relation to the  that precedes it.

But, because of the human tendency to exert the least effort, I first count four sixteenth-notes, then three quarters, during the duration of the whole note.

 In this second example, I also view the whole note in relation to the sixteenth-note. But this process, being retrospective, could cause inexact perceptions with each individual.

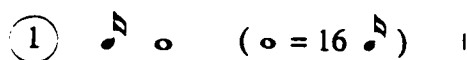
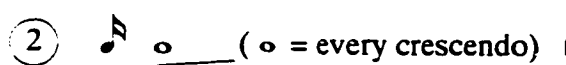
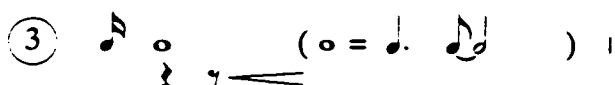
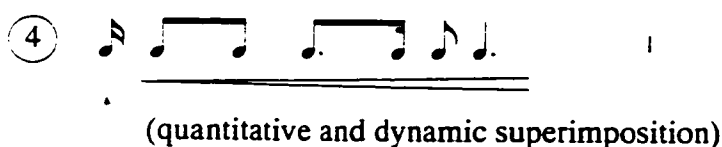
Extremely long and short durations are very difficult to comprehend because of the median character of our listening. Durations not divisible by three, or two, or their multiples are difficult for Westerners. If a varied rhythmic ostinato presents variations (augmentation, diminution, interpolation, additions or subtractions in each order) and

these variations follow a regular progression or simply an affirmed and continuous will, we numerically evaluate the first changes, but not the others.

In a long duration affected by any type of dynamic change, the duration's numeric evaluation is destroyed by the different instances of crescendo or diminuendo that impose their division of the duration upon the listener.

If the dynamic change affects a succession of durations, two orders become superimposed (dynamic and quantitative).

Examples:

- ①  (o = 16 quarter notes) |
- ②  (o = every crescendo) |
- ③  (o = quarter note, eighth note, sixteenth note) |
- ④  (quantitative and dynamic superimposition)

"The Time Traveler" by Wells says: "Can one conceive of an instantaneous cube?" (a solid object that has the three dimensions of space and that *does not endure*). Union of space and time. Reversal: *can one represent a number, a duration, and a rhythm outside of space? Bergson says no.*

"The number, composed according to a determined law, is decomposable according to any law." (p. 62) *Thus, without unity to a previous value, a long duration is inappreciable, because it is divisible by an infinite number of methods.*

Two types of multiplicity: that of material objects which immediately form a number, and that of the facts of consciousness which would be capable of finding the aspect of a number without means of some symbolic representation where space necessarily intervenes. (p. 65)

Example of the bell:

I hear the sounds of the bell successively. I retain each of these successive sensations in order to organize them with the others to form a group that reminds me of an unknown rhythm: then I do not count the sounds. I limit myself to regathering the qualitative impression placed on me by their number.¹

This number is known to me by the memory of anterior numeric sensations. There has perhaps been a spatial representation at the moment of the original sensation. Actually, all reference to time and space has disappeared to leave room for the memory alone.

When our self leaves itself to live, when it abstains from establishing a separation between the present state and earlier states, the form that the succession of our states of consciousness takes is completely pure duration. It no longer needs to absorb itself completely in the sensation of passing ideas, because then, on the contrary, it would cease to endure. Neither does it need to forget the earlier states: it suffices that in recalling these states it does not juxtapose them with the actual state like one point to another point, but organizes them with it, just as occurs when we remember the notes of a melody, melted together. (p. 75)

Pure duration could very well be nothing more than a succession of qualitative changes that melt into each other, that penetrate each other, without precise contours, without any tendency to exteriorize a rapport from one to another, without any relation to number. This would be pure heterogeneity. (p. 77)

"From the instant when the least homogeneity is attributed to duration, space is surreptitiously introduced." (p. 77)

Homogenous: of a constant nature, thus divisible and measurable like space.

Heterogeneous: of a perpetually changing nature, thus infinitely divided, and consequently indivisible: because if we affect its inherent division, we destroy infinity.

Bergsonian Theory according to Sivadjian

Pure duration = sense of the continuity of life.

Spatialized time = exteriorized duration.

Interior duration = unsupported change, movement without motion.

¹Messiaen gives no page number for this quotation.

If a soul's state ceased to vary, its duration would cease to change. A being that does not change, does not last and a psychological state which remains unaltered for so long that it is not replaced by the following state does not last either. (L'évolution creatrice)

"Duration is the continual progress of the past." (L'évolution creatrice)

"Time is what prevents everything from happening all at once. It slows, or rather it is retardation. It must then be elaboration." (La Pensée et le Mouvement)²

Time is then a break in total simultaneity, and a creation continues!...

Succession = three perceptions: 1) forgetting the individual elements in favor of the whole; 2) separating the terms; 3) linking the terms, by the memory that progressively accumulates the past. This is *pure duration*.

I say that a minute has just elapsed, and I hear that a pendulum, ticking seconds, has executed sixty oscillations. If these sixty oscillations are represented all at once and by one single perception of the mind, they hypothetically exclude the idea of one succession: I think, not of the sixty subsequent ticks, but of sixty points on a fixed line, each one symbolizing one oscillation of the pendulum. If, on the other hand, I want to represent these sixty oscillations successively, but without changing the way they are produced in space, I must think of each oscillation excluding the memory of the preceding one, because space has not conserved its trace: but by that I will condemn myself to remain forever in the present; I will renounce the thought of a succession or duration. Finally, if what I conserve connects the image of the present oscillation to the memory of the oscillation that preceded it: I will perceive them simultaneously, penetrating and organizing each other like the notes of a melody, so that they form what we will call an indistinct or qualitative multiplicity, without any resemblance to the number. I will obtain thus the image of the pure duration, but also I will be entirely disengaged from the idea of a homogenous middle ground or of a measurable quantity. (Bergson, *Données immédiates*.)

"The measure of time never conveys duration as duration. One counts only a certain number of extreme intervals or moments, in other words, virtual stops in time." (La Pensée et le Mouvement)

Duration of self is continuous change, not divisible into equal parts.

The equal divisions of the clock divide nothing if memory does not tie them together. Thus, two indispensable factors: *unity of value* and *memory*. (Messiaen)

²Thought and Movement.

"In our self, there is a succession without reciprocal exteriority; outside the self, reciprocal exteriority without succession." (Les données immédiates)

"Memory prolongs the before in the after and prevents the two from being purely instantaneous, appearing and disappearing in a present that is continually reborn." (Durée et simultanéité)

For the physician, the same cause always produces the same effect; for the psychologist who does not let himself be misled by apparent analogies, a profound internal condition causes an effect once, and never produces it again... That under the influence of the same exterior conditions, I do not drive myself today as I did yesterday, is nothing astonishing, because I change, because I endure. (Données immédiates)

The ephemeral who lives a few hours, the man who lives a few years, the mountain that lasts for a few centuries, and the star that lasts millions of centuries, have each accomplished their complete function before they cease to exist. Their duration is then the same. These superimposed times will be different only for a foreign observer. They are identical for those who live them, each one in the totality of its function, power, and duration. (Messiaen)

CHAPTER II

RHYTHM

- A) Definitions and sources of rhythm. Roots of the words music and rhythm
- B) Supremacy of rhythm
- C) Different definitions of rhythm
- D) Rhythmic orders
- E) Extra-musical rhythms and their influence on musical rhythm:
noises of nature – bird song – the mineral kingdom – the plant kingdom – dance – language and poetry – plastic arts

A) DEFINITIONS AND SOURCES OF RHYTHM – ROOTS OF WORDS: MUSIC AND RHYTHM

(I am borrowing the following from *Dictionnaire des racines* ¹ by R. Grandsaignes d'Hauterive)

The word: **Music**, derived from the Indo-European root: **MEN**.

MEN: indicates the movements of the spirit.

Principal derivatives:

Sanskrit – manyate: he thinks. Greek – menos: spirit; mnêmê: memory; manteia: divination.

Latin – musa: muse; monstrum: prodigious. Gothic – man: I think. German – Mensch:

man; Minne: love. French – esprit: mind; l'homme: man. German: Musik. English: music.

French: musique.

The fact that the word music belongs to: 1) the same root as mind, memory, muse, man – means that it belongs to the same order as thought, to the divinities of thought, and to the thinking being; 2) to the same root as divination, prodigious – means that it belongs to time and to the supernatural; 3) the same root as love – means that it belongs to the grandest of sentiments. All this clarifies our conception of music: it is a thinking art, intellectual, abstract, immaterial, an art of time (this speaks to the importance of rhythm in music), a supernatural art (this speaks to religious aptitudes and the psychic power of music). It is then an art of love, capable of expressing love – and this last point thrills me.

The word: **Rhythm** is derived from the Indo-European root: **SREU**.

SREU: to run. (*)²

¹*Dictionary of Roots*

*It is useful to remember this here.

²Messiaen treats this symbol [*] as an unnumbered footnote reference in his original text. All subsequent asterisks will be included among the translator's footnotes. This is the only time the asterisk appears within parentheses.

Principal derivatives:

Sanskrit – *śravati*: it runs Greek – *rhêô* (for *srewô*): to run; *rhoos*, *rheuma*: flowing; *rhuthmos*: movement of waves, rhythm. German – *Strom*: running water; *strömen*: to run in waves. English – *stream*: running water. Spanish – *ritmo*: rhythm. Italian – *ritmo*: rhythm. French – *rythme*: rhythm.

Here the idea is always the same. The roots and derivatives are in agreement: rhythm is the issue of movement in water, the undulations of the waves of the sea. It is primitively attached to movement, but to repeated movement which always has new variants; in other words to the infinity of irregular recurrence. Not the repetition of the same, not the alternation of the same and another, but the succession of sames that are always others, and of others that always have some relation to the same: this is *perpetual variation*. Moreover, like the waves of the sea that ceaselessly roll, rhythm is a perpetual overlapping of past and future, going toward the future, like Time.

B) SUPREMACY OF RHYTHM

"Poetry is made with words," wrote Mallarmé to Degas. Can one paraphrase the poet's quip, and say: "Music is made with sounds?" Alas! this is the common opinion. And endless discussions between partisans of tonal music and those of twelve-tone music forever turn on sonorous phenomena. The musics called "concrète" and "electronic" have only amplified this method of listening, while further falsifying the traits of the problem. I am quite sure that the majority of musicians who open this book will search first for sound combinations, consonant or dissonant aggregations, if not simple chains of chords. We must rise up against this professional deformation that risks diverting music from its sacred path. Music is made with sounds? *I say no! No, not only with sounds!* The sounds are there for a reason, for a good reason – do not underestimate their importance – but too often the emphasis is placed on them and on their study (in the West, especially). I dare not say that harmony and counterpoint have an anachronistic character... Let us be prudent: these modes of thought need not be destroyed; premature renouncements are dangerous.

Let us put each thing in its place. The research of simultaneous sounds has lead us to musical hedonism, to marvelous harmonies in which sonorous ecstasy surpasses the sensory joy of colors and scents, and it is so much the better for our ears! But let us not forget that music is first *Melody*, and that melody would not exist without Rhythm! Sound is only an agent of transmission for the different *pitches* of the melody; in the case of the melody accompanied by its natural harmony, the sonorous aggregates give the melodic movements their true sense. Counterpoint mixes the two preceding cases. For *Rhythm*, sound – musical or not – is often only its coloring: it remains the interpreter between Duration, Number, and our perception. Music is then, in part, made with sounds... but also and above all, with *Durations, Impulses, Rests, Accents, Intensities and Densities, Attacks, and Timbres*, everything that is grouped under a general word: *Rhythm*.

C) DIVERSE DEFINITIONS OF RHYTHM

I am going to cite a certain number of definitions by different authors that have truth for different historical periods. The majority are model definitions, which are alluded to by touch and word. After reflecting on it a bit, we perceive quite quickly that they are all incomplete. This is because Rhythm – like Time and Duration from which it originates – is an extremely complex notion that has evolved with human intelligence and with the different styles of musical language. Rhythm is a notion that is next to impossible to define in a few words, if we want to hold it accountable for all its conceptual and technical transformations. The thinkers and instigators of maxims are prudently contented with a few vague generalities... I am choosing the definitions that seem to me to be the best:

"Rhythm is the ordering of movement." (Plato)

"Rhythm is a determined ordering of time." (Aristoxenes of Tarentum)

"Music is Rhythm." (Confucius)

"In the beginning was Rhythm." (Hans von Bulow) (This paraphrase from the gospel according to John is undoubtedly disrespectful. It has, however, the merit of placing Rhythm at the origin of all music... Otherwise, let us not forget that the Hindus have

attributed the name Nataraja to the God Shiva: king of the dancers – and that, turn for turn, the Shiva's cosmic dance creates and destroys the universe with its rhythm). Here is a text from "Yo Ki" or "Memorial of Music," canonic opening from China, that can pass for a definition of Rhythm:

"Movement and repose have their constancy; the large and the small their distinction." (Yo Ki) (This is a list of cinematic and quantitative orders: movement and repose, or better, outburst and repose = weak beats and strong beats; large and small = long and short durations.)

Another text, this one modern, that applies to the life, to the self, and to the Rhythm that is a living being: "Is not life this mysterious movement that, by avoiding everything that happens, transforms me incessantly into myself?" (Paul Valéry – *L'âme et la danse*)³ In reproach of these words from Heraclitus: "Everything moves, nothing is, everything becomes..." (Heraclitus)

Classic definition of Rhythm:

"Order and proportion in Space and in Time: such is the definition of Rhythm" (Vincent d'Indy – *Cours de composition musicale*)⁴

Other definitions:

"Rhythm in music is the organization of Durations." (Maurice Emmanuel)

"Rhythm is in time what symmetry is in space." (E. d'Eichthal)

"Musical Rhythm is the structure of an organic sonorous system conceived under the category of evolution." (Boris von Schloezer)

"Rhythm is this property of a series of events in time that impresses upon the mind of the observer a proportion between the durations of diverse events or groups of events of which the series is composed." (Sonnenschein)

"Rhythm is perceived recurrence. It is situated where identical recurrence deforms the habitual flow of Time within us." (Pius Servien)

³*The Soul and the Dance.*

⁴*Course on Musical Composition.*

"Rhythm is alternation: the passage from the same to something else and of something else to the same." (Jean Guittou)

Edgar Willems establishes a distinction between Rhythm, Rhythmic, and Metric.

"Rhythm, rhythmic, and metric are three essentially different categories. The first being an actualized vital propulsion affecting a plastic or sonorous material; the second being the science of rhythmic forms which understand the writing and rules of phrasing; the third, a simple means of mensuration." By the return of certain words in the Platonic definition, Edgar Willems tells us more simply: "Rhythm is ordered movement." (Edgar Willems, *Le rythme musical*.)⁵ One could speak more clearly still of living rhythm, of conjured rhythm, of created rhythm...

Matila Ghyka nicely defines two types of Rhythm:

- 1) "Homogenous, static, completely regular rhythm, or more precisely, cadence or meter."
- 2) "Dynamic, asymmetric rhythm with unexpected undulations, reflections of the breath of Life itself, or precisely, rhythm." (Matila Ghyka, *Essai sur le Rythme*.)⁶

This distinction between meter and rhythm, between cadence and dynamic pulsation, can be transposed into the arts of space. Here we can also find uniformly repeated motives, isotropic, static partitions of space, as in crystalline collections and regular tilings. And we will be able to have by contrast, dynamic rhythmic growth as in living beings, as in symphonic arrangements that procure the use of irrational relationships brought to light and put into proportion by Greek or Gothic processes. (Ghyka)

We can find other examples of Meter and Rhythm in Nature. Meter: the hexagons in beehives. Rhythm in progression: the veins of tree leaves, the spirals of sea shells and spiders; and in the infinitely grand: nebulous spirals. Meter in successive transformations or varied recurrence: the waves of the sea (a very important example, since the word "Rhythm" is derived from the Indo-European root: SREU, to run – and is primitively attached to the movement of waves). One last example of pure dynamic movement: the comets.

⁵*Musical Rhythm.*

⁶*Essay on Rhythm.*

Three words return constantly to the mouth of rhythmologists: *Recurrence* – *Irreversibility* – *Symmetry*.

True *recurrence*, that of the waves of the sea, is – we are beginning to realize – the opposite of a pure and simple repetition. Each wave is different from the preceding and the following, by its volume, height, duration, the slowness or brevity of its formation, the power of its climax, the prolonging of its fall, flow, and scattering. We know that Leonardo da Vinci compared the movements and undulations of water to those of hair and vice versa. Now, nothing is more variable than locks of hair or the ocean. This is varied recurrence. To suppose an absolute recurrence, duplicating the same thing over and over again, as is the current practice in music with rhythmic pedals and ostinati, it is necessary to remember that there is a difference between each textual repetition: no note can be found in the same place within the sonorous unfolding. There is a first occurrence, a second occurrence, a third occurrence, and so on. Although all are similar, they are situated in a perpetual state of change. Here we touch on the second expression of rhythmologists: irreversibility. Irreversible: that which cannot be reversed.

Time always flows in the same direction: it goes toward the future and never returns to the past: it is then irreversible. This affirmation is however contradicted by a) atomic doctrines – in *Vie et transmutation des atomes*,⁷ Jean Thibaud speaks of stops in time and "of a certain conditioning of the present by the future," in other words, of an inverse determinism; and b) by the philosophers of the Past and Future – in his work, *du Temps et de l'Eternité*,⁸ Louis Lavelle declares, "The past adheres to our bodies, and our bodies accumulate every influence from our past. This accumulation has made us what we are." The past and our bodies are interdependent; this is a burden that we cannot deny... But then it is no longer the past, *it is the present*. Otherwise, retrospection creates a spiritual present out of the past, and the future is called to change itself into the past. Finally Louis Lavelle, distinguishing between our passivity and the future that can be, and our activity and the

⁷*The Life and Transmutation of Atoms.*

⁸*Of Time and Eternity.*

future that must be, rightly says: "The future is carried toward us – we are carried toward the future." Let us admit to the irreversibility of time. And let us speak of *Symmetry*. In music – as in the plastic arts, as in the decorative arts, as in the human body – symmetry is not only the art of the similar, it is also the mirror that inversely reproduces, it is *retrograde*. "*Non-retrogradable rhythms*" (of which I am author and apostle) have been critiqued by the claim that the expression "non-retrogradable rhythm" is itself superfluous and redundant, since rhythm flows in irreversible time and, like time, can never return to the past. I respond: it is a condition of the musician-rhythmicist to have this power over the sense of his durations: because he can make them to be heard successively and even simultaneously from left to right and from right to left. Perceived upon hearing, retrogradation and movement from right to left both go toward the future, but *memory recognizes in retrogradation the primitive text rising again toward the past*. According to "non-retrogradable rhythms": read from left to right or from right to left they give the same succession of durations. In supposing that one would execute a "non-retrogradable rhythm," then its retrograde, *memory makes us recognize exactly the same rhythm without changing its meaning*. In reality, one does not retrograde that which is non-retrogradable, and the force of these rhythms resides in the difference between the two operations of detailed memory: a useless operation in the second case because it consists of an *impossibility in power*.

D) RHYTHMIC ORDERS

In *Le Nombre musical Grégorien*,⁹ Dom Mocquereau reduces the phenomena that accompany sound to four principals: duration or quantity, intensity or dynamic, height or melody, timbre or phonetic quality. From these, we can deduce four rhythmic orders, to which Dom Mocquereau adds a fifth: the rhythmic order which he calls *cinematic order*.

The rhythmic orders are:

1) *Quantitative order* (long and short durations)

⁹*The Gregorian Musical Number*.

2) *Dynamic order* (intensities, loud and soft sounds, crescendo and decrescendo, density or number of simultaneous sounds)

3) *Order of pitches* (acuity, gravity. "Melodic order" seems improper, we must leave this term to the melody, but one can very well conceive a "rhythmic order of pitches." The sounds or the noises of different pitches can create a rhythmic language superimposed over the durations, as one hears in the Hindu bôls: groupings of syllables indicating differences of duration, intensity, and pitch to the Tablas player, which depend on the method, force, and placement of the percussive events. The art of changing register is a part of this third order.)

4) *Phonetic order* (timbres – attacks)

5) *Cinematic order* ("cinematic" comes from the Greek kinêma, kinêmatos – movement), and signifies: relative to movement. Do not confuse this with kinetic – the theory of movement of material particles. Cinematic order is the order of rhythmic movement: alternation of strong and weak beats, gestures and rests – the law of accentuation – rallentando and accelerando, differences of tempo. All this is a part of cinematic order.)

In turn, Matila Ghyka distinguishes the dynamic and quantitative orders, and the order of pitches which are included in musical rhythm and superimposed on the meter.

If we pass the cadences (simple static rhythms or uniformly repeated motives that recall crystalline arrangements or homogenous partitions of space) to the melodies, we find, drawn precisely on the cadence's basic tempo, the rhythm (dynamic rhythm with some asymmetrical pulsations, as in the growth of living organisms) or rather the rhythms: rhythm of intensities, rhythm of durations, rhythm of pitches. (Ghyka)

Let us now address Chapter VII of the "Dialectique de la Durée"¹⁰ by Gaston Bachelard, entitled "Les Métaphores de la Durée."¹¹ Here we will find an entire philosophy on musical Rhythm that will aid us in completing our documentation of the Rhythmic orders. Bachelard, like Ghyka, admits to quantitative and dynamic orders, and to the order of pitches, "To the dialectic on long and short forms not only the dialectic of loud and soft, but also the dialectic of treble and bass." He even speaks of "rhythms constructed on the

¹⁰*Dialectic of Duration.*

¹¹Metaphors for Duration.

dialectic of sound and silence," naming thus a primordial element in musical rhythm: silence – an element which is understood poorly or not at all by the majority of musicians. It suggests to me a new rhythmic order, an almost opposite order: the order of silence.

Following Lionel Landry, Gaston Bachelard critiques retrograde movement that would admittedly go against the irreversible character of music's temporal flow. Now, we know how much René Liebowitz has praised Schoenberg's address¹² that brought retrograde movement back to honor, forgotten since Guillaume de Machaut (see the Rondeau *Ma fin est mon commencement, Et mon commencement ma fin*)¹³ and *The Musical Offering* by J. S. Bach (there is no retrogradation in *The Art of the Fugue*), and retrieved for an instant with the fugue that terminates Beethoven's sonata opus 106. I, as well, defend retrograde movement, and not only retrograde movement but all the possible transpositions or permutations, of which retrograde movement is only one among hundreds of millions of others: and I reclaim a rhythmic order – the order of inverse durations. Here are the four simplest ways in which the rhythmicist can read a succession of durations: forward (from left to right) – retrograde (from right to left) – from the center to the extremes – from the extremes to the center. Let us again take the Landry-Bachelard objection: music and rhythm unfold in time, in perpetual evolution. Retrograde movement and other permutations would then be counter-duration, counter-sense, with all the force implied by this last term? First response: one of the great qualities of the musician-rhythmicist is this power to juggle different treatments of duration! Second response: retrograde movement, along with other permutations, unfolds toward the future and is only appreciated as such by the listener retrospectively in relation to what was heard earlier in the forward sense. This is because to a greater extent than spoken language, musical language and rhythmic language are not audible without the aid of memory, which ties the different sounds, timbres and durations together into one ceaselessly renewed, synthetic operation. On this point, Gaston Bachelard

¹²It is most likely that Messiaen is referring to Schoenberg's speech entitled "Composition with Twelve Tones." There are two versions of this address, the second was published in 1948.

¹³*My end is my beginning, And my beginning my end.*

shares my opinion entirely, and he describes so precisely the complex mechanism of musical and rhythmic hearing, that I feel obliged to cite, almost in extenso, this passage:

Note the decline in the impression that rises from the present to the past, and that brings to rhythm and melody a continuity and a life that they lacked in their first production. A lack of attention to the melody would suffice to stop this decline... The continuity of sonorous tissue is so fragile that a cut in one location sometimes determines a rupture in another. In other words, the approaching link does not suffice; this partial link is conditioned by a disputable solidarity, by a continuity of ensemble. In fact, it is necessary to learn the continuity of a melody. One does not immediately listen; and it is often the recognition of a theme that brings consciousness out of melodic continuity. There, as elsewhere, recognition precedes cognition. (Gaston Bachelard, *La dialectique de la durée*.)

What Bachelard says about the melody and about the theme can be applied textually to the rhythm and to every sonorous or rhythmic succession (thematic or not).

Following Maurice Emmanuel, Gaston Bachelard attacks measures in which he sees – and rightly so – only a convenient reference, often without any rapport to the true rhythm. A good orchestra conductor must give accentuation and dynamism; he gives an equally distributed signal throughout equal measures (classical music), or unequal measures (*Sacre du Printemps* by Stravinsky), or even in unequal time, each beat having its own duration (see my *Poèmes pour Mi* and my *Cinq Rechants*). In the case of polyrhythm, the different rhythms are inscribed in conventional measures (see my *Turangalila-Symphonie*), and the conductor gives a distributed signal in equal but fictive durations. Then the beat acts only as a signal and Bachelard says vehemently "that it ties the coincidences together." Always in the case of polyrhythm, the reference to an absolute duration does not correspond to the real musical material. It is necessary, says Bachelard, for the listener to "accept the reciprocal support of the rhythms." These last words lead me to an eighth rhythmic order. We have just seen successively: 1) the quantitative order, 2) the dynamic order, 3) the order of pitches, 4) the phonetic order, 5) the cinematic order, 6) the order of silence, 7) the order of inversions and durations. Let us add a number 8: the polyrhythmic order in which a) the listener hears each rhythm separately (what an educated listener would guess to be an admirably distributed polyrhythm, and the total absence of the factors of cohesion); b) the listener hears all the rhythms as an ensemble where each one completes the other (this is the

most frequent case and is what Bachelard calls "acceptance of the reciprocal support of rhythms"); and c) after the detail and the combination, a third and stranger case – that of the resultant rhythm – the listener hears a supplementary rhythm, that is neither written, played nor conducted, but results from all of the combined rhythms. Not having always been foreseen by the author, it can be reduced pitifully enough to equal values; so, on the contrary, the resulting rhythm has been thought of by the composer as the essence of polyrhythm. There is a ninth rhythmic order that could be called: 9) the order of rhythms resulting from polyrhythm.

Gaston Bachelard concludes by saying, "The sonorous duration is dialectic in every sense, in terms of the melody, in terms of the harmony, in its intensity, and in its timbres." This statement is full of consequences. Let us give free reign to our imagination: we are going to find – in replacing "rhythmic order" with "rhythmic language," a richer term – not harmony, as Bachelard has just suggested to us, but a quantity of diverse rhythmic languages that can coexist in the same music. They are:

- 1) *the rhythmic language of durations* (long and short durations – quantitative order)
- 2) *the rhythmic language of intensities* (loud and soft sounds – crescendo and decrescendo – dynamic order)
- 3) *the rhythmic language of densities* (thickness – number of simultaneous sounds – belonging also to dynamic order)
- 4) *the rhythmic language of pitches* (high, low – changes of register)
- 5) *the rhythmic language of timbres* (phonetic order)
- 6) *the rhythmic language of attacks* (legato, accented, all types of staccato, sforzando, etc.– belonging also to phonetic order)
- 7) *the language of rhythmic movement* (weak and strong beats – accentuation – cinematic order)
- 8) *the rhythmic language of tempi* (rallentando and accellerando – differences of

tempo – belonging also to the cinematic order – extreme speeds, such as those practiced in "musique concrète," have an effect of "transmutation," as Varèse and Jolivet say, and completely change music and timbre: this is one of the most interesting aspects of the dialectic of tempi)

9) *the rhythmic language of transpositions and durations* (all possible permutations or transpositions: retrograde movement, center to the extremes, extremes to the center, and the hundreds of millions of others...)

10) *polyrhythmic language*

11) *the rhythmic language resulting from polyrhythm*¹⁴

12) *the rhythmic language of harmony* (there can be a rhythm of chords: Beethoven and Wagner practiced it in juxtaposing conventionally short harmonies with very long held ones – in our day, we could give a particular and more complex rhythm to simultaneous sounds, independent of the rhythm of pitches and of very short rhythms: there would be thus rhythm of harmony, rhythm of melody, and rhythm of rhythm, if I may be permitted this last redundancy...)

13) *the rhythmic language of musical premises* (premise = modality, tonality, polymodality, polytonality, atonality, twelve-tone series, all other types of series, etc. An opposition or mix of these different places, assigning a particular duration to each one)

14) *the rhythmic language of silence*

Silence! Alas! it is an element that is so important and so little known among musicians! I am no exception to this rule and admit my frightening ignorance on the subject... I often refer to Roger Vitrac's beautiful quote pertaining to the heavy sculptures (full) and the light sculptures (empty) of Jacques Lipchitz: "Lipchitz has observed the only two noble attitudes that correspond to *light*: those of submission or of passivity." And I apply to Edgard Varèse, André Jolivet, Anton Webern, Pierre Boulez, John Cage, and perhaps even to Pierre Schaeffer and Karlheinz Stockhausen, a paraphrase of Vitrac's text:

¹⁴This seeming redundancy may be the result of Messiaen's lack of editing.

"they have observed the only two noble attitudes that agree with *silence*: those of submission or of passivity." Alas for a second time! Admit it very quickly: poor silence! it is often crushed under sounds – rarely, very rarely, is it expressed with complete freedom...

Before the execution a musical work: an eternity of silence – after the execution of a musical work: an eternity of silence. But I do not want to occupy myself with these terrible silences that are no longer on the human scale: I consider only the musical work, and the piercing silences during the course of hearing it. In music, there are three types of silence: 1) *silence of prolongation*, 2) *silence of preparation*, and 3) *empty silence*. *Silence of prolongation* is the most normal, the most frequent. Every sound, every noise, is supposed to rest during the silence that follows it: one sonorous duration, then another silent duration. Together they form, in reality, one single total duration that is the product of adding sound to silence. I do not give examples of prolonged silence, no matter what music is being performed. *Silence of preparation* creates a feeling of expectation on the part of the listener, an expectation motivated entirely by a preceding context. I imagine a theme, a refrain, a restatement, a reprise, any repetition: if the repeated passage is brusquely interrupted, breached by a silence in the course of the repetition, then continued after this stop of an instant, the silence will be furnished by the expectation of what will follow and of what we already know through memory. This will be a silence of preparation. Outside of this special case, I consider the silence of preparation as an unthinkable absurdity, because a silence cannot, in any fashion, prepare a music which does not yet exist. The *empty silence* is a little less rare. Here are a few examples, taken from the work of Claude Debussy.

1st example. Beginning of *Prélude à l'après-midi d'un faune*:

(Claude Debussy –
Prélude à l'après-midi d'un faune)

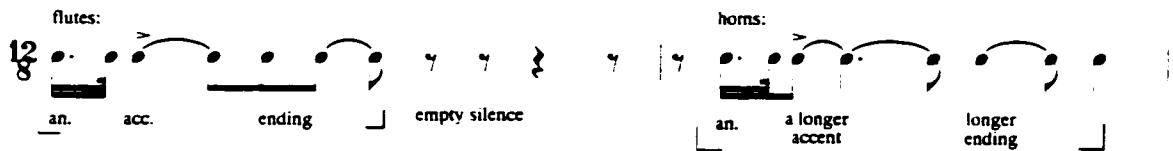
Repetition of the first horn's rhythm. The interruption occurs between two phrases. If the interruption had been placed in the middle of the second phrase, the silence would have been a silence of preparation. But the interruption occurs between the two phrases, and we do not yet know what will happen after the silence. Otherwise, it would definitely consist of an interruption, not a prolongation. It is then an *empty silence*.

2d example. Beginning of *Pelléas et Mélisande*:

(Claude Debussy – *Pelléas et Mélisande*)

During the measure of silence, the kettledrum continues its pianissimo roll. This imperceptible noise does not hinder the silence of the music or of the rhythm, which is a true *empty silence*.

3d example. Also taken from *Pelléas et Mélisande*:



(Claude Debussy – *Pelléas et Mélisande*, Act I, scene iii – 1 measure after 45)

This is the same rhythm, twice in succession. The accent and the ending are longer the second time. The first accent has a value of three eighth-notes, the second has a value of five eighth-notes. The first note of the first ending is an eighth-note, the first note of the second ending is a dotted-quarter note. Between the two phrases, the silence of six eighth-rests can pass neither for a prolongation of the first phrase, nor for the preparation of the second phrase: this is then, again, an *empty silence*. The pianissimo tremolo sul tasto in the violins that continues during the six eighth rests neither hinders nor stops the music, the rhythm, or the empty silence. A final reason for the empty silence: according to the preceding context, it consists of Golaud's theme, which is missing the last note in each phrase. The silence interrupts the theme: it is therefore an *empty silence*.

Pierre Boulez hears sounds and silences in an isolated manner, so short are they! Two perpetual antitheses, two worlds closed to one another and ceaselessly bordering on each other – the sound of one side, the silence of the other, not of recovery. This is one conception: we believe it or we do not believe... It has, in any case, permitted Boulez to use an extraordinary process: the negative reprise. "I have imagined," says Boulez in an article of the *Revue musicale*, "what one could call the photographic negative of a rhythmic

cell, in the sense that sound and silence can be inverted: all sounds become silence, all silences are transformed into sound." We find, for example, in the fourth movement of Boulez's second piano sonata, these three rhythmic cells:

(Pierre Boulez – 2d sonata for piano – p. 38, last 2 measures of the 3d system)

At the end of the same excerpt (page 47, measures 3, 4, 5), Boulez uses these three cells in the following fashion:

uppermost voice:

Let us examine each cell separately:

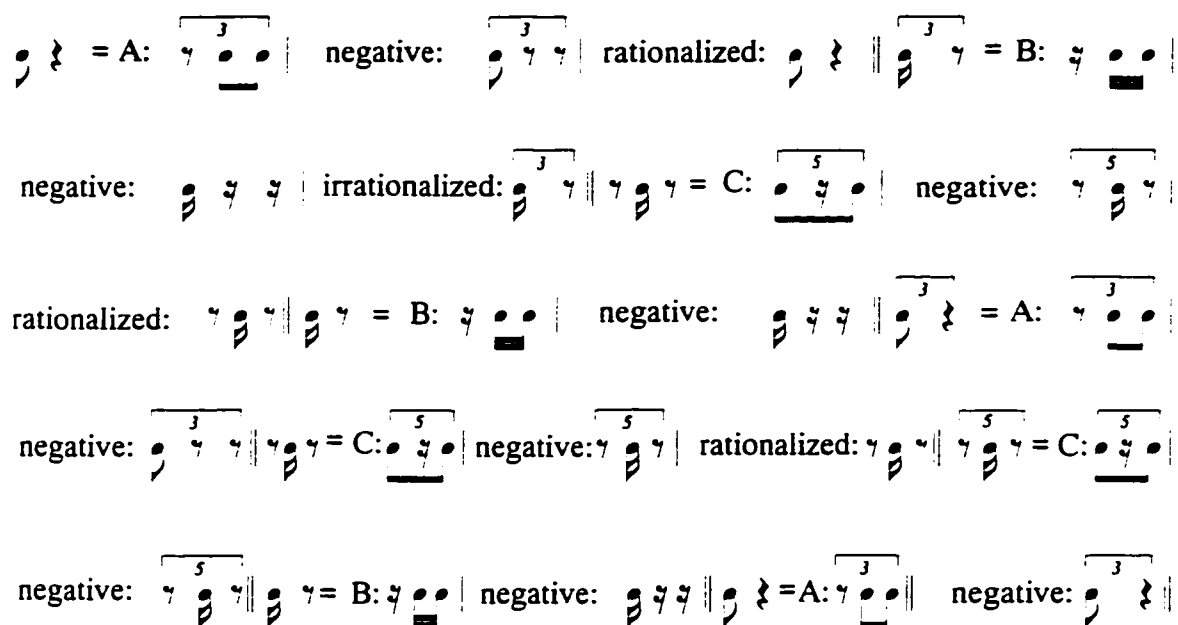
$\gamma \text{ } \text{ } = \text{B: } \gamma \text{ } \text{ } | \text{ negative: } \text{ } \gamma \text{ } \gamma | \text{ retrograde: } \gamma \text{ } \gamma | \text{ } \text{ } \text{ } = \text{A: } \gamma \text{ } \text{ } |$

negative: $\text{ } \text{ } \gamma | \text{ retrograde: } \gamma \text{ } \text{ } | \gamma \text{ } \gamma = \text{C: } \text{ } \text{ } \text{ } | \text{ negative: } \text{ } \text{ } \gamma |$

in rational values: $\gamma \text{ } \gamma \text{ } \parallel \gamma \text{ } \text{ } = \text{B: } \gamma \text{ } \text{ } | \text{ negative: } \text{ } \gamma \text{ } \gamma |$

retrograde: $\gamma \text{ } \gamma \text{ } | \text{ in irrational values: } \gamma \text{ } \text{ } \parallel \text{ } \text{ } \text{ } = \text{A: } \gamma \text{ } \text{ } | \text{ negative: } \text{ } \text{ } \gamma |$

retrograde: $\gamma \text{ } \gamma \text{ } | \text{ rationalized: } \text{ } \text{ } \parallel \gamma \text{ } \text{ } = \text{C: } \text{ } \text{ } \text{ } | \text{ negative: } \text{ } \text{ } \gamma |$



One of my students asked me one day for whom did I compose music. This kind of questions cannot be answered. One could just as well ask: why do you live in the city? Why do you prefer the mountains to the city, or the sea to the mountains? Why are you married? Why aren't you? Why do you have enemies? Why are you alive and not dead? etc. I tried to respond to my student through successive elimination: I do not compose for the general public, neither do I compose for a few initiates. Then – said the student – you compose for a single listener who is yourself? There I found myself very embarrassed. I compose for the pleasure of internal hearing at the precise moment of composition. And I arrive thus at a new, completely abstract rhythmic order. There is the heard rhythm, transmitted by the interpreter of the sound. There is the notated rhythm, conceived and internally unfolded as one runs down a few lines of a theological or philosophical work. There is even the rhythm conceived by an individual in one unique moment, solely for the intellectual pleasure of the number, an absolutely personal rhythm, like prayer – and incommunicable. In a quite beautiful chapter of his book, *A la recherche d'une musique concrète*,¹⁵ Pierre Schaeffer attempts to define "the musical object," in other words an

¹⁵*In Search of a Musique Concrète.*

ensemble of sonorous phenomena recorded once and for all (excluding the possibility of a new execution or thought) which can be: 1) changed by varying the intensities of the different superimposed registers and the different aligned moments; 2) transposed to treble or bass while changing speed; 3) superimposed onto itself (and thus transformed), and onto those which can be subtracted from, making it susceptible to diverse manipulations. Subtraction is a cut in any musical work. I think here of the short deductions, those that Schaeffer calls fragment (a few seconds) and element (attack, extinction, or excerpt of the body of a complex sound). Schaeffer's method is exactly opposed to that of my creator of rhythms and essentially the idea of deduction can also exist with the latter. Who hinders my creator of rhythms from choosing – in the unfolding of durations that he has just conceived – a short fragment, of superimposing this short fragment onto itself in diverse permutations, of then making a cut of the same fragment to effectuate a third cut in the previous superimposition, and so on? This process of choice and of successive mixes is a normal function of our minds. One last word: the creator of rhythms has an incontestable superiority over the hearer and over the reader. Bergson says quite justly, "every number is one, but this unity is that of a sum... The idea of numbers implies the simple intuition of a multiplicity of parts or unities which are absolutely similar to each other." (Données immédiates) To appreciate a duration, however long, the listener must be familiar with the unified value that can divide it into equal parts: this unified value is imposed by the author. If it is imposed before, all is easy. If it is imposed after, a considerable effort of memory is necessary on the part of the listener. For the reader, the possibility of going back, of repeating a passage at will, of consulting the preceding context and following it, suppresses a large part of the problem. The unity of value remains imposed upon it. The creator chooses the division at the same time as the sum, the parts at the same time as the unity: his pleasure depends on nothing but his own will. This is certainly the abstract and intellectual will of the Number; a unique ecstasy that surpasses the Quantitative Order to attain the grandest of all Rhythmic Orders; the distinct order of all times and of all rhythms that

arranges itself around us; the distinct order of our physiological time, and even of the flow of our states of consciousness; an order absolutely independent of all sonorous phenomena that can be imposed upon us; a unique and singular order, without repetition and without recognition; a personal, intimate and incommunicable order that is a creation, a parturition, a ceaselessly renewed flower: *The Order of Interior Rhythm*.

E) EXTRA-MUSICAL RHYTHMS AND THEIR INFLUENCE UPON MUSICAL RHYTHM

We can take the sources of musical rhythm back to the number eight:

1) noises of nature, 2) birdsong, 3) mineral kingdom, 4) plant kingdom, 5) animal kingdom, 6) dance, 7) language and poetry, and 8) plastic arts.

1) Noises of Nature

Medieval philosophers divided the arts into two branches: the trivium, which encompassed grammar, rhetoric, and dialectic; and the quadrivium, which encompassed arithmetic, geometry, astrology, and music. Music, the art of rhythm, came after the true sciences, and was considered to be the perfect intellectual art. In our day still, the superdodecaphonists who cry: "my intelligence! my brain! my rigor! my lucidity!" etc. follow the same path. By contrast, the painter seeks counsel from light and shadow, the architect takes his lessons from mountains and valleys of foliage. This is normal, and nothing about it is astonishing. This method is unknown to musicians. In the *Pastoral Symphony*, Beethoven has expressed his impressions in the face of nature without really listening to the noises of nature. The admirable "Invocation à la nature" from *La Damnation de Faust* by Hector Berlioz (Scene xvi, Forests and Caverns, Faust alone), on the other hand, carries the trace of a visual communion with the terrible mountains of Dauphiné (we know that Berlioz was born in the Côte-Sainte-André, Isère). Moreover, the vast genius of Richard Wagner, especially in his wonderful tetralogy: *The Ring of the Nibelung*, contemplates and reassembles all the forces of nature and the most diverse beings: water (the Rhine), fire (Loge), the earth (Erda), the sky (Wotan, Valhalla and the Gods), the

Walkyries (Brünnhilde), the giants, the hero (Siegfried), suffering men (Siegmund), subterranean gnomes (Alberich), wavelets (Rhine maidens), and finally monsters (the dragon Fafner), and the voices of nature (bird songs, forest murmurs, salute to light); all traveled through Death and dominated by Love. Finally, there is Claude Debussy who loved the water – *Nuages, Reflets dans l'eau, Les cloches à travers les feuilles, Brouillard, Feuilles mortes* – and who has orchestrated his *Sirènes* and his symphony *la Mer*¹⁶ with the movements of water. He loved Nature like one loves a woman, and such mysterious pages from *Pelléas et Mélisande* as the fall of night at the end of the first act, the far away rumbling, the calm menacing of the sea, the cavern "full of blue shadows" from the second act, and the departure of the prisoners (through the dungeon) in the third act indicate a unique sense of this secret rapport between analogy and poetry... But let us say it quite loudly: Berlioz, Wagner, and particularly Debussy, are the exceptions. And it is too bad. A true musician would have everything to gain from listening, from noting the noises of nature – vibrations and the atmosphere, harmonic sounds spread throughout the air, on high mountains, the delicate melodies and rhythms of the rain and other sources of water (the noise of raindrops falling on trees during and after a storm is particularly interesting for the study of *accelerando* and *rallentando*), densities, the intense pillars of harmonic movement provoked by the wind in the trees, for which timbral changes follow the tree's leafy sound quality, the arsis and thesis of the wind and the sea, and all the noises and rustlings of insects: the underground hum of the locust, the chirping legs of the cricket, the cymbal trill of the grasshopper¹⁷ rubbing his wings against each other, the buzzing of June bugs, not to mention the exquisite vibraphone notes, dropped one by one by a chorus of Midwife toads (little toads that sing under the pebbles in humid places). All this is useful to the musician – not through sterile recordings which are as far from music as photography

¹⁶*Clouds, Reflections in water, Bell sounds from leaves, Fog, Dead leaves, Sirens, The Sea.*

¹⁷Messiaen specifies the sauterelle éphippigère, a large grasshopper indigenous to Mediterranean areas. Its taxonomical name is *ephippium*.

can be from painting, but in retrieving the spirit of these sonorities, of these marvelous rhythms, and to extract them to form a new technique of sound and duration...

2) Bird Songs

It is necessary to distinguish here the melodic order, the phonetic order, and the quantitative order. Bird song is the source of all melody. I can affirm that all I know about melody has been taught to me by birds. No melody in the world can equal the confident and amiable sweetness of the Robin, the humoristic fantasy of the Blackbird, the strophes so pure of the Sky Lark,¹⁸ the virtuosity and facility of invention of the Garden Warbler.¹⁹ If we address the quantitative order (short and long durations) which is the principal element of rhythm, we must cite two great soloists as well: the Song Thrush and the Nightingale. The Nightingale – celebrated by poets of every era – is more orator and actor than singer, more rhythmicist than musician. He has the faculty of brusquely passing, without transition, from one sentiment to another, while finding exactly the appropriate rhythm and intensity. He jumps effortlessly from the mysterious to the tender, from the strange to the passionate, from the cunning to the humble, from the plaintive to the irascible, from the hopeless to the victorious, with the typical formulas of each sentimental attitude, and a well-studied technique of changing tempo. The Song Thrush – who is perhaps the queen of the singing birds – possesses a magical, incantatory song, cut into neat little rhythmic formulas, always repeated from two to five times, the most often being three times (as in the ritual of religious invocations and enchantments of primitive sorcery). Outside of a few characteristic rhythms, the strophes are always new and the rhythmic inventions inexhaustible. The arrangement of durations and of numbers – always unexpected, unforeseen, surprising – is manifest yet with such a sense of equilibrium that one has difficulty believing it is an improvisation. When it comes to timbres (phonetic order), no instrument made by man (woodwinds, brass, strings, percussion, piano, organ, Ondes Martenot, musique concrète, or electronic) can equal their quality and their prodigious

¹⁸This bird is also known as the Black-headed Warbler.

¹⁹This bird is also known as the Blackcap.

diversity. Let us mention as a reminder the timbre of a clear whistle from the joyously mocking Blackbird; the sweet, liquid timbre of the Robin, so gentle and amiable; the timbre – young and spring-like in forte, authoritarian and incantatory in fortissimo, xylophone or metal balls in acute fortissimo – of the Song Thrush; the humid harpsichord timbre of the Nightingale; the legatissimo, fluted timbre of the Lark; the metallic appellations of the Coal Titmouse; the purring, spinning wheel noise of the Nightjar; the turnstile, the coffee grinder of the Jay; the enormous croaking in proximity, surrounding sonorous halos in the distance, mixed with the bells and car horns of the Carrion Crow; the music box of the Wren; the stifled cooing of the Turtledove; the slightly hoarse creaking of the Reed Warbler; the piston of a locomotive or the dramatic sound of horses' hooves on pavement from the gray Heron; the musical outcry, the tragically desolate glissando, and the savage, mounting accellerando of the Curlew; the slightly stony anthem of the Wallcreeper; the melancholy of the Bullfinch; the clear sweetness of the Tree Pipit; the metallic, gilded, shimmering, strangely powerful, yet whistled and almost mocking call of the Golden Oriole; the rolling R of the Starling; the disturbed, cruel cry of the Alpine Chough flying in the high mountains above the abyss that separates them; the disturbing and terrifying shouts of a child who has had his throat cut from the Tawny Owl; the drumming of the wood-block from the Great Spotted Woodpecker; the burst of satanic laughter, the supernatural whinny of the Green Woodpecker; etc. And that is to say nothing of exotic birds – the bursting or pearled voice of the Red Cardinal (Texas – Louisiana); the creaking of pulleys, mewings, and hurlings of the Mainate (South Indies); the formidable shouts of the White-crested Laughingthrush (Himalayas); the delicate warbling of the Lesser Green Leafbird (Himalayas, East Indies, Malaysia, Indochina); the gay, slightly mechanical timbre of the Red-billed Mesia (China); the fluted, delicate, warbling calls, the cracking wicker percussions, the velvety drops of crystalline water, and the bursting fanfares of the Shama (India); the delicious melodic virtuosity, the mix of disagreeable and pitiable mewlings from the Catbird (North America); etc. In closing, a bird from France, of

which the timbre is so sweet, so smooth, so exquisite, that one can compare it to the music of a dream, to the music of clouds, to a string of rosy aerial sound that is extinguished in absolution. I name the Willow Warbler – which J. M. Giovanna would like to hear at the time of his death: "At the instant of our death," he said, "which bird, by chance or by an unheard-of miracle, would we like to hear sing one last time? I know that I would choose the Willow Warbler over any other. For its simple and tender phrase, especially rich in subtlety and poetry, a bit melancholy but serene, distanced from all terrestrial music, if not from the music of leaves."

3) Mineral Kingdom

We know that Chôros by Villa-Lobos was inspired by popular Brazilian rhythms. We also know that he used flamboyant orchestrations of typical Brazilian percussion – Xucalho, Réco-réco, etc. We know less about the rhythmic workings of the mineral kingdom. He has told me himself that he found these rhythms by contemplating high oaks in the mountains along the coast of the Atlantic (states of Bahia, São-Paulo). I have done the same thing in Dauphiné with the marvelous designs in rock of the Grand Som; the folds of the rocks and the profound movements of the water of the Grand Goulets; the changing geometry of the mountains, complicated with the *accelerando* from armies of hooded pines and of the *rallentando molto* from the snowy carpet, to which a play of light is added. All these have lead me to find rhythms! The countrysides of Oisans have especially enriched my catalogue of rhythms. I defy any rhythmicist to look at the mountainous decor which is reflected in the Chambon lake; the dream of snow and solitude that unfolds on the Meije and its three glaciers (Râteau, Meije and Tabuchet); the formidable and multiple cathedral, Dôme de Nieve des Ecrins (a true music of space), without also feeling a profound intellectual joy in the presence of the rhythmic arrangement of these numerous rocks. It is in the same spirit that I have sought melodic movement and successions of duration in contemplating stalactites and stalagmites – the stalactites' rain of swords, the stalagmites' giant columns, bouquets of gypsum flowers, colonies of calcite phantoms, terrifying

palaces, divine caverns. Here there are thousands of powerful rhythms and melodies. Mountains, glaciers, rocks, torrents, stalactites and stalagmites, all the natural architecture of the terrain above and under ground (of "positive terrains and of negative terrains" as Norbert Casteret, the speleologist said). Does it not respond to the pure rhythms of space extolled by Matila Ghyka, rhythms that he describes as "dynamic arrangements, governed by geometric proportions and irrational relationships? (Ghyka – Essai sur le rythme)

4) Plant Kingdom

Somewhere a museum of rhythmic forms must exist, of archetypes of the branch, the leaf and the flower that would be, at the same time, the origin of all known forms and rhythms. The great Leonardo da Vinci has left us numerous drawings that are studies of inundations and reveal a comparison between the forms of water and of hair. Here is Leonardo's text that accompanies one of these drawings: "Let us observe the movement of the surface of water, which resembles that of hair, and which has two movements: one depends on the weight of the hair, the other on the direction of the curls. Thus water forms whirlpools in which one part is dependent on the impulse of the original current and the other on the fortuitous movement of the flux and the reflux." In her *Journal de l'analyste*,²⁰ Susanne Lilar speaks of a cemetery of Franciscans in Rome for which the six chapels are decorated with their remains – a decoration for which four thousand skeletons have furnished the materials. She describes it in these terms:

Nothing, at first, permits distinguishing these decorative interlacings from any exquisite marble or stucco decoration elegantly carrying their florets, except perhaps, the admirable earth tone burnt sienna. But the eye familiarizes itself early enough and discovers that these delicately inflected shades are the edges, the cup of the tulip or the rose. This leaf, completely retrieved, is the sacrum which was ignored until the day of the noble acanthus. All the small bones of the hand and foot have converged at this point, which was believed to possess charm and refinement, and seem to have copied their motifs – ravens, rubies, flowers, stars, shells – onto the salons of the day.

Based on such analogies, it no longer seems very surprising that a musician could trace his rhythms to the massive Chestnut Oak, the bent, swan-like arms of the hairy Elm, the too-long tresses of the Weeping Willow, or the serpentine undulations of the Sleeping

Pine. Flowers have exquisite, refined rhythmic divisions to which delicate or warm colors add an intensity or a particular timbre. Childlike, I would savor the irregular recurrence of the bluish little bells of the Campanula or the purple bells of the Digitalis. "Nothing better evokes the delicious bloom of the Columbine than the charming image of five little blue or purple doves, pressed around a miniscule fountain, drinking." This comparison by Jean de Boschère states very exactly the rhythm of the flower. I cite, in conclusion, the Fuchsia, my favorite flower. I have named it in the text of my *Petites Liturgies*. The Fuchsia is decorative with its upside-down blossom, red chalice, violet petals, and stem and stamen hanging listlessly. It has a tender and nonchalant rhythm that is not unrelated to the most beautiful Deçi-Tâlas of ancient India...











5) Animal Kingdom

The Hindus have quite profoundly felt the importance of Animal Kingdom and have attached to it their principal sounds and rhythms. The seven sounds of the Hindu scale (independent of the number of çrutis that divide them, the accidentals that are affected by them, and the 72 modes that this engenders – at least in the karnâtic system) carry the abbreviated names of sa, ri, ga, ma, pa, da, and ni. Sa (from Shadja: born of six) is borrowed from the call of the peacock. Ri (from rishabha: bull) provides the bellowing of the cow. Ga (from gândhâra: that which produces song) imitates the bleatings of the goat. Ma (from madhyama: median) – the perfect or augmented fourth, the imperishable note – is conceived simultaneously with the howl of the jackal and the cry of the crane. Pa (from pancama: fifth) reproduces the cry of the kokila (the black Indian coucou). Da (from dhaivata: song of fishermen) utilizes the croak of the frog and the neighing of the horse. Ni (from nishâda: that which rests, that which finishes) is inspired from the trumpeting of the elephant. If we now consult the table of 120 Deçi-Tâlas, or popular Indian rhythms, such as they are reproduced in the *Samgîta-Ratnâkara*, we again find the influence of the Animal Kingdom. It is less a question of the voices of animals. It is primarily their movements and

²⁰*The Analogist's Journal.*

their gait after which the Deçi-Tâlas are modeled. Tâla 8 is Simhavikrama: the lion's strength. Tâla 10 is Simhalîla: the lion's game. Tâla 18 is Gajalîla: the elephant's game. Tâla 27 is Simhavikrîdita: the lion's leap. Tâla 30 is Hansanâda: the duck's voice. Tâla 31 is Simhanâda: the lion's voice. Tâla 35 is Simhanandana: the lion cub. Tâla 39 is Kokilâpriya: dear to the Indian coucou. Tâla 77 is Gajajhampa: the elephant's jump. Tâla 96 is Hamsa: the duck. Tâla 99 is Gaja: the elephant. Tâla 101 is Simha: the lion. Tâla 103 is Sârasa: the stork. Because I will analyze the 120 Deçi-Tâlas at length in the fourth chapter, "Hindu Rhythms," I am content now to cite one which well illustrates my thought: tâla 27, Simhavikrîdita, the lion's leap:



We realize at once that this rhythm subdivides into two values A and B, perpetually alternating, but that A increases and decreases while B never changes. A is amplified from  to , then returns from  to  ( |  |  |  | ) in a crescendo-decrescendo of perfectly progressive durations. The trajectory described by the lion's leap is thus well explained. As for value B, which remains immutably , it seems to represent a point of supreme altitude that can only be attained at the apex of a certain curve and for a single instant.

The gestural manifestations of Animals are diverse. Personal gestures particular to how the animal was created. A horse on the meadow, rid of its harness, is easily more beautiful – the show of suppleness, its more than extended, more than new stance. Imagine the swimming of a fish, its undulation, the vertical station of its body laterally flattened, its ease of propulsion, its speed. We assist this primitive spectacle of the perfect security of equilibrium. The flight of the scourge around our steeple does not frighten us. We feel that its stability, in the most rapid and risky movements, is of perfect ease. (Roger Reboussin, *Nature aux cent visages*, 168, 169)²¹

These few lines, written by an animal painter, nicely describe the variety of movements among different animal species: the horse's gallop, the lion's leap, the silent undulations of the black panther's stalk, the tiger's furious gestures, the fish's swimming,

²¹*The Hundred Faces of Nature.*

the bird's hovering or fluttering flight, the cricket's hop. From the colorful unfolding of the butterfly's wings to the ridiculous and terrifying yawn of the crocodile, each of these movements has a rhythm which can be translated into music...

6) Dance

"The rhythm of the march responds to the ordinary definition of rhythm itself: the recurrence of phenomena," François Guillot de Rode tells us. Let us add to this affirmation (a) that all natural recurrences are irregular.²² The march does not escape this law. It is a series of constantly avoided chutes with varying amounts of impatience or nonchalance. Let us set aside the "measured step" of soldiers, awfully artificial! The free march – the true – never carries two groups of steps with absolutely identical durations. As for the difference between marching and dancing, let us listen again to François Guillot de Rode: "Marching travels through space and time, that is a given... The first act of dance consists of the creation of a rhythmic, spatio-temporal unit." In other words, we march in a space and a time which is imposed upon us. The dancer, on the other hand, tries to create a space and a time which is personal. Philosophers establish a difference between range, which is concrete or accessible to the senses, and conceptual or abstract Space, and duration, which is concrete or accessible to the senses, and conceptual or abstract Time. The dancer, going outside of himself during his dance, constructs for himself an abstract, objective, homogenous space and time, a geometric space, a quantitative time. His rhythm is extended at the same time in the space and time designed by him: he becomes the Number.

Paul Valéry sees in dance the symbol of Life itself. Life – like a dancer – dashes and leaps outside of itself, then falls again into itself incessantly, so that the living always find themselves in each transformation, and this perpetual return assures our existence... "Life is a woman that dances, and that divinely ceases being a woman, with the leap she makes she would soar to the clouds. But as we can go neither to infinity, nor into the dream, nor

²²Messiaen does not follow (a) with (b).

in her waking, she, similarly, becomes herself again; ceases to be a snowflake, a bird, an idea; – at last to be all that the flute would like to be..." (Paul Valéry, *l'Ame et la Danse*).

Dance is at the origin of one of the most essential concepts of rhythm: *arsis* and *thesis*. These words come to us from Greek.

The often simultaneous use of the three artistic movements – poetry, music, dance – caused them to use only one single rhythmic vocabulary. They borrowed a local rhythmic movement from dance: two clear, luminous expressions that they applied to vocal or instrumental sonorous rhythmic movement. In dance they call *arsis* ascending movement – the outburst of the body – and *thesis* descending movement – the body's repose at the end of its movement. Consequently, in music (vocal or instrumental) and in poetry, they called *arsis* elevation, enthusiasm, the sounds and syllables that sang at the same moment the dancers touched the ground, either to find a simple support and elevate themselves again, or to strive toward a definitive repose. It is from the movement of dancers that the terms *arsis* and *thesis* have come to us. We call *arsis* the beginning and *thesis* the end of a choreographed movement. (Dom Mocquereau, *Le nombre musical Grégorien*, 101.)

The two primitive types of rhythm – rhythms at two equal (or spondaic) verses and rhythms aligning short, long or iambic durations – both merge into one unique principle: outburst–repose. This is the principle of rhythmic movement, or the cinematic order. Dom Mocquereau adds several corollaries to this principle: a) since outburst and repose belong to the same movement, they follow each other in an indissoluble union, b) the repose encompasses all rhythms (large and small), and c) rhythm naturally moves in binary and ternary steps which harmoniously alter each other. (See Dom Mocquereau, *Le nombre musical Grégorien*, vol. 1, chapter 5.) The *arsis-thesis* question requires extensive discussion. I will dedicate an entire chapter to it.*

Bearing in mind that dance has two essential motors at its origin: combat and love, dance is restored to two vital instincts, the instinct of conservation and the instinct of procreation: dances and war, dances and seduction. Aside from these origins, dance had to satisfy other needs of human nature, most often sentimental needs, that tempered the brutality of instinctive needs. The intervening mystic necessity superimposes rites onto passionate gestures and, the more the evolution of the race is advanced, the more this rite is distanced by stylization, to the point of sometimes making it lose all its original appearances. (Raymond Cogniat)

This is the case of the sublime dancers of Bali (island province of Indonesia, celebrated for its dances and music). It was at the 1931 World Exposition in Paris that I first saw and

* In Volume IV of this Treatise.

heard Anak Agung Gede Mandra, his Balinese orchestra, or gamelan, and the marvelous dances of the eyes, neck, and hands, whose sonorous and visual rhythms impressed me so strongly that I was marked, impregnated, transformed for all my life. I salute my sisters and brothers from Bali, who love rhythm as I do...

We know that the dances and the music of Bali originate from ancient Hindu traditions. These traditions have such importance that I want to end this paragraph with a glimpse of the dance as it is taught and practiced in India. "Hindu dance is the physical manifestation of cosmic rhythm." (Srimati Usha) Shiva-Nataraja is the God Shiva in the form of an eternal dancer. In dancing the Tandava, he destroys and rebuilds, he perpetually annihilates and resuscitates illusions and disillusion. Numerous Hindu sculptures represent this dance of Shiva.

The harmonious disposition of the dancer's six, eight, or ten arms, of his head and of his legs, express the incessant, perfect equilibrium between the creation and the destruction of the Universe, between birth and death. The contrast between the movement of his members (arms and legs) and the immobility of his face express the paradox of time and of eternity, of mortal existence and of the indestructible Self. (Pierre Rambach and Vitold de Golish)

Nataraja signifies King of the Dance. Shiva-Nataraja dances always and everywhere. All the activity of life is maintained by Shiva "in numerous phenomena, that he changes, creates, and destroys turn for turn. These manifestations are always the expression of his cosmic dance." (Srimati Usha) The musical instruments that accompany Hindu dance are drums (mridangam, khôl, tablas), cymbals (khunjunis), flute, and plucked stringed instruments (vina, sarengi). I must also add sleigh bells (ghungurs), strapped to the dancer's ankles. The drums mark the rhythms of the dance. These rhythms are learned by heart – both by the dancer and by the drummer – by means of rhythmic syllables called bôls. These syllables at once represent the durations, the intensities, the timbres and the pitches which are linked to percussive style and placement. A group of bôls is called thora: thousands exist which have been transmitted through the oral tradition. In his Tetralogy, Richard Wagner has invented a musical language (with all the force of the word "language"), by means of the "leitmotif." Leitmotifs – melodic, harmonic, or rhythmic

themes – represent mother-ideas. Their variations and combinations tell us about the actions of the elements (water, fire, earth, sky) and the sentiments of the different characters who live in these elements. Similarly, Hindu dance is a language in every sense of the word. It is a double language: a language of body movements, and especially a language of gestures. This language is perfectly clear for the initiated "at a point when the dancer can dance a solo of four or five hours without boring the audience." We are not speaking of pure acrobatics or harmony of movement. Dance speaks: it tells the public of the great episodes from Hindu mythology. At the inception of most oriental languages that recognize several meanings for each word, the dancer's body and the gestures express a mother-idea, an action-type, which unfolds into quantities of secondary notions. In the body's movements, the entire body enters into the game with diverse and superimposed rhythms, of which each detail is important. To speak only of the head, the "Natya-Shastra" defines a) 13 movements of the head, b) 36 expressions, c) eight types of looks, d) nine movements of the eye, e) nine movements of the eyelids, f) seven movements of the eyebrow, g) six movements of the nose, h) six movements of the mouth, i) four movements of the face, and j) nine movements of the neck. The combination of foot positions and body movements results in attitudes, leaps, turns, and steps: the whole forming a knowing polyrhythm. I borrow from Srimata Usha the explanation of the three head movements according to the "Abhinaya Darpanam" classification: *Udvahita*: raised head: significance: "to design a banner, the moon, the sky, a mountain, celestial bodies, the gods, the sages." (*la danse hindou*, by Srimati Usha)²³ *Adhomukha*: lowered head: significance: "To express shame, pain, anxiety, fainting, things placed low, a plunge into water." (id.) *Alolita*: turning head: significance: to express drowsiness, the expropriation of a bad spirit, drunkenness, the action of traveling, a savage and uncontrolled laugh." The language of gestures or *mudras* is more expressive still. "Its explanatory value is such that it truly permits the spectator to read a dance," says Srimati Usha. Two kinds of *mudras*

²³*Hindu Dance.*

exist: the mudras for one hand, and the mudras for two hands. I borrow again from Srimati Usha the explanation of a few mudras. Three mudras, taken from 28 mudras for one hand mentioned in the "Abhinaya Darpanam": *Chandrakala*: significance: "the moon, the face, the crown of Shiva, etc." (id.) *Mayura*: significance: "the neck of the peacock, an ivy, a bird, a decoration on the side, the water in a river, etc." (id.) *Alapadma*: significance: "a lotus in bloom, a circular movement, a mirror, a bosom, beauty, the full moon, a hill, a lake, a prayer, etc." (id.) Three mudras are taken from 23 mudras for two hands mentioned in the "Abhinaya Darpanam": *Anjali*: significance: "a salutation, a divinity, a Brahman." (id.) *Pasa*: significance: "a quarrel, an oak, a necklace." (id.) *Puspatuta*: significance: "an act of adoration consisting of balancing lamps before the image of a god, the absorption of water, an offering, the evening, a hand endowed with magical power." (id.) Because of Shiva, the cosmic master of everything down to the incessant polyrhythms of body language and gestures – knuckling under the rhythmic syllables called bôls that determine durations, intensities, the timbres and pitches of the rhythms, the tablas or the mridangam – everything in Hindu dance is rhythm and its source...

7) Language and Poetry

We will see in the following chapters the importance of Greek Rhythms: rhythms that at once govern the Poetry, Music, and Dance of ancient Greece. We will again see the theory of accentuation, the issue of spoken language, and how the greatest Classical and Romantic authors can be analyzed according to this theory, with Mozart in mind.* We also know with what care Monteverdi and Mussorgsky have tried to reproduce the inflections of speech in their recitatives. Lully learned declamation by listening to a famous French tragedian from the seventeenth century, la Champmeslé. Finally, Debussy has created an extraordinary recitative in *Pelléas et Mélisande*, at once very melancholic and very musical. It is built on sharps and flats, louds and softs, fasts and slows, which correspond to the spoken language on which it is based.

* In Volume IV.

I would like now to speak to my musician reader about the analytical processes employed by Pius Servien to discover the rhythmic secrets of French prose and poetry. Will he, perhaps, find musical rhythmic organizations therein?... In French prose and poetry Pius Servien sees two rhythms: the rhythm of intensities and the rhythm of timbres. To analyze the rhythm of intensities in a prose text, he counts "how many syllables there are before the first accented syllable, inclusively: and so on." Let us take this text by Rousseau : "Le vorace épervier, le corbeau farouche / et l'aigle terrible des Alpes / faisaient seuls retentir de leurs cris ces cavernes. / Tout respirait ici / les rigueurs de l'hiver et l'horreur des frimas. / Les feux seuls de mon cœur me rendaient ce lieu supportable / et des jours entiers s'y passaient à penser à toi."²⁴ The accents being underlined, I count the syllables according to the process indicated above, suppressing the mutes that precede a punctuation or pause, and I obtain a succession of numbers:

3 3 3 2 / 2 3 3 / 3 3 3 3 / 1 2 3 / 3 3 3 3 / 3 3 3 2 3 / 3 2 3 3 2

"The distinctive property of this passage shows itself in this succession of numbers. We find here (with a single exception) uniquely the numbers two and three, the latter with an extraordinary frequency." (Pius Servien, *les rythmes comme introduction physique à l'esthétique*).²⁵ In truth, one would have been able to analyze Rousseau's text by means of shorts and longs, giving a succession of feet in Greek fashion. This returns to the same:

Le vorace (anapest) - épervier (anapest) - le corbeau (anapest) - farouche (iamb)
 U U — U U — U U — U —

(the mute does not count because of the breath) | et l'ai... (iamb) ... gle terri...
 U — U U —

(anapest)... ble des Alpes (anapest) (the mute does not count because of the breath) |
 U U —

faisaient seuls (anapest) - retentir (anapest) - de leurs cris (anapest) - ces cavernes
 U U — U U — U U — U U —

(anapest) | (the mute does not count because of the period) Tout (isolated long at the
 —

²⁴The voracious sparrow hawk, the wild raven, / and the terrible eagle of the Alps / make these caverns retain their solitary cries. / Everything breathes here / the harshness of winter and the horror of the icy mist. / The lonely fires of my heart made this place bearable / and the days I spent there thinking of you.
²⁵*Rhythms as a Physical Introduction to Aesthetics.*

beginning of the phrase, an anacrusis in Greek metrics) - respirait (anapest) -

U U —

ici (iamb) | les rigueurs (anapest) - de l'hiver (anapest) - et l'horreur (anapest) - des

U — U U — U U — U U — U

frimas (anapest) | Les feux seuls (anapest) - de mon coeur (anapest) - me rendaient

U — U U — U U — U U —

(anapest) ce lieu (iamb) - supportable (anapest) (the mute does not count because of
the breath) | **et des jours (anapest) - entiers (iamb) - s'y passaient (anapest) -**

U U — U — U U —

a penser (anapest) - à toi (iamb).

U U — U —

In poetry, examples abound. One, chosen at random:

"Le vierge, le vivace et le bel aujourd'hui" (Mallarmé)²⁶

This gives the numbers: 2 4 3 3 / and the Greek feet:

Le vier (iamb) - ge, le vivace (Peon 4) - et le bel (anapest) - aujourd'hui (anapest).
 U — U U U — U U — U U —

The rhythm of timbres is more subtle. Everyone knows the admirable *Ballade des dames du temps jadis* ²⁷ by François Villon, and his melancholic lullaby on the sweet and mauve sonorities of an and aine, counterbalanced by is and ous. "Dⁱctes moy ou, n'en quel pays, / Est Flora la belle Rommaine, / Archipiades, ne Thais, / Qui fut sa cousine germaine, / Echo parlant quant bruyt on maine / Dessus rivière ou sus estan, / Qui beaulté ot trop plus qu'humaine. / Mais ou sont les neiges d'antan?"²⁸

This verse from Verhaeren, "Voici le vent cornant novembre,"²⁹ unites the rhythm of Timbres to that of intensities. It is an iambic dimeter (four iambs):

Voici | le vent | cornant | novembre.
u — u — u — u —

Almost all the longs are an: the strike of the three ys and the clarity of the os, adds again to

²⁶"The Virgin, the vivacious and the beautiful present."

²⁷Ballad of the Women of Yore.

28"Tell me now in which country, / Is Flora the beautiful Roman, / Hipparchia, and Thaïs, / Who was his first cousin, / Where is Echo, possessed by no one, / Above the river or over the marsh, / Whose beauty is more than human. / But where are the snows of yesteryear?"

²⁹"Here is the noisy November wind."

the timbral power.

Rhythm and timbres in sweet waves, like the water on the edge of a river, and the wool on the flock of sheep far away on the hill:

"Ondoe une blancheur animale au repos"³⁰ (Mallarmé, *l'après-midi d'un Faune*.)

Bluish rhythm and timbre, like being drowned in fog:

"La montagne moite et légère / Entourant l'air calme du jour." (Cécile Sauvage, *Mélancolie*.)³¹

Symmetric rhythm (two iambs framing two Peon IVs, twice in succession), denser timbres because of the dentals (t and d):

"Je suis autour de toi comme l'amande verte / Qui ferme son écrin sur l'amandon laiteux"
U — U U U — U U U — U — U — U — U U U — U U U — U —

(Cécile Sauvage, *L'âme en bourgeon*.)³²

Hard, brusque sonority, shocking timbres, accellerando and crescendo until the dry fortissimo: "Et les cavaliers lumineux dont les chevaux battaient le ciel de leurs sabots lunaires descendirent en bloc vers le poteau qui indiquait le but." (Pierre Reverdy, *les jockeys camouflés*.)³³

True music of words, that opens like profound wells: "Ta chevelure d'oranges dans le vide du monde / Dans le vide des vitres lourdes de silence / Et d'ombre où mes mains nues cherchent tous tes reflets." (Paul Eluard, *Capitale de la Douleur*.)³⁴

In conclusion, a magnificent example of Claudelian verses, in which rhythm can serve as a model to many composers of music:

Car de même qu'un homme par une matinée sereine et pure contemple la terre,
Et que son oeil qui fait la différence entre deux herbes traverse la distance et embrasse l'étendue,
Et de même que par la nuit, avec la mer dans le vent, on entend la voix de l'enfant qui pleure,

³⁰"An animal's whiteness undulates at rest."

³¹"The moist, light mountain / Turns the day's calm air." *Melancholy*.

³²"I am wrapped around you like the green almond / That closes its shell around the milky kernel." *The Budding Soul*.

³³"And the luminous horseback riders whose hair brushes against the sky of their lunar hooves will descend in a block around the pole that indicates the end." *Camouflaged Jockeys*.

³⁴"Your hair of oranges in the emptiness of the world / In the emptiness of the heavy windowpanes of silence / And of the shadow where my naked hands search all your reflections." *Capital of Sorrow*.

C'est ainsi que mon esprit, comme le Sage qui découvrit les Sept Notes, du sens aigu de la chose plus basse ravi au supérieur,
 Monte de cause en cause et s'élève comme dans l'enlèvement de la flamme. O vision!
 ô éveil!
 Et voici qu'arrête dans mon extase je n'entends plus que le bruit premier. Le bouillon de la source, le jaillissement des eaux éternelles.
 Comprenez la similitude du sommeil:
 Celui qui tient son regard fixe cesse d'abord de voir les formes, puis les couleurs, et puis il ferme les yeux,
 Et de même l'ouïe cesse de percevoir et puis d'entendre,
 Et puis l'odorat meurt: et puis le tact s'éteint,
 Et le dernier le goût subsiste, et c'est la saveur de Dieu, la Sagesse par qui la bouche et l'âme s'emplissent de miel et d'eau. (Paul Claudel, *le repos du septième jour*.)³⁵

Matyla Ghyka recognizes five components of rhythm in prosody: arithmetic rhythm, prosodic rhythm, tonic rhythm, rhythm of pitch, rhythm of timbres. Arithmetic rhythm = number of syllables. Prosodic rhythm = short and long durations. This is what we will study specifically in the chapter on Greek Metrics. It is the musician's *Quantitative order*. Tonic rhythm = intensities; this is what Pius Servien has brought to light by cutting prose and verse from tonic accent to tonic accent. It is, for the musician, the *Theory of Accentuation* that we will study in the chapter entitled "Mozart and accentuation." Rhythm of timbres: we have seen that the greatest poets are specially gifted in this. Since "Klangfarbenmelodie," or the melody of timbres utilized by Schoenberg and especially by Anton Webern, young musicians try everything, at all cost, to attribute a different timbre to each sound. This is the *Phonetic order*, which includes John Cage's works for prepared piano, and the mode of attacks in my *Mode de valeurs et d'intensités* for piano.

The rhythm of pitches merits a special mention. In prosody, this is a sort of melody of vowels.

³⁵"Because just as a man on a serene and pure afternoon contemplates the earth, / And because his eye, which marks the difference between two plants, travels the distance and embraces the stretch, / And just as through the night, with the sea in the wind, one hears the voice of the child who cries, / It is thus that my spirit, like the Sage who discovered the Seven Notes, of the acute sense of the lowest thing delights in superior rapport, / Rises from cause to cause and lifts itself as in the rising of the flame. O vision! o awakening! / And here, stopped in my ecstasy, I no longer hear the first noise. The bubbling of the spring, the gush of eternal waters. / Comprehend the similarity of the sun: / He who holds his fixed look ceases at first to see the forms, then the colors, and then he closes his eyes, / And similarly the ear ceases to perceive and then to hear, / And then the odor dies; and then touch is extinguished, / And lastly, taste subsides, and this is the savior of God, the Wisdom by which the mouth and the soul fill with honey and water." *Rest on the Seventh Day*.

*In Volume IV of this Treatise.

The succession o - ɔ - α - a - ε - e - i,³⁶ forms a type of ascending scale; the succession œ (as in "peur"), ø (closed as in "peu"), y (as in pur), and the succession on - an - in - un, are equally ascending. The ascending, descending or mixed character of the vowel sequences in a multi-syllabic word plays its role in the phonetic properties of this word. Because each word, each phrase, has its melodic line, governed by the relationships of the pitches between successive vowels. (Matila Ghyka, *Essai sur le rythme*.)

It is what musician-rhythmicists could call, a little abusively, *the Melodic order*. It is, in music, a sort of melody of downbeats that can exist outside of all musical sound simply by the use of noises or different percussive pitches. (The tablas or mridangam players in India are very familiar with this rhythm of pitches which is linked to the style and placement of the downbeat.) Several contemporary musicians in particular have used this genre of rhythm since Stravinsky's *Sacre du Printemps* from Jolivet and myself, to the final research of Pierre Schaeffer (musique concrète). The best example of the rhythm of pitches is without a doubt "Ionisation" by Edgar Varèse, written for an orchestra of percussion instruments covering several registers.

8) Plastic Arts

The distinction between meter and rhythm, between cadence and dynamic pulsation, can be transposed to the arts of space. Here we can also find uniformly repeated motifs, isotropic, static partitions of space, and regular tilings as in crystalline collections. In contrast, there is also dynamic rhythmic growth such as in living beings and in symphonic arrangements that procure the use of irrational relationships which were brought back to light and put into proportion through Greek and Gothic processes. (Matila Ghyka, *Essai sur le rythme*.)

Inversely, the notation continues. Irrational relationships or proportions, although a deductive characteristic of the arts of space, can sometimes be applied to the arts of duration, as it falls under Sonnenschein's definition: Rhythm is this property of a succession of events in time which produces, in the mind of the observer, the impression of a proportion between durations and diverse events or groups of events of which the succession is composed. (id.)

In summary, recurrence, repetition, and symmetry, as well as the only proportion in an apparent great liberty, belong at once to Music and to Architecture. Paul Valéry also

³⁶Because of inconsistencies in English pronunciation, I have transcribed Messiaen's succession of French vowels into the International Phonetic Alphabet. The original succession is as follows: ô - o - â - a - è - é - i.

unites Architecture and Music by situating them in the world of Laws and Forms, which obey each other:

Music and Architecture make us think of everything else; they are in the middle of this world like monuments of another world; or for example, this and that, diffused, of a structure and a duration related not to being, but instead to forms and laws. They seem dedicated to recalling to us directly: on one hand – the formation of the universe, on the other – its order and stability. They invoke the constructions of the mind, and its freedom, that studies this order and reconstitutes it in a thousand ways. They neglect then the particular appearances by which the world and the mind are ordinarily occupied: plants, animals and people... Similarly, I have sometimes observed, in listening to music with equal attention to its complexity, that I no longer perceive, in any way, the sounds of instruments as much as sensations in my ear. The symphony itself makes me forget the sense of hearing. It changes promptly, so exactly, in animated truths and in universal adventures, or again in abstract combinations, that I no longer have an awareness of the sensible intermediary, the sound. (Paul Valéry, *Eupalinos*, 56.)

It can be said that sculpture has an equal influence on music. There is an evident rapport between the rhythm of *densities* in music and the rhythm of *volumes* in sculpture. Volumes: hear the concave and the convex. Densities: hear the larger or smaller number of voices, sounds, or simultaneous timbres. One can find a certain rhythm of densities, of thicknesses, in Varèse and Jolivet. The process of swelling a sound, used in musique concrète under the name of "grosse note," that arrives at making this sound into an entire group of sounds by development of the attack, of the body, and by the extinction of the initial sound, is again connected to the rhythm of densities. Another sculpture-music analogy exists, that of light and silence. In comparing the heavy and light sculptures of Jacques Lipchitz (I mean his massive rocks and his hollow bronzes), Roger Vitrac awards him a singular compliment:* "You have observed," he says, "the two single noble attitudes that he agrees to take with *light: those of submission or compliance*." In changing the sentence a bit, one could apply it to all contemporary musicians who understand the sound-silence duel: to André Jolivet for his *Mana*, to Pierre Boulez for his *Structures*. Faced with *silence*, they have adopted in their turn, the only two possible attitudes: *submission or compliance*.

* (I have permitted myself a second citation of this very important text).

I have personally been much more influenced in my own music by the magic of colors in painting and by the art of stained-glass. The nearby rainbow, despite the predominant blue or violet, the large roses, the North and South crossbars of Notre-Dame in Paris or of Jesse's tree in the Chartres Cathedral, the immense stained-glass windows of the Sainte-Chapelle, are surely at the origin of certain rhythms and modes used in my works. The extraordinary voluptuousness of color in certain paintings by Robert Delaunay – *Première fenêtre simultanée*, *Formes circulaires (le soleil et la lune)*, *Femme nue lisant*, especially in the colored disks of *La joie de vivre*³⁷ – has always awakened in me the audio-visual sensation of infancy provoked by the wonder of soap bubbles. In the course of my captivity, colored dreams have roused the harmonies and rhythms of my *Quatuor pour la fin du Temps*. Finally, in the ninth movement of my *Turangalila-Symphonie*, I have utilized a rhythmic mode established on a rhythmic chromaticism of 17 durations (going from a value of one sixteenth-note to a value of 17 sixteenth-notes), distributed simultaneously and in no particular order to five diverse timbres of percussion instruments. The rhythm of each percussion instrument is doubled by the chords that are its resonance: these chords, executed by the soloists in the muted string quintet, reinforce the timbre of the percussion instrument by use of a "mode of limited transposition" which is different for each timbre. At the same time, it renders the durations more appreciable to the ear. The harmony here depends then entirely on rhythm and timbre. It unites rhythm and timbre by underlining each one. It emphasizes the *Quantitative* and *Phonetic Orders* through diverse correlations: it creates colored rhythms.

It remains for us to speak of colored hearing. This consists of anastomosis (nets of communication between two nerves) that link certain cells of the audio and visual centers. This disordering is a particular form of synesthesia in which hearing sounds produces the phenomenon of colored vision. I had a friend stricken with this agreeable malady, of which he was very proud: Charles Blanc-Gatti, the painter of sounds. I am looking now at his

³⁷*First Simultaneous Window, Circular Forms (the sun and the moon), Nude Woman Reading, The Joy of Life.*

paintings: *Modulation, ondes sonores des orgues, Carillon de Malesco*.³⁸ The titles say well enough that he painted what he heard. In addition to the three paintings above me, he has left me an album of little pastels painted according to my *Nativité du Seigneur*³⁹ for organ: a thin, yellow, undulating flame is lost in a night of profound, leisurely blue tainted with green (this is "La Vierge et l'Enfant");⁴⁰ charcoal blue, hemmed with royal blue clouds, standing black forms (towers, town, trees, who knows what else...), the flight of mauve wings, a low light that rises (these are "les Bergers");⁴¹ golden cones, the blue-green of very black night, blue sapphire on the first plane (these are "les Enfants de Dieu");⁴² two luminous, chiseled rays, issued from an invisible spring, somewhere very high; a very clear, gray night, very dark blue-green; the blue patches of cobalt touch each other and lose themselves on the far away horizon (these are "les Mages").⁴³ According to Blanc-Gatti, these colors and forms correspond to what he has seen during the hearing of my organ pieces...

The things that form in synesthetic visions, being made for other uses, cannot be named by our words. Here we find straight lines, curves, circles, bubbles, a sheaf of lines, stylized "flowers;" but not – or only by analogy or verbal license – roses, irises, trees, birds, and even fewer faces. Man, animal, and even the "irregular vegetable" are banished from this world. The rock and the cloud, or rather their phantoms, only figure into the equation by comparison, analogy and metaphor, because we do not have other familiar words and other images to identify these original phantasms. (Pierre Quercy, "l'hallucination.")

"Farsighted nature," says Blanc-Gatti "however, has not wanted to deprive individuals who do not experience the phenomena of colored hearing, of these beautiful visual spectacles. At their whim, in Mexico, a little cactus of gray-green color grows, garnished in silky, bleached hairs: the *Echinocactus Williamsii*." (Blanc-Gatti, "des sons et des couleurs.")⁴⁴ From this cactus, better known under the name of Peyotl, is extracted an alcalide: mescaline. This poison transforms the auditory sensations into colored visual

³⁸*Modulation, sonorous organ waves, Carillon of Malesco.*

³⁹*Birth of the Saviour.*

⁴⁰*The Virgin and the Infant.*

⁴¹ the Shepherds.

⁴²Children of God.

⁴³The Magi.

sensations. In addition, it destroys the notion of time. "The brain is surprised by the abundance of images because it does not usually have to perceive so many in the same lapse of time: its imaginative, creative activity prodigiously accrues the mistake." (A. Rouhier, "le Peyotl.")⁴⁵ Here is a mescalinic vision, described by Weir Mitchell:

The summit of a gigantic cliff is projected over an abyss of an unheard-of depth. My invisible charmer places the stony claw of an immense bird on the edge. Above this foot or hanging paw, a shred of I-don't-know-what unfolds and begins to float on the gulf to a distance that appears to represent Time as well as the Immensity of Space. Then thousands of purple waves appear, half transparent and of ineffable beauty. From time to time, the tender, golden clouds seemed to evade each other and float outside of their folds with great clarity about them. Things similar to green birds detached and threw themselves, flying, into the gulf below. I then see clusters of rock hanging in a mass like the claws of a bird's foot, and it seems to me that there have been multiple down-theres, far away, above, in the infinity of the black gulf. (Cited according to A. Rouhier, *le Peyotl*.)

Mescalinic visions are like sisters to those of Synesthesia. My colored dreams were of the same order. I alone have followed the process in exact opposition to that of Blanc-Gatti: *he painted what he heard – I transformed into sounds and rhythms what I have seen*. A parallel between sonorous and luminous vibrations to me seems full of lessons. *For colors:*

It is red that contains the longest wave length, and that diminishes when passing to orange, to yellow, to green, to blue and to violet: this last color having the shortest wave length. By contrast, the most elevated frequency of vibrations is arranged in reverse order in such a way that violet has the largest number of vibrations and red the smallest." *For sounds:* "It is the low sounds that also have the greatest wave length, those which become subdued in passing by all the intermediary sounds, and end on high pitches with the shortest wave lengths. With color, the frequency of sonorous vibrations grows in reverse order. Low sounds carry numerous vibrations which are elevated relatively little when compared to high sounds, for which the frequency is very elevated. (Blanc-Gatti, *des sons et des couleurs*.)

Before leaving painting-music and sound-color relationships, I hope I will be permitted to add a little secret. By a singular failing of my mind, I have always loved the monsters of the Cretaceous period (brontosaurus, diplodocus, stegosaurus, tyrannosaurus rex), and the painters of these monsters: Jérôme Bosch, Goya in *Los Caprichos* and *Los Disparates*, Picasso, Max Ernst, Dali, Labisse. Following their example, I have tried to produce monsters of music: I have never succeeded. Music can produce terror, fear, the

⁴⁴Sounds and Colors.

⁴⁵Peyote.

supernatural (see the "Casting of the Magic Bullets" in *Freischütz*, the "scene of the Commandeur" in *Don Juan*, the scene between Alberich and Hagen in the *The Twilight of the Gods* and its black prelude, Boris' hallucination, the prisoners from *Pelléas*, the murder of Marie in *Wozzeck*), but there is in the art of sounds and rhythms an intellectual ecstasy absolutely improper to monstrosity and taste – as to laughter and comedy. All these things are based exclusively on an anthropomorphic criterion which is quite far from musical abstraction...

CHAPTER III

GREEK METRICS

- A) Greek Metrics –
- B) Survival of Greek rhythms – Analysis of the second movement of Beethoven's 7th Symphony – *le Gibet* and *Scarbo* by Ravel
 - Appendix 1: comparison between Greek and Latin rhythms
 - Appendix 2: Latin metrics
 - Appendix 3: Survival of Greek metrics in Bulgarian folklore
 - Appendix 4: Modernization of ancient meters
- C) Analysis of the 39 choruses of *Le Printemps* by Claude Le Jeune
- D) Greek rhythms used and transformed in my works:
 - Turangalila-Symphonie* – *Sept Haïkai* – *Messe de la Pentecôte* – (Short citations)

A) GREEK METRICS

A) GREEK METRICS

Our knowledge of musical art in ancient Greece remains incomplete. Musical and orchestral documents exist in small quantities. By contrast, literary documents abound. Fortunately, among the Greeks, Poetry, Music, and Dance were intimately linked; so intimately that the same author utilized the three arts simultaneously and the same rhythm was common to them all. Greek Poetry sufficiently enlightens us on Greek rhythmic practice.

This rhythmic practice is supported by an extremely simple notion: one long equals two shorts. The rhythms, or feet, were grouped into a very small number of longs and shorts. The systematized combination of several feet gave birth to the verse. Several assembled verses consisted the strophe. A combination of two similar strophes (Strophe-Antistrophe) and of a third differently structured strophe (Epode), is called a Triad. These different elements are organized into immense literary and musical constructions such as the musical mode dedicated to Apollo; the Dithyramb in honor of Dionysus; the Ode, illustrated by Pindar; the tragedy, immortalized by Aeschylus, Sophocles and Euripides; the comedy, by Aristophanes; and finally the poets, Alcaeus and Sappho (7th century BC), who created alcaic and sapphic strophes and utilized the Paian, or song of joy, and the Threnody, or deploration. If Greek art has submitted to diverse influences – the island of Crete, the Dorian invasion, Thrace-Thessaly, Asia Minor – Latin art has submitted to Hellenic influence, and we find Greek rhythms used by Latin poets.

Metrics – the science that explains the laws of the different verses, and consequently their rhythms – has had several Greek and Latin representatives. The two principal Greek metricists are Aristoxenes of Tarentum (born around 350 BC), and Hephaestion (2d century AD).

The foundation of Greek metrics was, I repeat, the distinction between long and short, being heard as one long equals two shorts. The primary characteristic of Greek verse is precisely the succession of longs and shorts. The duration of pronouncing a short syllable was called metron: the long then had two metrons. Associated by three, four, five, or six, the long and short durations form feet.

It is useful to indicate the long durations by a horizontal line and the short durations by a horseshoe pointing upward. Here are the two conventional signs:

long: —

short: ∪

The following table comprises all the known feet. I will indicate the shorts with a quarter-note: ∪ = ♩ and the longs with a half note: — = ♩

Table Of Greek Rhythms

at 2 metrons:

Pyrrhic (or Poriamb)

∪ ∪ ♩ ♩

at 3 metrons:

Trochee (or Choriamb)

— ∪ ♩ ♩

(in Greek: trochaïos, de trekho: to run)

Iamb

∪ — ♩ ♩

(The iamb is the opposite of the trochee).

This is the best known and the most important of Greek rhythms. St. Augustine and Paul Claudel saw this as the fundamental rhythm. It imitates the beating of the human heart if each beat is divided as follows:

contraction = ♩ , suspension = ♩ , rest = ζ

This invention is attributed to the poetess Iambus and comes from her Greek name: Iambos. Another etymology: iapto: to yearn, to hurl oneself – no doubt because of the hurling of the short toward the long. The rhythm of the Passacaglia is an iambic rhythm.

Tribrach

o o o • • •

at 4 metrons:

Spondee

— — o o

(The two longs give a sensation of calm and peace; this foot is often used as a substitute for another foot.)

Dactyl

— o o o • •

(In Greek: dactylos: digit, finger. This name comes from the resemblance to the three bones of each finger. A rhythm of solemn character, it was very much in use among the Greeks. The Allegretto of Beethoven's seventh symphony is constructed entirely on dactyls and spondees.)

Anapest

o o — • • o

(In Greek: anapaistos, diana, paiô: to knock backwards: because the anapest is the opposite of the dactyl. Many examples can be found in the lightest of our late nineteenth-century authors: they have been generally accused of vulgarity and triviality. However, this rhythm is defended in flowery counterpoint!... For the Ancients, it was a powerful and warlike rhythm!)

Proceleusmatic

o o o o • • • •

Amphibrach

o — o • • •

(See the explanation of the amphimacer or cretic, with which it must not be confused.)

at 5 metrons (1st type):

This first type of rhythms at five metrons comprises the feet of two longs and one short, the short being placed at the beginning, in the middle, and at the end of the foot, according to the principle of permutation or inversion.

1st case, short first:

Bacchius (or Bacchee) ∪ — — • • •

Greek name: Backheïon: comes from Backheïos, a Greek epithet attributed to Dionysus, who has become Bacchus, the Latin name of God. Backheïos, Bacchus, etymology: wakh (Indo-european root) = to howl; because of outcries from drunken people, Dionysus being the God of wine and the symbol of the productive forces of Nature.

(Maurice Ravel has used as a rhythmic pedal in his *Gibet* for piano a sort of

Dochmiac: iamb and bacchius: ; • ; • •

2d case, short in the middle:

Amphimacer (or Cretic) — ∪ — • • •

(This rhythm is of extreme importance. It is without a doubt very ancient, as are all the rhythms based on the number five, the number of fingers on the hand. One can find this in the 120 Hindu Decî-Tâlas from the Çârngadeva, under the name of

Denkhî: S | S (♩ ♪ ♪). Its first Greek name, Amphimacros, signifies

long all the way around, a long casing, and in fact, the long surrounds the short, since it consists of two longs surrounding a short. Its second Greek name: Crêticos, signifies coming from the isle of Crete – if we imagine that the isle of

Crete was at the apex of its civilization before 2000 BC, we have here a new proof of the antiquity of rhythm. The amphimacer is the opposite of the amphibrach (♪ ♪ ♩): two shorts surrounding one long; they are both non-retrogradable: from left to right or from right to left, the order of these values remains the same. The amphimacer or cretic is the oldest, the simplest and the most natural of these non-retrogradable rhythms. It is found among our classical musicians in this corrupted form: ♪. ♪ ♩ which destroys the non-retrogradation. I have used it all my life as a model, and always in its pure form, Indo-Greek, without dotting the 1st value, and by diminution: ♪ ♪ ♩

3d case, short at the end:

Antibacchius

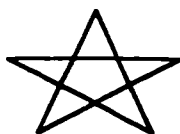


(retrograde of the bacchius)

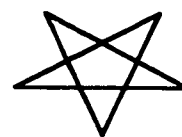
(The bacchius, the amphimacer and the antibacchius are found in Stravinsky's *Petrouchka*.)

A few reflections on the number five and the three Greek rhythms at five metrons which are comprised of two longs and one short. These rhythms are based on five, the number of fingers on the hand. The **Amphimacer**, or cretic (Denkhî of the Hindus): — ♩ — (♪ ♪ ♪), is a non-retrogradable rhythm. It is comprised of three attacks, and divides the five into 2 + 1 + 2. It is the masculine symbol for this title. The number five is otherwise the symbol of man in general, with his four limbs and the mind – the daemon, the creative force which surmounts them. The pyramids of ancient Egypt express the same idea: the grand pyramid of Kheops or pyramid "Ta Chut" and the pyramid "Chaf-Ra" are quadratics, says Bindel, and their summit, bathed in sun, "planes a fifth above the tetrad which is found below." Same idea again in the pentacle and its reversal.

The pentacle creates the form of a star:



its reversal:



evokes a star that falls from the sky, a fallen angel. The right star is like a good genie: an Agathodaïmon. The reversed star is like a bad genie: a Kako-daïmon. Similarly, the

Bacchius: — — — (♩ ♩ ♩) which places the fifth at the beginning, (the spirit above) no doubt represents the creature made noble by Good – spiritual intoxication.

Similarly, the **Antibacchius:** — — — (♩ ♩ ♩) which places the fifth at the end, (the spirit below) no doubt represents the creature debased by Evil – material intoxication.

at 5 metrons (2d type):

The second type is comprised of the feet of three shorts and one long, the long always being displaced according to the principle of inversion. These are the four peons. The peon was the rhythm for the song of joy, or Paian. As is normal in a series of inversions, the peons are retrogrades of each other: Peon III is the retrograde of Peon II, Peon IV is the retrograde of Peon I. The first peon has been used by Maurice Ravel in the general Dance at the end of *Daphnis et Chloé* as an ostinato bass accompaniment for the bacchiac dipody on the E-flat clarinet. Marcel Dupré, in the first movement of his *Symphonie-Passion* for organ, utilizes the first and the fourth peon, alternated with Epitrites II and III.




Peon I	— — — —	♩ ♩ ♩ ♩
Peon II	— — — —	♩ ♩ ♩ ♩
Peon III	— — — —	♩ ♩ ♩ ♩
Peon IV	— — — —	♩ ♩ ♩ ♩

(The single long is an exception. It seems more in line with the Greek spirit of dividing the peons into a pyrrhic (♩ ♩) plus a ternary rhythm:

Peon I: ♩ ♩ | ♩ ♩ = trochee and pyrrhic;

Peon II:		= iamb and pyrrhic
Peon III:		= pyrrhic and trochee;
Peon IV:		= pyrrhic and iamb.)

at 6 metrons:

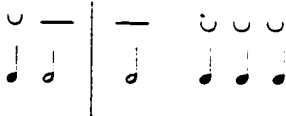
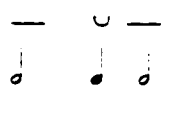
Ionic Major	
Ionic Minor (reversal of preceding)	
Molossus	

at 7 metrons (epitrites):

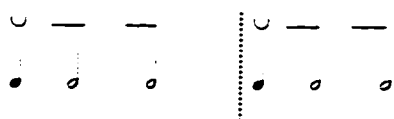
These feet are rare among the Greeks; but they hold great interest for modern musicians and rhythmicists. They are comprised of three longs and one short. The short is displaced according to the principle of inversion already encountered in the rhythms at five metrons. As is normal in a series of inversions, the epitrites are retrogrades of each other: Epitrite III is the retrograde of Epitrite II, Epitrite IV is the retrograde of Epitrite I.

A few examples of rhythms with five morae¹ of two types (with two longs, and with a single long).

Olympic II, *Pindar*:

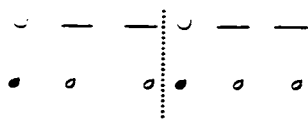
		Cretic dimeter (2 amphimacers)
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¹ Mora (singular) refers to a unit of metrical time in ancient Greek and Latin poetry. It is the equivalent of one short duration.

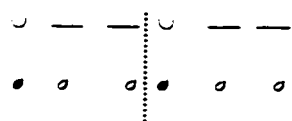


bacchiac dimeter (2 bacchius)

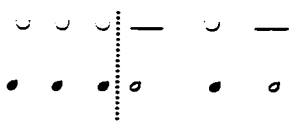
Agamemnon, *Aeschylus*:



bacchiac dimeter (2 bacchius)



idem.

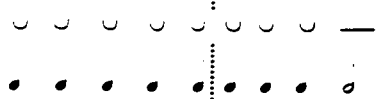


dochmiac (iamb altered into tribrach = cretic)

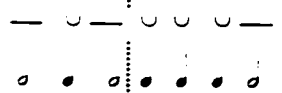
Hymn to Isis, *Mesomedes*:



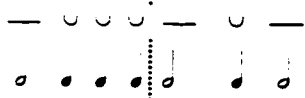
antibacchius and Peon IV



cretic entirely resolved, Peon IV



cretic and Peon IV



Peon I, cretic



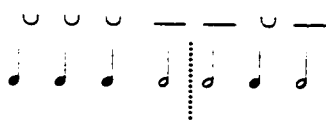
Peon I, antibacchius



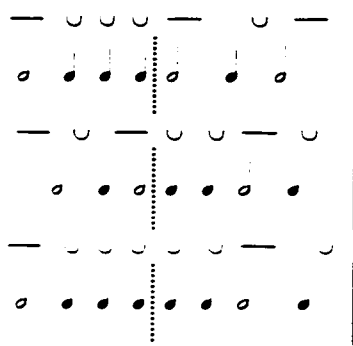
2 Peon Is



cretic and Peon IV



Peon IV, cretic

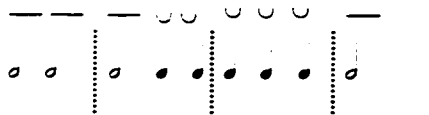


Peon I, cretic

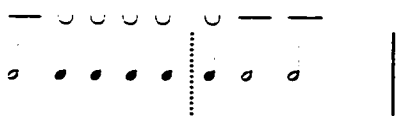
cretic, Peon III

Peon I, Peon III

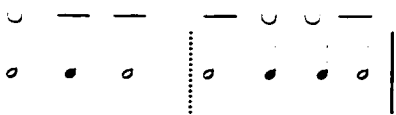
A fragment of *Nomos*, entitled "The Persians" by *Timotheus*, that combines the bacchius and the cretic with the most varied feet, juxtaposing 5 and 6; 6 and 7; 3 and 4; 2, 7 and 6, and 6 as well as 5:



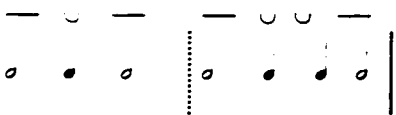
glyconic (base of spondee, dactyl, trochee resolved into a tribrach, catalexis)



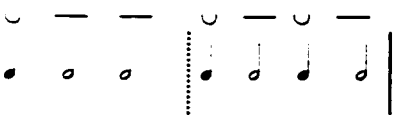
resolved choriamb, bacchius



cretic, choriamb



idem.



bacchius, diiamb



iambic dimeter (4 iambs – the spondee substituted for the 3d iamb creates the analysis: diiamb, Epitrite III.)



bacchaic tetrameter (a molossus is substituted for the 2d bacchius)



glyconic (base: tribrach – dactyl, trochee, and transformed catalexis)

	diiamb, cretic
	choriamb, cretic
	Epitrite III, choriamb
	iambic dimeter (4 iambs – dactyl substitutes and tribrach substitutes for the 1st and 3d iambs)
	iambic dimeter (4 iambs – the spondee substituted for the 1st iamb gives the analysis: Epitrite III, diiamb)

Epitrite I	
Epitrite II	
Epitrite III	
Epitrite IV	

(The third epitrite: can be found in the "Glorification de l'Élué"² from Stravinsky's *Sacre du Printemps*, and in the vocal bass solo before the terminal carillon of *Les Noces*³ by the same composer. The third epitrite figures equally in the second movement of the *Second Sonata for Violin and Piano* by Béla Bartók. The ravishing of *The Love Sorcerer* (Manuel de Falla) is a second epitrite. Finally, there are Epitrite IVs in the dance of the devil in Stravinsky's *L'histoire du Soldat*.)

²"Glorification of the Chosen Victim"

³*The Wedding*

Compound Feet:

Ditrochee (or Dichoree) — ◡ — ◡ ◡ ◡ ◡ ◡
(two trochees, six metrons)

Diiamb ◡ — ◡ — ◡ ◡ ◡ ◡
(two iambs, six metrons)

Choriamb — ◡ ◡ — ◡ ◡ ◡ ◡

(Combination of trochee or choree and the iamb, six metrons. According to Maurice Emmanuel, this rhythm serves as a unifying device between the trochaic and iambic series, it is an kind of change or rhythmic modulation.)

Antipast ◡ — — ◡ ◡ ◡ ◡ ◡

(Combination of iamb and trochee: the opposite of the preceding. Also six metrons.)

Dochmius ◡ — — ◡ — ◡ ◡ ◡ ◡ ◡

(8 metrons, by 3 + 5. Combination of the iamb and the amphimacer, or cretic.)
This compound foot is confused with the dochmiac meter which I will discuss further.)

Dispondee — — — — ◡ ◡ ◡ ◡

(Two spondees, 8 metrons, using 4 x 2)

Dactylo-epitrite — ◡ ◡ ◡ — — — ◡ ◡ ◡ ◡ ◡ ◡

(11 metrons, 4 + 7. Is confused with the meter of the same name: I will discuss it further.)

Metricists recognize three genres of feet: the equal genre, for which the metrons divide into 2 + 2 (spondee, dactyl, anapest, proceleusmatic); the double genre, for which

the metrons divide into 2 + 2 or 1 + 2 (trochee, iamb), resulting in 4 + 2 or 2 + 4 (ionic major, ionic minor); and the hemiola or peonic genre, for which the metrons divide into 3 + 2 or 2 + 3 (bacchius, antibacchius, and the four peons). Quite frequently, one foot is employed in place of another, giving variations by elongation: spondee (— —) instead of iamb (— •): this process is called *substitution*, and the foot that replaces the other is a *substitute*. When the long is changed into two shorts: iamb (— •) becoming tribrach (• • •), metricists say that there is dissolution. In these different transformations, as in rhythms of four and of three metrons, and as in all Greek versification, the short always equals the short. We may want to place these variations in the isochronal measures. Here is, for example, a verse from *Antigone* by Sophocles:

• • • — • • | — • • — • • | — • —

This metric scheme is given by Masqueray. I see here a logaedic verse where a trochee transformed into a tribrach (• • •), three dactyls (— • • — • • — • •), and two trochees, of which the second has lost a short, are mixed. This renders the verse "catalectic" (— • —). The normal transcription is:



• • • | • • • | • • • | • • • | • • |

Now, certain musicians read:

| 1/8 1/8 1/8 1/8 | 1/8 1/8 1/8 1/8 | 1/8 1/8 1/8 1/8 | 1/8 1/8 1/8 |

This transforms the entire verse into one measure of regular 6/8, by means of irrational values (eighth-note quartuplet, equaling three normal eighth-notes), and the final dotted

value. Better yet, an attempt has been made to turn the isochronal alternation between 5 and 6 into a savory event:



 (amphimacer and ditrochee), or
 (bacchius and choriamb), and to

completely destroy the equality of short durations in logaedic verses and in dochmiac meter! All these opinions are erroneous. They contradict Louis Laloy and Dom Mocquereau, and especially the sovereign authority of the greatest metricist of ancient Greece – Aristoxenes. "On the contrary," says Westphal, German rhythmicist, "Aristoxenes does not declare the equality of attacks as a necessary principle of rhythm. He expressly states that we should accept the way in which the measure has changed from that of ancient musical art."

"Greek music alternated between states of movement and repose," says Maurice Emmanuel. The movement was called *arsis*, the stationary *thesis*. "In dance, the Greeks named arsis ascending movement, the outburst of the body; and thesis descent, the repose of the body at the terminal point of its movement. Arsis was called the beginning, thesis the end of an orchestral movement." (Dom Mocquereau) Localized movement in dance and the beat, which indicated undulations of rhythm followed by vocal or instrumental movement, shared the same term: the new proof of union in the three arts (poetry, music, and dance).

The *meter* was a group of syllables comprised of two feet. It corresponded to one measure. Thus an iambic meter is composed of two iambs, a trochaic meter of two trochees, etc. According to this rule, tetrameter was the name given to verses composed of eight feet. Similarly a trimeter has six feet, a dimeter has four. When we count by feet we say, dipody (two feet), tripody (three feet), tetrapody (four feet), etc. In dactylic verse the meter only contains one foot. Dactylic hexameter or dactylic hexapody both signify six dactyls.

The *Verse* is a union of feet and meters.

The *Strophe* is a series of verses of different rhythms but repeated in the same order.

Anacrusis "Many lyric verses can be scanned more easily if we put aside the first syllable which is sometimes short, sometimes long. "Certain metricists isolate this preliminary syllable and call it anacrusis." (Laurand)

Base "Often, the first two syllables of a lyric verses can be either short or long (◡ ◡ or — — or ◡ — or — ◡). Certain metricists call these two first syllables the *base*." (Laurand)

Verses which contain an incomplete last foot are called catalectic.

Greek verses can be divided into three categories: 1) verses in simple meter, 2) verses in compound meters, and 3) verses in mixed meters.

1) Verses In Simple Meter

Verses in simple meter make use of the same rhythm or foot throughout. They can only be varied through substitutions and use of the catalectic form.

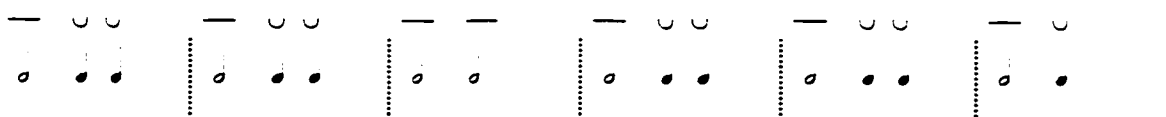
Dactylic hexameter – (We remember that in dactylic verse the meter only contains one foot.) Its composition: six feet: four dactyls (for which spondees can be substituted), a fifth dactyl, and a last foot with substitute: spondee or trochee.

Pure form — ◡ ◡ | — ◡ ◡ | — ◡ ◡ | — ◡ ◡ | — ◡ ◡ | — — | 24 unified values

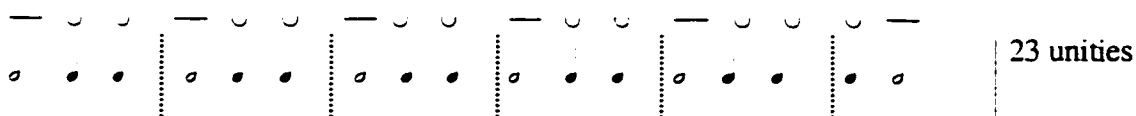
Form for substitutes, catalectic (because of the terminal trochee):

— ◡ ◡ | — — | — — | — ◡ ◡ | — ◡ ◡ | — ◡ | 23 unified values (prime number)

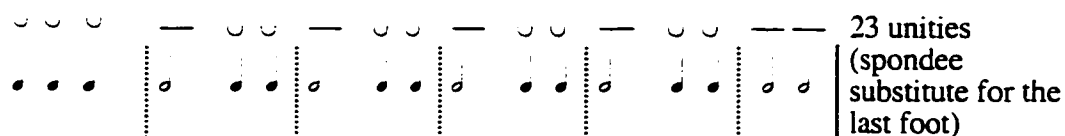
other dactylic hexameters:



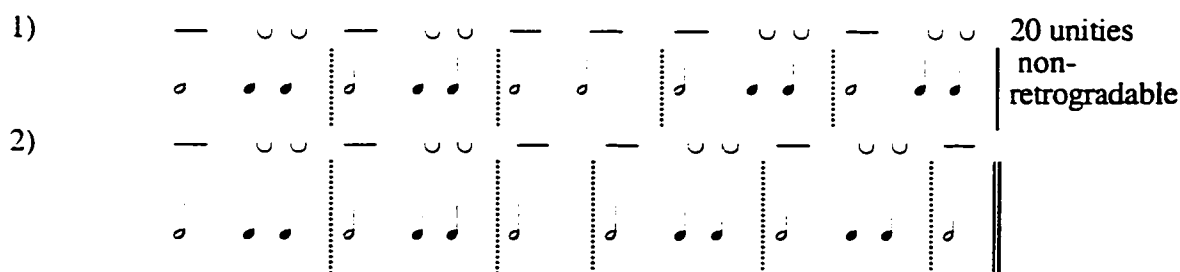
Maeuric dactylic hexameter ("with the short tail"), ends with an iamb:



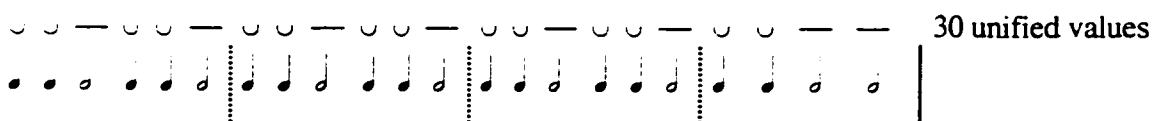
Acephalus ("headless") dactylic hexameter, beginning with a tribrach:



Dactylic pentameter – five feet: two dactyls, one spondee, two anapests. (In fact, this is a Dicatalectum composed of two catalectic dactylic tripodies):

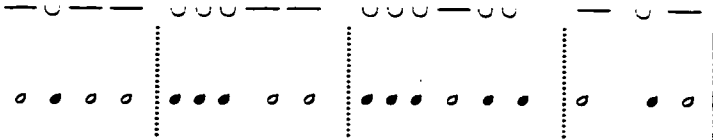


Catalectic anapestic tetrameter – (Each meter contains two feet: eight feet, one long single in the last foot. Frequently used by Aristophanes):

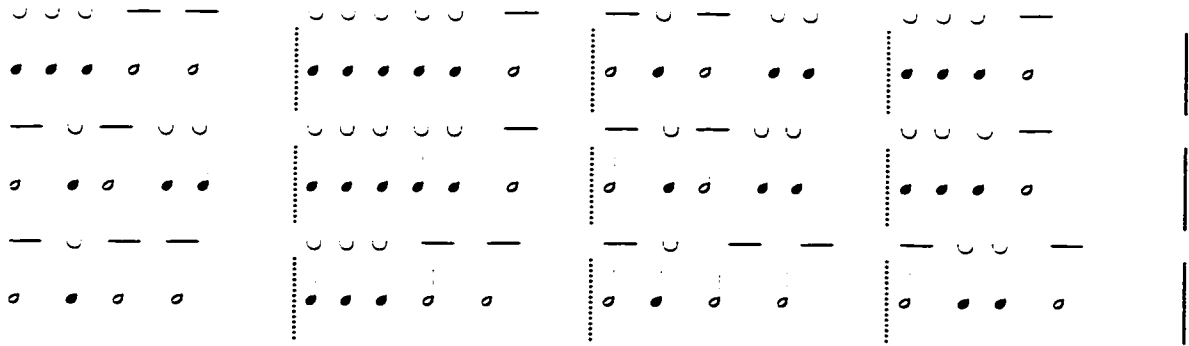


Catalectic trochaic tetrameter – (Eight feet. Substitution: tribrach throughout, spondee in paired feet; sometimes anapest or dactyl. One long in the last foot. Employed by the tragic Greeks):



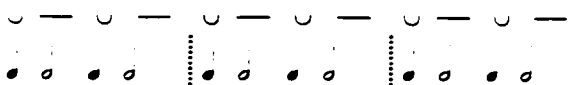
Substitute forms:  26 unities


other catalectic trochaic tetrameters:



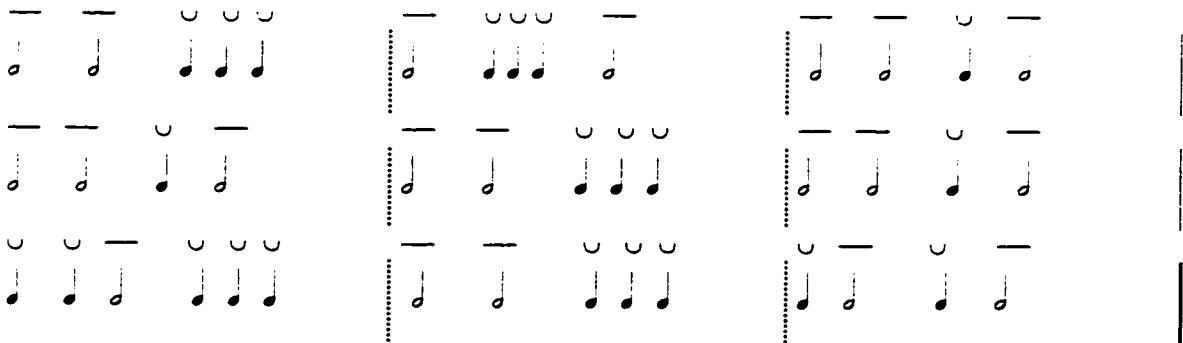
Iambic trimeter – (Six feet. Substitutions: tribrach throughout, except for the last foot.)

Among the tragedians and Archilochus, a spondee with impaired feet; anapest for the first foot, dactyl for the third foot:

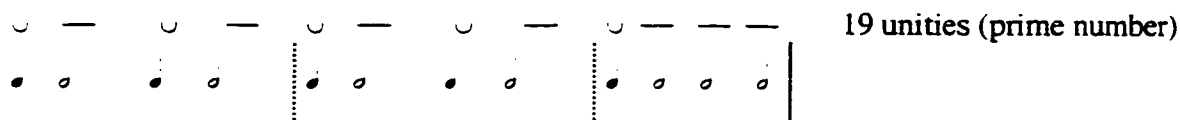
Pure form:  18 unified values

Substitute forms:  21 unities

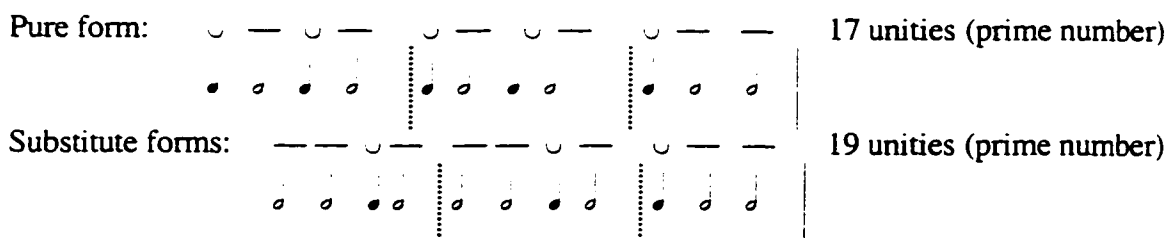
other iambic trimeters:



Scazon or choliambic iambic trimeter – the last foot is a spondee:

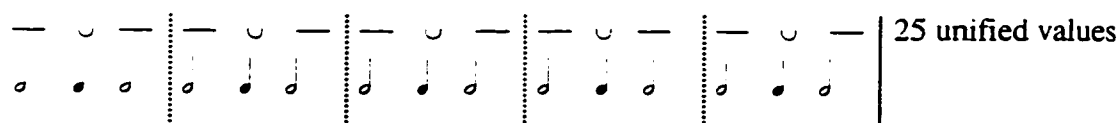


Catalectic iambic trimeter – rare among the Greeks; we find it among the Latins, with Horace:

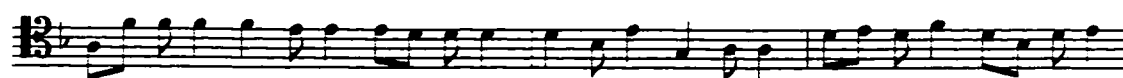


We find also, in the choruses of Greek tragedies and comedies, verses based on ionic major and minor. For the hemiola or peonic genre the bacchius, the antibacchius, and the four peons are rarely used. The cretic verse (based on the amphimacer) is frequent, especially with Aristophanes.

Cretic Pentapody – five amphimacers or cretics:



Here is the first strophe of a Delphic hymn, entirely based on the amphimacer. It is comprised of a cretic pentapody, a cretic tetrapody, three cretic pentapodies, a cretic hexapody. The amphimacer is frequently transformed into pyrrhic and iamb, or trochee and pyrrhic. (Text established by Weil and Th. Reinach, and quoted from Maurice Emmanuel):





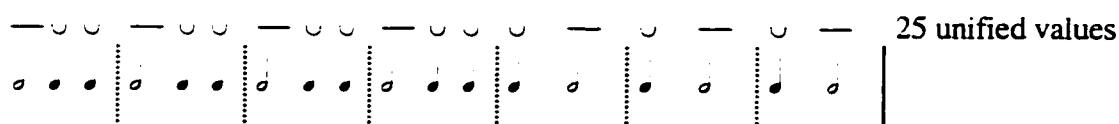
Another Delphic hymn (text established by Weil and Th. Reinach, and quoted from Maurice Emmanuel). I have reproduced the second strophe. "This hymn," says Maurice Emmanuel when speaking of the mode used here, "places all known theories in question." It is, in effect, written in an unusually chromatic genre and carries two modulations to the sharp fifth (at brackets) as well. The strophe is composed of amphimacers. It is comprised of one verse of seven amphimacers (the second and the fourth being entirely transformed into shorts, the seventh being transformed into pyrrhic plus iamb), one cretic hexapody, two cretic tripodies, one cretic dipody (all with transformations), one cretic tripody (first amphimacer entirely transformed into shorts, the two others transformed into pyrrhic plus iamb), finally one cretic pentapody (with transformations).



2) Verses In Compound Meters

The verses in compound meters are those which allow for two periods with different rhythms. At the testimony of Hepestion, Archilochus (7th century AD) was the inventor of these meters. This poet did not yet use mixed or logaedic meters: "those based on prime numbers preceded the others, the union of two different periods, in a single verse being simpler than that of different feet in a single period." (Masqueray)

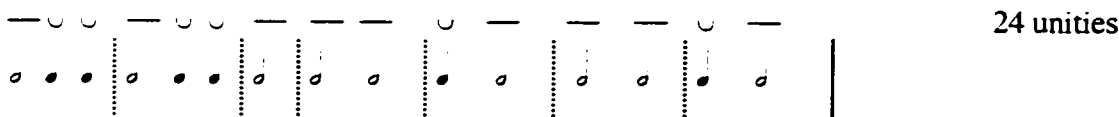
Archilochean major (or *grand archilochean*) – dactylic tetrapody renited with a trochaic tripody:



The Elegiamb – catalectic dactylic tripody followed by an iambic dimeter:



A spondee can be substituted for the first and third iambs:



The lambelegiac – The opposite of the above (iambic dimeter preceding a catalectic dactylic tripody):



with substitutions:



3) Verses In Mixed Meter

The preceding verses opposed groups of four in favor of groups of three, or vice versa. In logaedic verses, the isolated four (dactyl, anapest) *mix* together with the isolated three (trochee, iamb). We will see presently the dochmiacs that mix three and five (iamb and amphimacer), and the Dactylo-epitrites, that mix four and seven (dactyl and epitrite). All enter into the category of mixed meters, of the logaedus type.

Logaedus

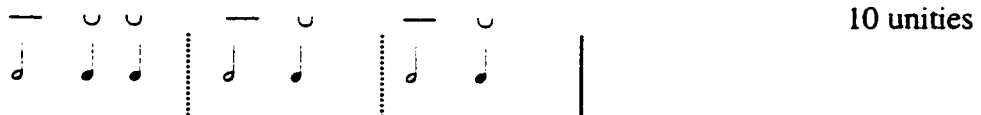
"The word logaedus comes from two Greek words – logos (word, prose), and aoidê (sing)." (Dom Mocquereau) "The dactyl is a foot from epic verse: aoidê, while the trochee is the nearest neighbor to ordinary prose: logos." (Masqueray) "Now, what we call logaedic is a verse which contains a mixture of dactyl and trochee." (Laurand) This mixture is produced in the same period. It is the difference between verses in compound meter and the progress made on them. Logaedic verses are divided into two categories: the *simple* (those that contain only one dactyl), and the *compound* (those that contain several dactyls).

Simple Logaedics

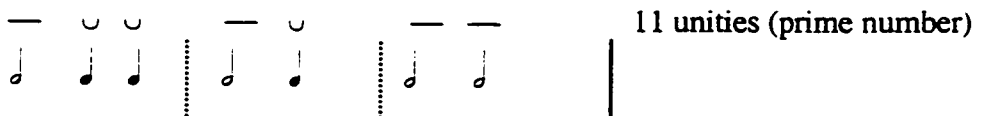
The Adonic – one dactyl and one trochee:



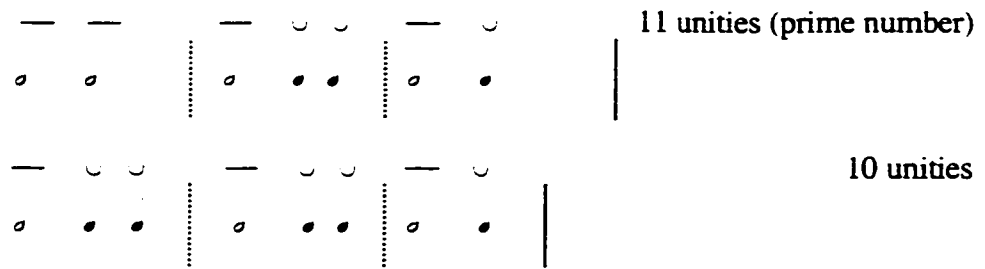
The aristophanean – one dactyl and two trochees:



with spondee substitute for the last foot:



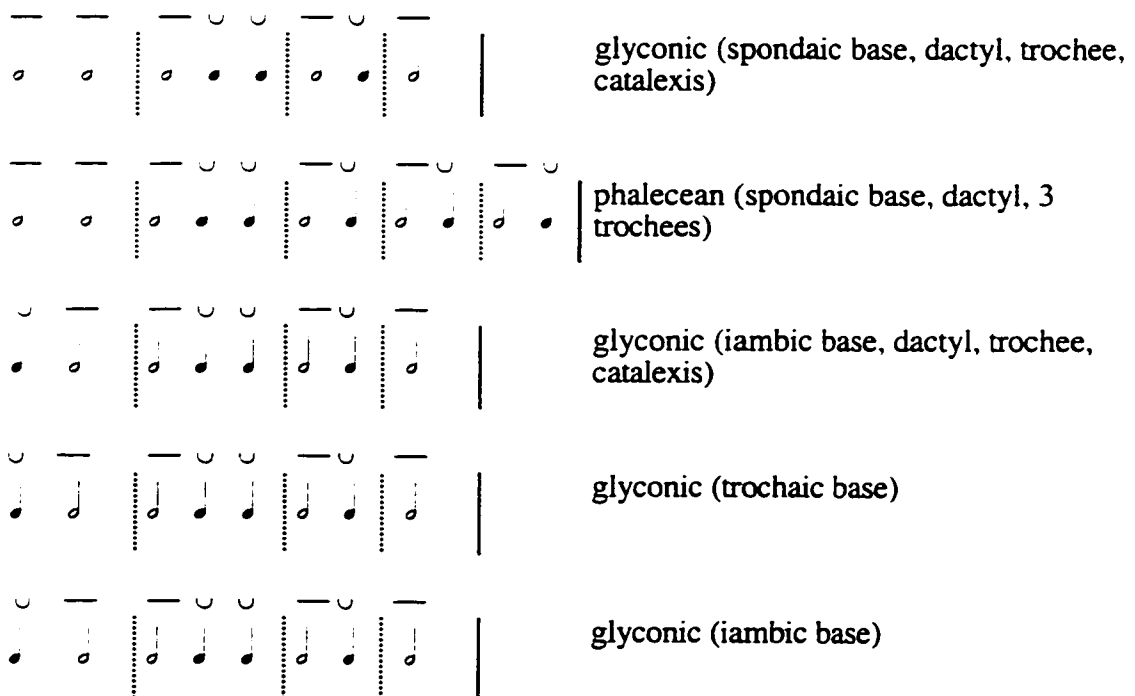
The pherecratean – adonic preceded by a base (spondee or trochee):

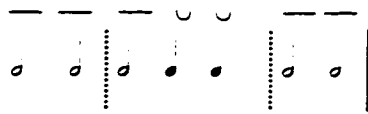


The glyconic – dactyl preceded by a base and followed by two trochees of which the second is catalectic (or spondaic base and catalectic aristophanean):

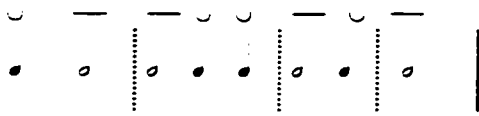


One example of the use of simple logaedics – Strophe taken from *Œdipus at Colone* by Sophocles (verses 668–680):





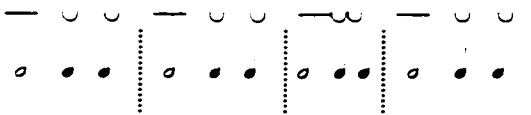
pherecratean (spondaic base, dactyl – the terminal trochee is replaced by a spondee)



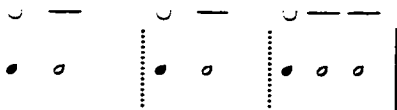
glyconic (iambic base, dactyl, trochee, catalexis)



glyconic (spondaic base)



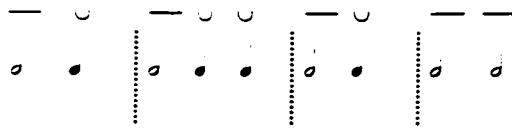
dactylic tetrapody (4 dactyls)



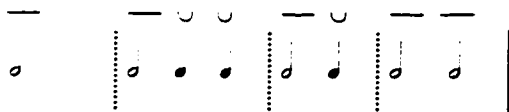
catalectic iambic dimeter (4 iambs, of which the 4th is catalectic)



glyconic (spondaic base, dactyl, trochee, catalexis)



phalaecean (trochaic base, dactyl, 2 trochees, spondee substituted for the last foot)



glyconic and hypercatalectic acephalus (Koster calls it "paraglyconeus")

Compound Logaedics

Asclepiadean minor (or small asclepiadean) – one base, one dactyl, one long single, one dactyl, one trochee, one catalectic trochee:

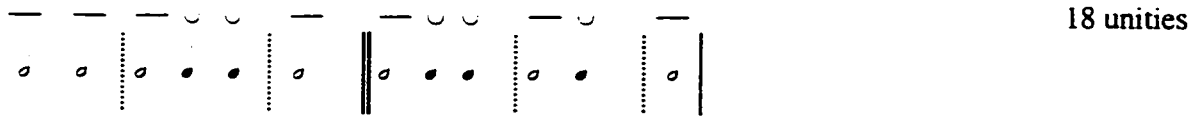


19 unities (prime number)

Alternate analysis using a catalectic pherecratean (long note, short note, long note, short note, long note, short note)

and a catalectic aristophanean (long note, short note, long note, short note, long note, short note)

Third analysis with one trochee for base (instead of a spondee) – this is a non-retrogradable rhythm:

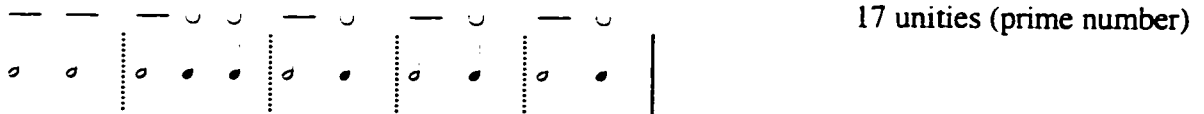


Asclepiadean major (or grand asclepiadean) – asclepiadean minor with interpolated catalectic adonic:

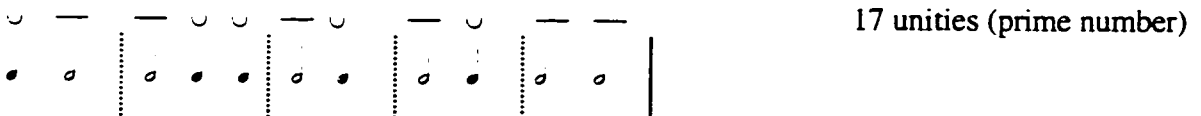


This is also a non-retrogradable rhythm.

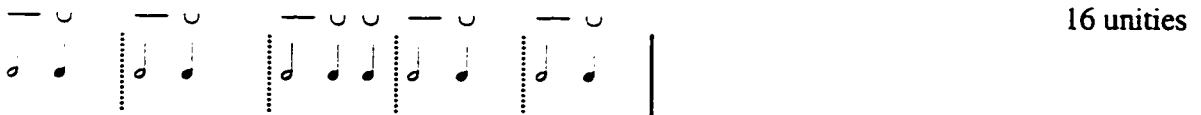
The Phalecean – base, dactyl, three trochees:



Substitute for the last foot, iamb for base:

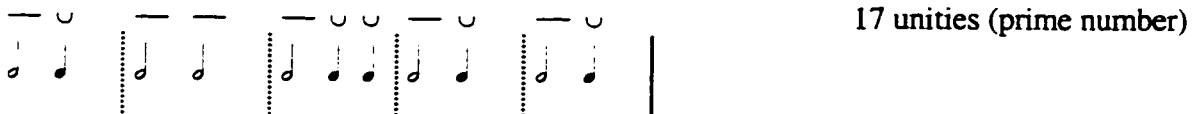


The sapphic minor (or small sapphic) – dactyl preceded and followed by two trochees:




Among the Greeks, the second and the fourth trochee allow for a spondee substitute.

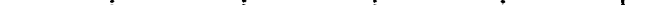
With Horace, the second foot is always a spondee:



16 units

22 unities

Pure form:  13 unities (prime number)

Substitute forms:  14 unities

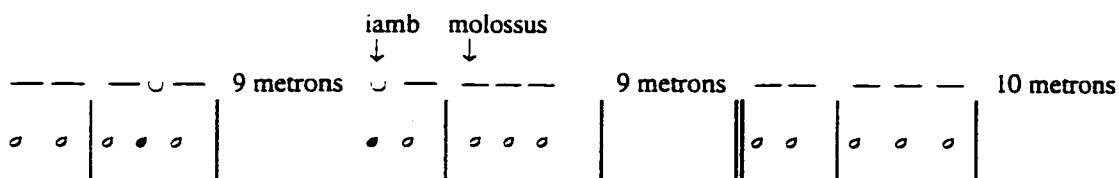
Other substitutions:							16 unities
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14 unities (This is, in fact, a verse of compound meters.)

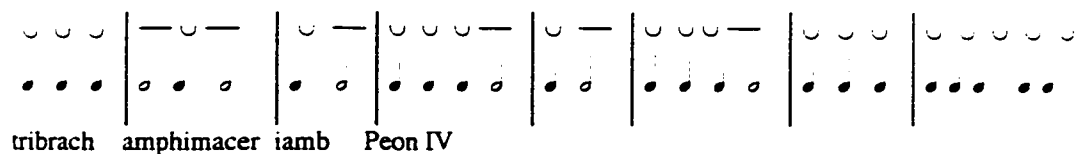
The dochmiac verse utilises the dochmius (Greek dochmios: oblique). The dochmius is a compound foot, at 8 metrons, by 3 + 5. Its pure form is a combination of the iamb and the amphimacer (or cretic): $\cup - - \cup -$ ($\text{♩} \text{♩} \text{♩} \text{♩} \text{♩}$)

U — — U — (♯ ♯ ♯ ♯)

Often employed by Aeschylus, the dochmiac, divided into 3 + 5, is frequent in all of ancient tragedy. It allows the substitution of longs for shorts:



and also the dissolution of the long durations:



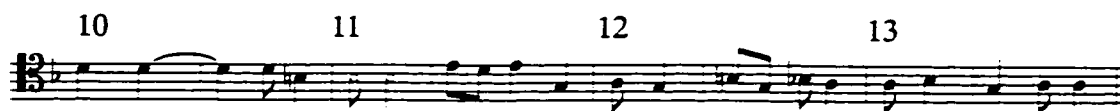
Here is a grouping of five dochmiacs, taken from *Sept contre Thèbes*⁴ (Aeschylus), musical transcription by Gevaert:



The following fragment is a chorus from *Orestes* by Euripides transcribed by Weil and Th. Reinach. The square notes indicate an instrumental ending. Each measure of the example contains a more or less varied dochmiac.

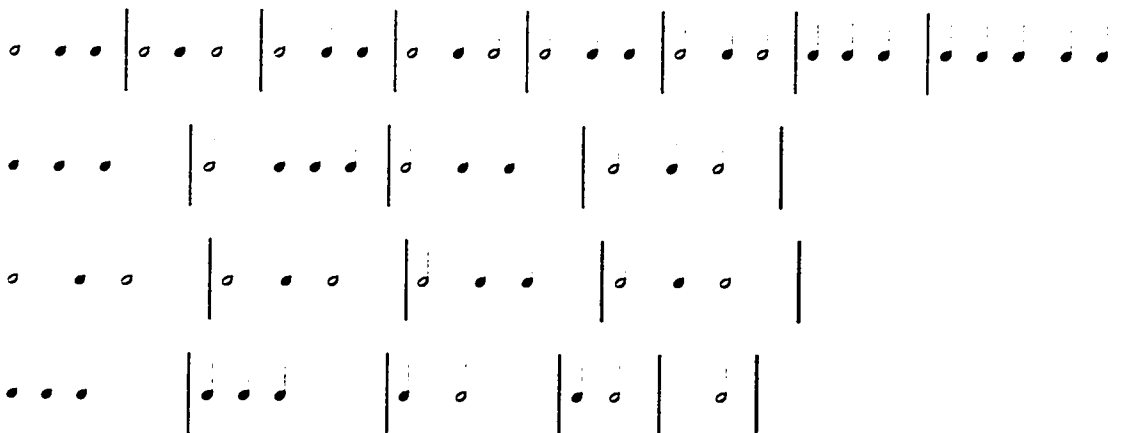


⁴ *Seven Against Thebes*



Measure 1: dochmiac, in which the initial iamb is transformed. Measure 2: substitution of a dactyl for the initial iamb of the dochmiac. Measures 3 through 7, inclusive: dochmiacs with transformations of the initial iamb. Measure 8: substitution of three longs (molossus) for the amphimacer. Measure 9: transformed iamb, instrumental recapitulation. Measure 10: two longs substituted for the iamb, and syncopated (which is predicted by Emmanuel). Measure 11: iamb because of the accompanying instruments, the amphimacer is replaced by an Ionic minor. Measure 12: transformation of the amphimacer into pyrrhic plus iamb (or Peon IV). Measure 13: dochmiac.

Again an interesting dochmiac series, taken from *Sept contre Thèbes*, by Aeschylus:



First verse: three dochmiacs, of which the initial iamb is replaced by a dactyl. Then a fourth dochmiac entirely transformed (dissolution of longs).

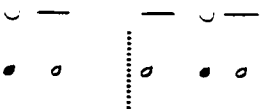
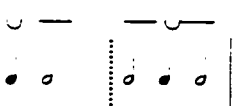
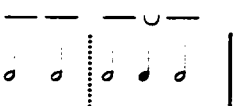
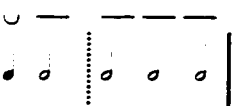
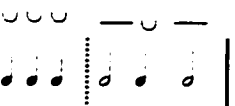
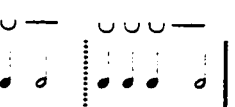


Second verse: first dochmiac with dissolution of the first and last long: second dochmiac with substitution of a dactyl for the initial iamb.

Third verse: cretic dipody (two amphimacers), and one dochmiac (always begun with a dactyl instead of an iamb).

Fourth verse: catalectic iambic pentapody (the first two iambs are transformed, the fifth iamb has lost its initial short duration).

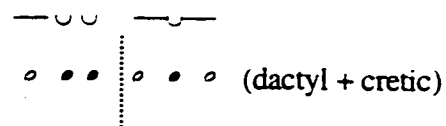
List Of All Dochmiac Forms

Siedler has enumerated 32 Dochmiac forms. W. J. W. Koster finds 42. Here are the most interesting ones:

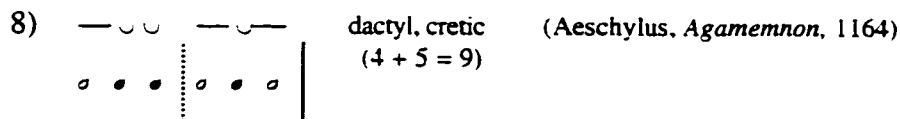
- A *Form I* (which is the model):  (iamb + cretic)
- a) pure:
- 1)  iamb, cretic (3 + 5 = 8) (Aeschylus, *Suppliants*, 348)
- b) shorts replaced by longs:
- 2)  spondee, cretic (4 + 5 = 9) (Aeschylus, *Eumenides*, 781)
- 3)  iamb, molossus (3 + 6 = 9) (Sophocles, *Antigone*, 1341)
- c) one resolved long:
- 4)  tribrach, cretic (3 + 5 = 8) (Aristophanes, *Birds*, 1188)
- 5)  iamb, Peon IV (3 + 5 = 8) (Aeschylus, *The Persians*, 665)
- 6)  iamb, Peon I (3 + 5 = 8) (Sophocles, *Antigone*, 1320)
- d) two resolved longs:
- 7)  tribrach, Peon I (3 + 5 = 8) (Sophocles, *Oedipus Rex*, 1340)

B

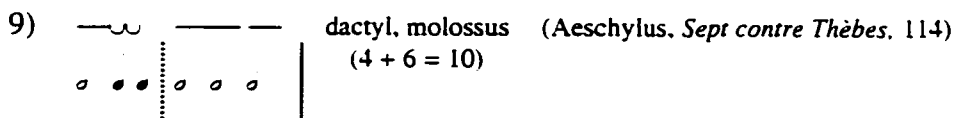
Form II (almost as important as the first):



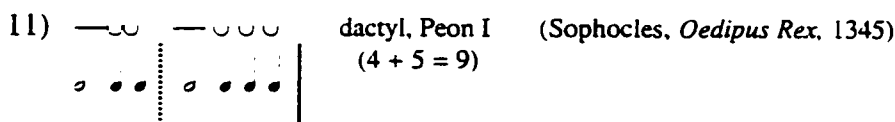
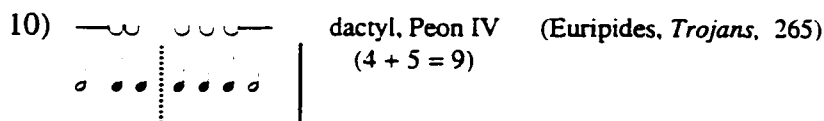
a) pure:



b) shorts replaced by longs:

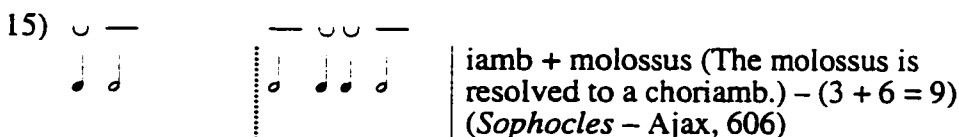
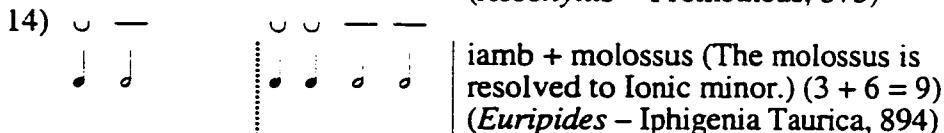
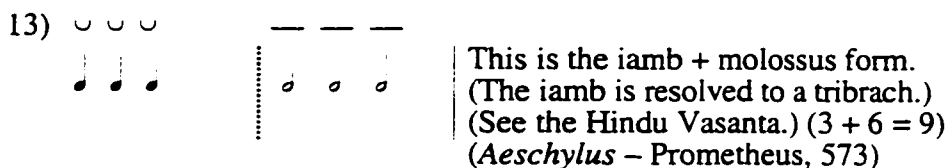
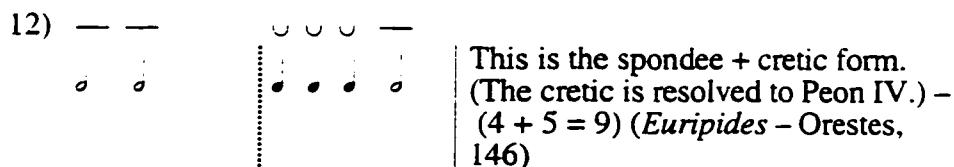


c) one resolved long:

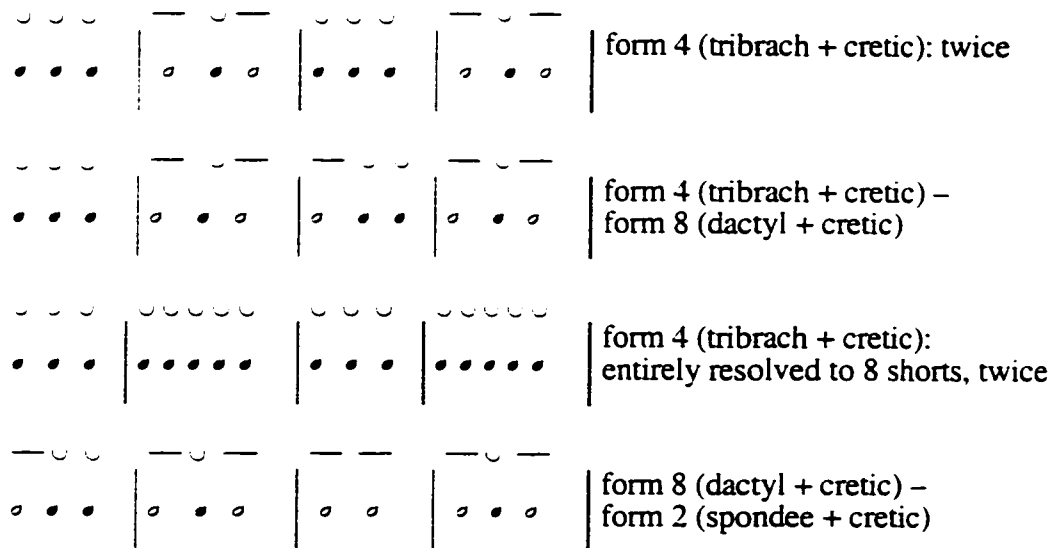


C

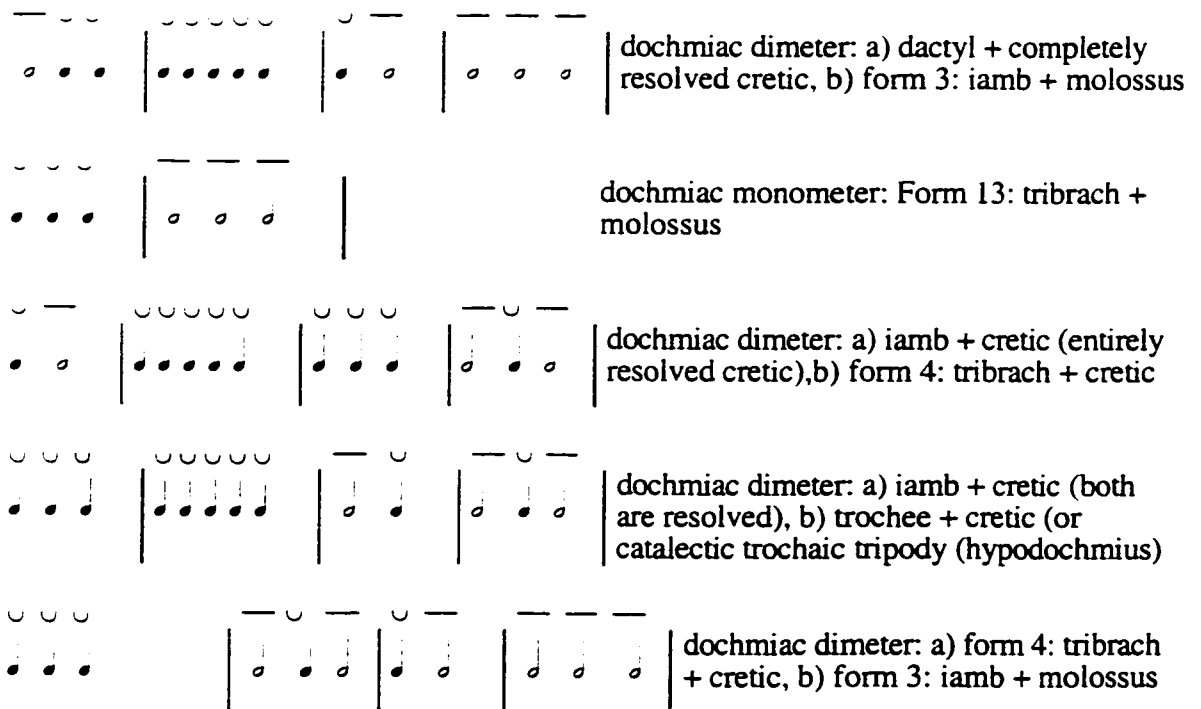
A few lesser known forms or exceptions:



Here is an example of these different dochmiac variants, taken from *Birds*, by Aristophanes, 1188–1195. It consists of one strophe of four dochmiac dimeters:

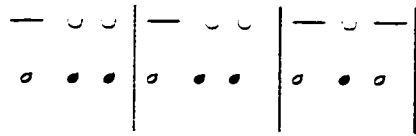


Another quite extraordinary example is borrowed from *Orestes* by Euripides (verses 1304-1310), where the accelerando and the rallentando follow each other in a very dramatic fashion, by avoiding resolution to shorts through substitution of longs:



Last example, the "Phrygian Monody" from *Orestes* by Euripides – (Orestes, 1381-1392):

	<p>catalectic dactylic tetrapody (with spondee substituted for the 3d dactyl) Result: 2 dactyls, 1 molossus</p>
	<p>dochmiac form 4 (tribrach + cretic) hypodochmius (trochee + cretic, or catalectic trochaic tripody)</p>
	<p>dochmiac dimeter: a) form 10 (dactyl and Peon IV), b) form 4 (tribrach + cretic)</p>
	<p>hypodochmius and dochmiac type</p>
	<p>hypodochmius: dochmiac form 6 (iamb and Peon I)</p>
	<p>dochmiac dimeter: a) form 8 (dactyl + cretic), b) form 9 (dactyl + molossus)</p>
	<p>dochmiac form 12 (spondee + Peon IV) and a 2d Peon IV (which is like a 1st resolved cretic)</p>
	<p>dochmiac dimeter: a) form 2 (spondee + cretic), b) model</p>
	<p>dochmiac monometer (model)</p>
	<p>iambic dimeter (4 iambs)</p>
	<p>dactylic tetrapody (4 dactyls – a spondee is substituted for the 2d dactyl)</p>



logaedic tetrapody employed by Ibycus (Schröder named it "ibyceum"): two dactyls, two trochees of which the 2d is catalectic (The two catalectic trochees are equivocal with the cretic that terminates the dochmiac.)

Dactylo-epitrites

The Dactylo-epitritic verses or periods contain the cola⁵ in which the dactyls (— ◡ ◡) and trochees (— ◡), or the anapests (◡ ◡ —) and iambs (◡ —), are in approximately equal proportion. As in Logaedic verse, they consist of a constant mix of four and three with the extra seven, usually in the form of an Epitrite II (— ◡ — —) and III (— — ◡ —). The Dactylo-epitrites belong to the choral chant from drama and lyric poetry, especially lyric poetry. It is in the *Odes triumphales*⁶ by Pindar (Olympic, Pythian, Nemean, Isthmicus) that we can find the best examples of Dactylo-epitrites.

First example – *Isthmicus Ode I* by Pindar (strophe):

Verse I		<p>Elegiamb, comprised of 2 dactyls and 1 central catalexis – hypercatalectic iambic monometer (spondee substituted for the 1st iamb, 2d iamb, final ending = Epitrite IIIs + 1 isolated long)</p> <p>19 unities</p>
Verse II		<p>2 dactyls and central catalexis – iambic monometer (2 iambs)</p> <p>16 unities</p>
Verse III		<p>Epitrite II and Dactylic tripod (spondee substituted for the 3d dactyl)</p> <p>19 unities</p>



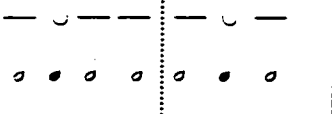
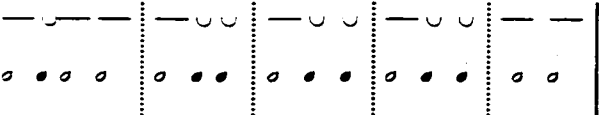
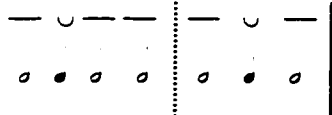
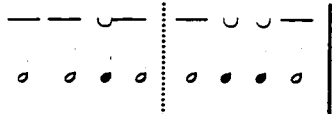
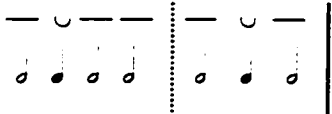
⁵Cola, plural of colon, is a rhythmic period in Greek and Latin verse that consists of two to six feet and has one principal accent. *American Heritage Dictionary*, s.v. "colon".

⁶*Triumphant Odes*

	2d colon:		catalectic dactylic tetrapody (with spondee substituted for the 3d dactyl) 14 unities
verse III			catalectic trochaic dimeter: spondaic base – 1st meter: 2 trochees with spondee substituted for the 2d trochee (Epitrite II) – 2d meter: trochee and catalexis cretic) 16 unities
period IV	1st colon:		elegiamb, comprised of a long anacrusis, 2 dactyls and 1 central catalexis – then 2 iambs 18 unities
	2d colon:		Epitrite II and catalexis dactylic tripody 17 unities
	verse V:		catalectic trochaic trimeter, with spondee substitute for the 2d and the 4th trochee = 2 Epitrite IIs + cretic 19 unities
period VI	1st colon:		2 dactyls and one central catalexis (penthemimers) + Epitrite II 17 unities
	2d colon:		dactylic tripody (with spondee substituted for the 3d foot) 12 unities
	3d colon:		identical to the 1st colon of period VI: penthemimers + Epitrite II 17 unities

Third example – Pindar's *First Nemean* (Epode)

period I	1st colon:		epitritic dimeter (2 Epitrite IIs, the 1st long from the 1st epitrite is resolved to 2 shorts) 14 unities
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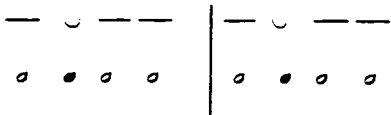
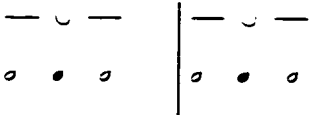
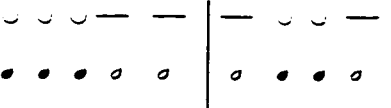
	2d colon:		catalectic dactylic tripod (penthemimers), with 1 catalexis (cretic) Epitrite II as clausula	15 unities
period II	1st colon:		dactylic tetrapody, with spondee substituted for the 4th foot	16 unities
	2d colon:		catalectic epitritic dimeter (Epitrite II + cretic)	12 unities
period III	1st colon:		Epitrite II, followed by a dactylic tripod (with spondee substitute at the 4th foot)	23 unities
	2d colon:		For the 2d time, catalectic epitritic dimeter (Epitrite II + cretic)	12 unities
period IV	1st colon:		choriambic dimeter (Epitrite III and choriamb)	13 unities
	2d colon:		For the 3d time, catalectic epitritic dimeter (Epitrite II + cretic). The following analysis can also be made: catalectic trochaic dimeter or "lecythium" 1st meter: 2 trochees with spondee substituted for the 2d trochee (Epitrite II) – 2d meter: trochee and catalexis (cretic)	12 unities

Fourth example – Pindar's *Fourth Pythian* (Strophe – Epode)

This Ode is one of Pindar's longest works. It contains 13 triads (Strophe, Antistrophe, Epode). Written to the glory of Arkesilaos, king of Cyrene (who was the greatest of chariot racers, at the Pythian games, in 462), it speaks especially of Jason and of Medea, of Pelias, and of the expedition of the Argonauts.

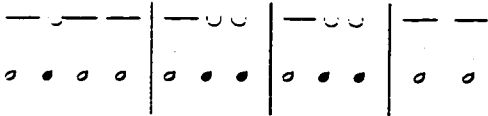
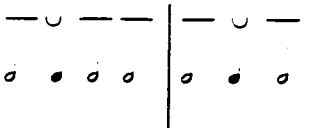


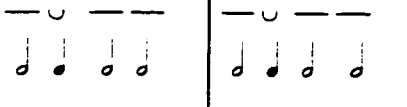
Strophe

verse I		Epitrite II – catalectic dactylic tripod 17 unities
period II 1st colon:		Epitrite II – dactylic tripod (with spondee substitute for the 3d foot) 19 unities
2d colon:		Epitrite II – catalectic dactylic tripod 17 unities
period III 1st colon:		Epitrite II – dactylic tripod (with spondee substitute for the 3d foot) 19 unities
2d colon:		2 Epitrite IIs 14 unities
verse IV		dactylic tetrapod (spondee substitute for the 4th foot) – Epitrite II 23 unities
period V 1st colon:		dactylic tripod (spondee substitute for the 3d foot) 12 unities
2d colon:		catalectic trochaic dimeter or "lecythium," 1st meter: 2 trochees with spondee substitute for 2d trochee (Epitrite II) – 2d meter: trochee and catalexis (cretic) 12 unities
period VI 1st colon:		2 Epitrite IIs 14 unities
2d colon:		catalectic dactylic tetrapod 14 unities

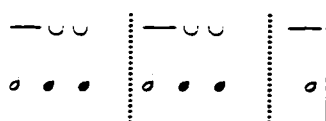
period VII	1st colon:		2 Epitrite IIs	14 unities
	2d colon:		2 cretics	10 unities
verse VIII			choriambic dimeter: Epitrite II and choriamb (the 1st long of the epitrite is resolved)	13 unities

Pindar's *Fourth Pythian* (continued)

Epode

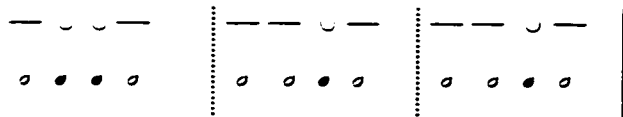
period I	1st colon:		Epitrite II – dactylic tripod (with spondee substitute for 3d foot)	19 unities
	2d colon:		catalectic trochaic dimeter or "lecythium," 1st meter: 2 trochees with spondee substituted for the 2d trochee (Epitrite II) – 2d meter: trochee and catalexis (cretic)	12 unities
period II	1st colon:		dactylic tripod (spondee substitute for 3d foot)	12 unities
	2d colon:		Epitrite II – catalectic dactylic tripod	17 unities
period III	1st colon:		2 Epitrite IIs	14 unities

2d colon:



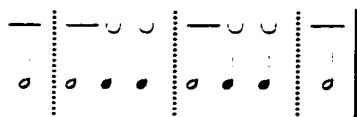
2 dactyls and catalexis
10 unities

period IV 1st colon:



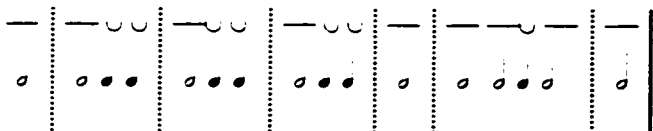
choriamb and 2 Epitrite IIIs
20 unities

2d colon:



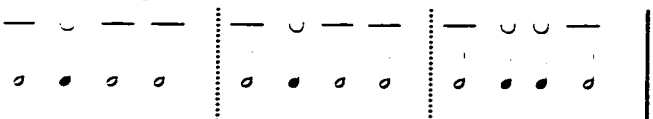
long anacrusis, 2 dactyls
and catalexis 12 unities

verse V



Elegiamb of unusual
proportion in relation to the
dactyls: comprised of 1 long
anacrusis, 3 dactyls and 1
central catalexis –
then 1 hypercatalectic iambic
monometer (spondee
substituted for the 1st iamb,
2d iamb, final ending =
Epitrite II + isolated long.
25 unities

verse VI



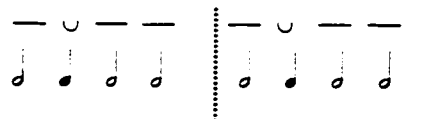
2 Epitrite IIs, choriamb
20 unities

period VII 1st colon:



Epitrite II – 2 dactyls and
catalexis 17 unities

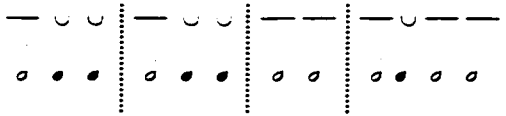

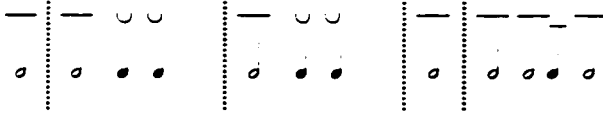
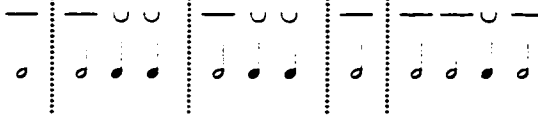



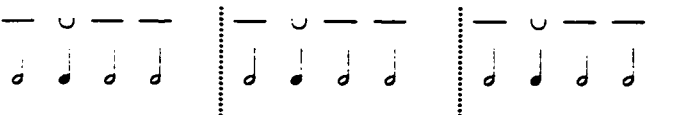
2d colon:



2 Epitrite IIs 14 unities

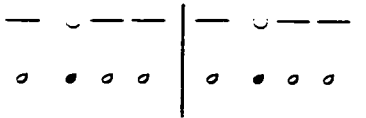


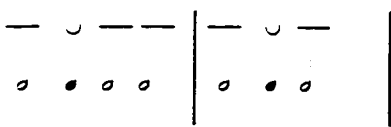
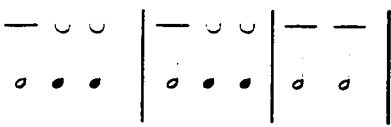
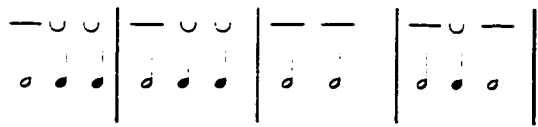
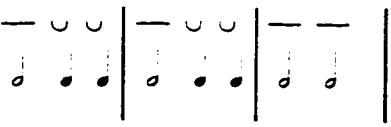

Fifth example – Pindar's *Third Olympic* (Strophe – Epode)

Strophe

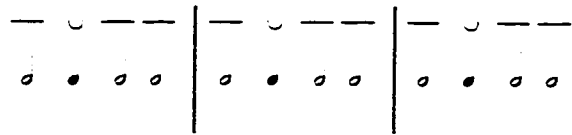
period I	1st colon:		dactylic tripod (2 dactyls and spondee substitute) – Epitrite II	19 unities
	2d colon:		2 dactyls and 1 catalexis	10 unities
verse II			catalectic dactylic tripod, preceded by a long anacrusis – Epitrite III	19 unities
period III	1st colon:		catalectic dactylic tripod, preceded by a long anacrusis – Epitrite III	19 unities
	2d colon:		catalectic anapestic tripod, with the following substitutes: spondee, anapest, tribrach	11 unities
period IV	1st colon:		3 Epitrite IIIs	21 unities
	2d colon:		catalectic dactylic tripod, preceded by a long anacrusis – Epitrite III	19 unities
verse V			epitritic trimeter (3 Epitrite IIIs), called "metrum stesichorium" or <i>stesichorean</i>	21 unities

Pindar's *Third Olympic* (continued)

Epode

period I	1st colon:		2 Epitrite IIs	14 unities
	2d colon:		2 dactyls and 1 catalexis	10 unities
period II	1st colon:		Epitrite II – dactylic tripod with spondee substitute for 3d foot	19 unities
	2d colon:		catalectic epitritic dimeter (Epitrite II + cretic)	12 unities
period III	1st colon:		dactylic tripod (2 dactyls and spondee substitute)	12 unities
	2d colon:		dactylic tripod (2 dactyls and spondee substitute) – cretic	17 unities
period IV	1st colon:		dactylic tripod with spondee substitute for 3d foot	12 unities
	2d colon:		Epitrite II – 2 dactyls and 1 catalexis	17 unities

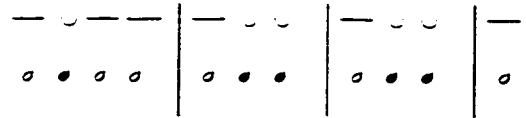
verse V



identical to the last verse of the strophe: epitritic trimeter (3 Epitrite IIs), called "nutrum stesichorium" or *stesichoreen* 21 unities

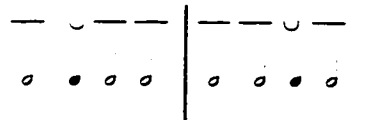
Sixth example – Ode IX by Bacchylides:

period I 1st colon:



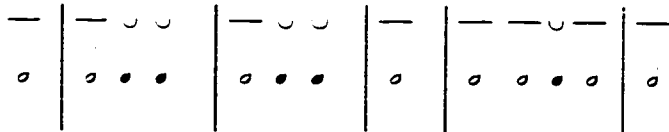
Epitrite II and catalectic dactylic tripod 17 unities

2d colon:



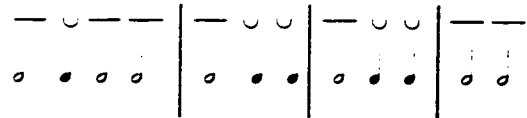
2 Epitrite IIIs 14 unities

verse II



elegiamb, comprised of: 1 long anacrusis, 2 dactyls and 1 catalexis – hypercatalectic iambic monometer (spondee substituted for the 1st iamb, 2d iamb, final ending = Epitrite III + 1 isolated long) 21 unities

period III 1st colon:



Epitrite II and dactylic tripod (spondee substituted for the 3d dactyl) 19 unities

2d colon:



catalectic trochaic dimeter (3 trochees, with spondee substituted for the 2d trochee), and the catalexis = Epitrite II + cretic

12 unities

period IV 1st colon:



dactylic tripod with 1 long anacrusis and spondee substitute for 3d foot 14 unities

2d colon:



catalectic trochaic dimeter (3 trochees, with spondee substituted for the 2d trochee, and the catalexis) = Epitrite II + cretic

12 unities

period V	1st colon:		hypercatalectic iambic dimeter (spondee, iamb, spondee, iamb, and ending) = 2 Epitrite IIIs + one isolated long 16 unities
	2d colon:		epitritic trimeter (3 Epitrite IIIs), called "metrum stesichorium" or <i>stesichoreen</i> 21 unities

Let us leave lyric poetry and turn toward the drama. Here we find a new element – the use of the ithyphallic:

for instance: 2 trochees and 1 spondee (10

unities), or trochaic tripod with spondee substituted for the third trochee. The ithyphallic was sung in processions in honor of the god of fertility. It can undergo changes, such as:

(2 tribrachs and 1 spondee), and even

the anacalasis:
(antipast and spondee)

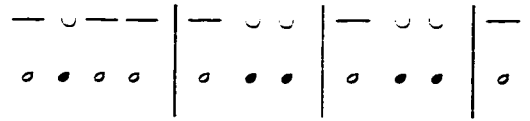
We will find it at the end of this Dactylo-epitritic strophe, borrowed from *Medea* by Euripides:

7th example – taken from *Medea* by Euripides:

verse I
elegiac, comprised of 1
short anacrusis, 2 dactyls
and one central catalexis –
hypercatalectic iambic
monometer (spondee)

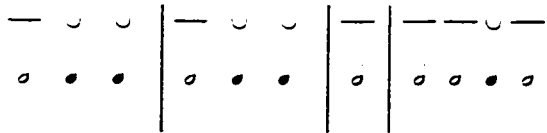
substituted for the 1st iamb,
 2d iamb, final ending =
 Epitrite III + 1 isolated long)
 20 unities

verse II



Epitrite II – 2 dactyls and
 1 catalexis 17 unities

Period III 1st colon:



elegiamb shorter than that of
 verse I: no anacrusis before
 the dactyls – no isolated
 long after Epitrite III
 17 unities

2d colon:



dactylic tripod, with
 spondee substituted for the
 3d foot 12 unities

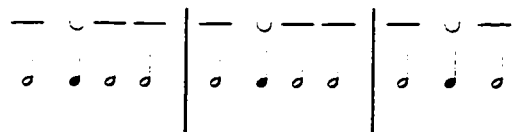
verse IV



Epitrite II – catalectic
 dactylic tripod or
 "penthemimers"
 hypercatalectic iambic
 monometer (spondee
 substituted for the 1st iamb,
 final ending = Epitrite III +
 one isolated long)

26 unities

verse V



catalectic trochaic trimeter
 (with spondee substituted
 for the 2d and the 4th
 trochee) = 2 Epitrite IIs and
 1 cretic

19 unities

verse VI

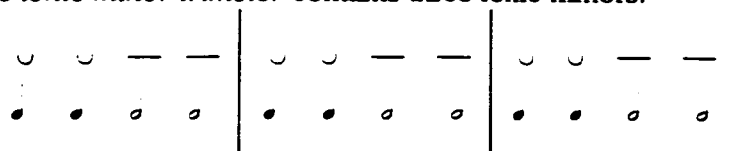


dactylic tripod, with
 spondee substituted for the
 3d foot – ithyphallic (or
 trochaic tripod, with
 spondee substituted for the
 3d foot) The ensemble
 forms a verse known under
 the name of archilochian
 asunartetus

22 unities

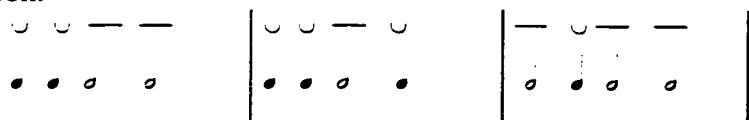
Before approaching the study of Strophes, let us look again at two verses which are very interesting for rhythmicist-musicians: the *ionic minor trimeter* and the *choriambic dimeter*.

The *ionic minor trimeter* contains three ionic minors:



They can be transformed by permutations of longs and shorts. This process is called *anacalasis*. I will discuss it at length under the subject of the *galliambs* of Catullus, and we will come back to them several times in analyzing *Printemps* by Claude Le Jeune.

Here is the *ionic minor trimeter* with *anacalasis*, in the best known form, utilized by Anacreon:



for instance: three ionic minors with anacalasis become:

Ionic minor, Peon III, Epitrite II.

The *choriambic dimeter* contains four syllables (short or long) and 1 choriamb. It has been utilized by the Beotian poetess: *Corinna*.

Here are a few of its forms:



Epitrite I and choriamb (used by Euripides in *Iphigenia Aulica*)



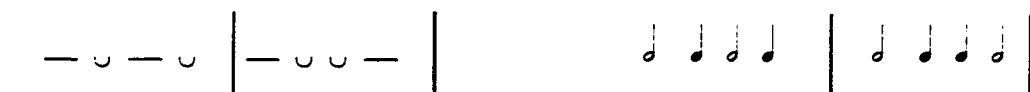
Epitrite II and choriamb (used by Corinna)



Epitrite III and choriamb (used by Pindar in the *7th Pythian*)



Epitrite IV and choriamb (Corinna)



ditrochee and choriamb (Corinna)

diiamb and choriamb (used by Euripides in *Helen*)

antipast and choriamb (used by Euripides in *Ion*)

Peon I and choriamb (used by Euripides in *Helen*)

Peon II and choriamb (Pindar)

Peon III and choriamb (Pindar)

The *acephalic choriambic dimeter* can disguise the following forms:

cretic and choriamb (used by Euripides in *Helen*)

bacchius and choriamb (used by Euripides in *Helen*)

antibacchius and choriamb (used by Euripides in *Iphegenia Aulica*)

A few of the preceding forms can be reversed:

choriamb and Epitrite II (Pindar, *Paian VIII b*)

choriamb and diiamb (used in the *Cavaliers* by Aristophanes)

choriamb and cretic (catalectic form, reversal of the acephalus form)


A few of the preceding forms can be reversed:



 choriamb and Epitrite II (Pindar, *Paian VIII b*)



 choriamb and diamb (used in the *Cavaliers* by Aristophanes)



 choriamb and cretic (catalectic form. reversal of the acephalus form)

Strophes

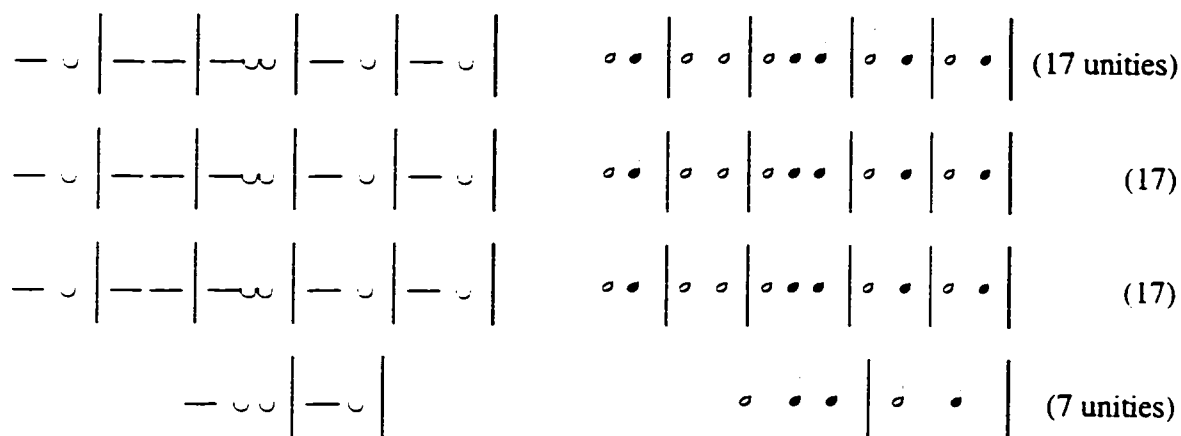
According to Plessis and Masqueray, the Greeks knew two general forms for grouping verses, and from there two forms of poems: a) "the monostic poem, in which a single and same genre of verse is repeated indefinitely" (see Homer's *Illiad*); and b) "the systemmatic poem which is formed from strophes" (see *Alcestis*, *Sappho*, *Anacreon*, and the odes of *Pindar*). The strophes were grouped in systems: the most celebrated system is the triad. The triad can have three dispositions: a) traditional form, type AAB in which the first two strophes (Strophe-Antistrophe) resemble each other and the third strophe (Epode) is of a different structure; b) type ABB in which the isolated strophe begins and is followed by two identical strophes; and c) type ABA in which the two similar strophes surround the free strophe.

Alcaeus and *Sappho* (7th century BC) constructed the first strophes. It is to them that we owe the alcaic strophe and the sapphic strophe. We will soon see the two asclepiadean strophes due to another *Alcaeus* (ca. 388 BC).

Sapphic Strophe

Invented by the poetess *Sappho* (610 BC). *Sappho* (exact name *Psapphos*) lived on *Lesbos*, an island of the *Aegean sea*. She was a genius – one of the greatest lyric poets of *Antiquity*. She created the two logaedic verses and the strophe that bears her name: sapphic

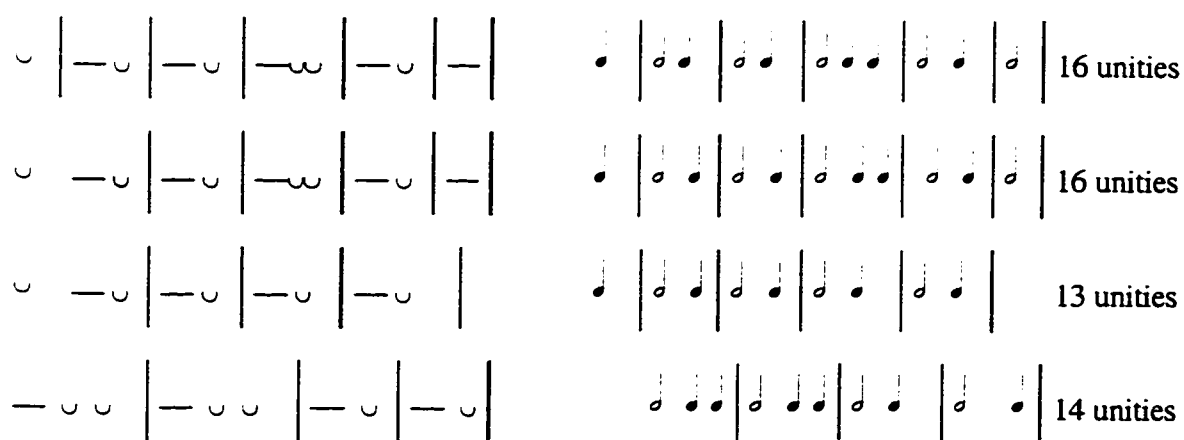
major, sapphic minor, sapphic strophe. The sapphic strophe contains four verses: three sapphic minors and one adonic:



This strophe only contains prime numbers: 17 (3 metrons) and 7 (1 metron). Its grace and frivolity are due to the small adonic verse, that shortens the sapphic by removing its third and fourth feet (dactyl, trochee), as if the "rhythmic character" of the first three verses wilted and shrank, to bounce up full of life in the first sapphic of the following strophe.

Alcaic Strophe







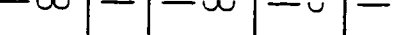

Invented by the poet Alcaeus of Mytilene (610 BC). It consists of four verses: two alcaic hendecasyllables, one alcaic enneasyllable, one alcaic decasyllable (otherwise called four alcaics adding 11 plus 11, plus 9, plus 10 syllables to the total).



The succession of unified values is made according to the following numbers: 16, 16, 13, 14. Among the Greeks, the two last verses were united into a single verse. Among the Latins, the 37 Horatian Odes (37 of 104) using alcaic strophes must be cited.

Asclepiadean, Greek: Asklepiadon. The verses and the asclepiadean strophes come to us from another Alcaeus, the poet Alcaeus of Athens (around 388 BC). There are two kinds of asclepiadean strophes. Composition of the first asclepiadean strophe consists of three asclepiadean minors and one glyconic:

This strophe is based on the prime numbers: 19, 19, 19, 13. As in the sapphic strophe, the last verse seems to be condensed: it shortens the other three.

		19 unities
		19 unities
		11 unities
		13 unities

It aligns four prime numbers: 19, 19, 11, 13. The pherecratean and the glyconic again seem abbreviated. Decreasing the two first verses: the glyconic, with its final long duration, adds two unities to the pherecratean, and prepares the forward surge of the asclepiadean in the First verse of the following strophe.

Here are a few Greek strophes that are not as well-known as the sapphic, the alcaic, and the asclepiadean, cited by W. J. W. Koster in his *Traité de Métrique grecque*:⁷

First example (Sappho, 96 D., verses 4, 5, 6):

	glyconic (for which the base is a trochee) 12 unities
	glyconic (for which the base is a spondee) 13 unities
	aeolian dactylic pentapody (spondaic base, 2 dactyls, 1 trochee, catalexis) 17 unities

The third verse reproduces the second and lengthens it by doubling the dactyl.

Second example (Sappho, 98 D., verse 12, 13, 14):

	an amphimacer (or cretic), followed by a glyconic (at the base of a trochee) – (to compare with the alcaic hendecasyllable, in analyzing this last as an amphibrach followed by a glyconic at the base of a trochee) 17 unities
	glyconic (of which the base is a trochee) 12 unities
	phalecean (with trochaic base, and spondee substitute for the last foot) 17 unities

⁷ *Treatise on Greek Metrics*

The second verse diminishes the first by suppressing the amphimacer. The third verse elongates the second, by doubling the trochee and the final long.

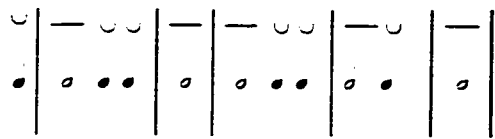
Third example (Alcaeus, 43D., verses 6 – 9):

	Epitrite III (according to Koster: iambic monometer with spondee substitute for the 1st iamb – followed by a glyconic with spondaic base 20 unities
	asclepiadean minor (with trochaic base) 18 unities
	same rhythm as the 1st verse, except for the base of the glyconic which is a trochee. 19 unities
	asclepiadean minor (with iambic base) 18 unities

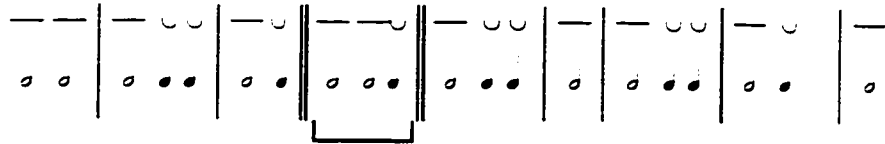
Verses with crossed rhythms: the first and the third verse are similar, the second and the fourth are similar. Only, the bases change. The second verse is non-retrogradable.

Fourth example (also borrowed from Alcaeus):

	asclepiadean minor with spondaic base 19 unities
	asclepiadean minor with trochaic base 18 unities
	glyconic, with spondaic base, elongated by the substitution of a spondee for the last trochee (This hypercatalectic glyconic is called hipponactean.) 15 unities

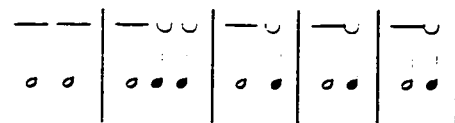

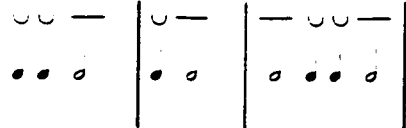
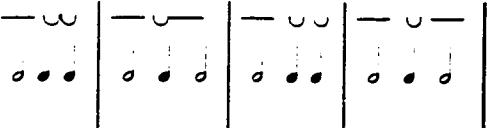
	acephalic asclepiadean minor (the base is replaced by a short anacrusis)	16 unities
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General rhythmic effect: two ordinary verses, the second shortened by a short duration: 19 unities, 18 unities – and one very long verse adding verses three and four:



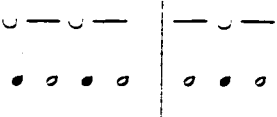
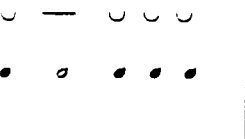
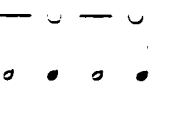
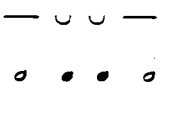
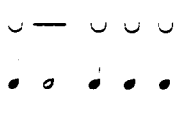

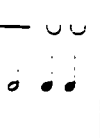
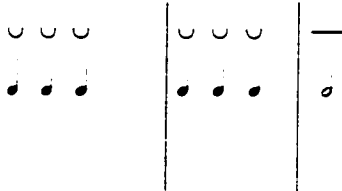
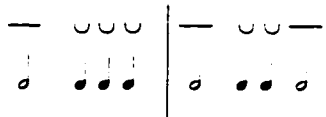
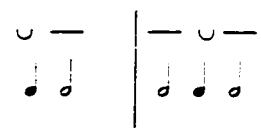
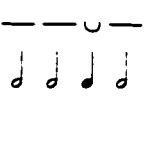
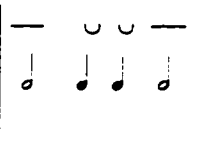

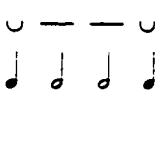
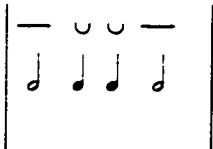

with an antibacchius in the center, and a total of 31 unities (prime number) = 19 + 18 + 31.

Fifth example (taken from anonymous texts):

	phalecean	17 unities
	phalecean, with spondee substituted for the last foot.	18 unities
	choriambic dimeter no. II, divided into: Epitrite III with resolution of the 1st long, choriamb	13 unities
	These are 2 dochmiacs, each group containing a dactyl and a cretic. Koster sees here 2 dodrants (Schroeder calls "dodrants" the combination of choriamb and iamb: (— ∪ ∪ — ∪ —))	18 unities

Remarks on crossed symmetry: the first verse (17 unities) and the third verse (13 unities), are both built on prime numbers. The second and the fourth verses (although divided differently) both have 18 unities. Otherwise stated, the second verse is a variant of the first, and the fourth verse reclaims the cretic rhythm already implied at the beginning of the third: ∪ ∪ (— ∪ —).

To terminate this too brief outline of Greek strophes, I add an example of an extremely free strophe and place it under more diverse analyses. It consists of one strophe from Pindar's *Fifth Pythian*:

			catalectic iambic. dimeter (diiamb + cretic)
			iambic monometer, transformed into iamb + tribrach. It is followed by a choriambic dimeter containing ditrochee + choriamb.
			verse in 3 parts: 1) iambic monometer transformed into iamb + tribrach, 2) glyconic (trochaic base, dactyl, trochee, catalexis), and 3) Peon IV
			hypodochmius (catalectic trochaic tripody – the 2 trochees are replaced by tribrachs)
			choriambic dimeter containing Peon I + choriamb
			dochmiac (iamb + cretic)
			choriambic dimeter containing Epitrite III + choriamb, and followed by an isolated iamb
			choriambic dimeter containing antipast + choriamb, and followed by an isolated iamb

			diiamb. 2 cretics

				verse in 2 parts: 1) choriambic dimeter containing cretic + choriamb, and 2) Peon IV and cretic

			bacchius – followed by a "lecythium" (catalectic dimeter, then 3 trochees and the catalexis)

B) SURVIVAL OF GREEK RHYTHMS

B) SURVIVAL OF GREEK RHYTHMS

1) Analysis Of The Second Movement (Allegretto) Of Beethoven's 7th Symphony

Beethoven said: "I am the Bacchus that grinds the delicious nectar for humanity. It is I who give the divine frenzy of spirit to man." As conceited as they are, these words are not too much to describe the extraordinary Dionysian joy which animates certain passages of the first movement, the opening of the Scherzo, and the entire Finale of Beethoven's 7th Symphony. The entire work has a dance-like character and Wagner called it "the apotheosis of Dance." But what interests us here is the genial second movement of the work, this funeral dance mixed with lamentations and luminous hopes (the consolation of major responding to the sorrow of minor). This piece remains modern and does not belong to any epoch, or to any country: it is timeless, spaceless. Two rhythmic styles are found here: feminine rhythms (anacrusis, tonic accent, mute) and *Greek rhythms*. The entire piece is, in effect, based on dactyls and spondees. Summary of the form – five sections: I) 1st theme, dactylic, in minor followed by three variations with expressive counter-melody; II) 2d theme, central, in major; III) 4th variation of the 1st theme (always with its expressive counter-melody); IV) Fugal development of the 1st theme constituting the 5th variation; V) Recapitulation of the 2d theme in major, and Coda on the 1st theme in minor forming the 6th variation.

The excerpt begins (and ends) on a fourth and a sixth in the winds and the horns (perfect minor chord). I) The 1st theme is introduced by low chords. Two periods. Period two is repeated in an echo. Aside from its beautiful modulation to the relative and its chromatic harmonies, this mysterious theme is written in a very gripping Dactylo-spondaic rhythm:



1st variation: the middle voice, sung by the altos and the violoncellos, adds a magnificent expressive counter-melody which is accented as follows:

2 longs (expressive accent) anacrusis - arsis - tonic accent - thesis - mute anacrusis tonic accent mute

feminine group feminine group

(expressive accent) anacrusis tonic accent mute 2 longs anacrusis tonic accent mute

feminine group feminine group

2 longs (transformation) (expressive accent) momentum etc.

- arsis - - thesis - masculine group

This counter-melody – by the variety of its rhythmic figures:


longs shorts (dactyl by diminution) →


dotted value accent and rest creating a rhythm contrary to the dactyls:

(not to mention the grace notes) – counterbalances the monotony of the dactyls and the spondees.

2d variation: The theme and its counter-melody ascend an octave. Perpetual eighth-

notes obtained by the combination of two new rhythmic figures  |  |

and:  |  

3d variation: tutti fortissimo. Theme played by the winds and the horns. Counter-melody in the first violins. Five superimposed rhythmic figures. Theme: 

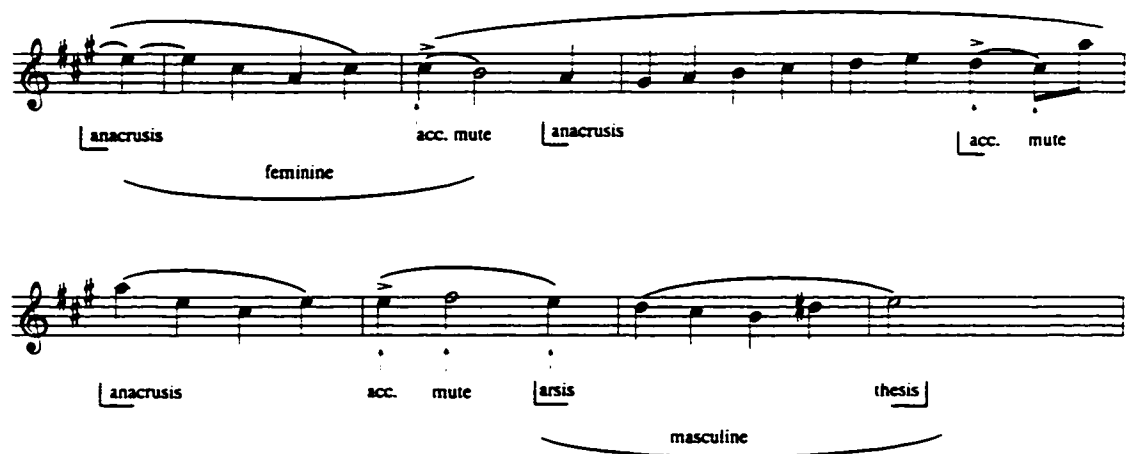
counter-melody:  2d violins: 

violins:  

violoncellos and contrabasses  

The last two superimposed figures create a perpetual movement of irrational eighth-notes. We must not forget the trumpets and the kettledrums that add their punctuation from time to time. A codetta at the end of the theme connects it to the middle section.

II) Middle section in major. Theme of the Middle played by the clarinets and bassoons. The 1st violins continue the irrational eighth-notes in a supple arpeggiated counterpoint. The pizzicato of the basses continues the dactyls. The clarinet's melody, all in quarter-notes, could be written as four metrons:



The image shows two staves of musical notation in treble clef with a key signature of one sharp (F#). The melody consists of quarter notes. Above the first staff, a bracket labeled 'feminine' spans the first two measures. Above the second staff, a bracket labeled 'masculine' spans the last two measures. Below the first staff, the annotations 'anacrusis', 'acc. mute', 'anacrusis', and 'acc. mute' are placed under the first, second, third, and fourth notes respectively. Below the second staff, the annotations 'anacrusis', 'acc. mute', 'arsis', and 'thesis' are placed under the first, second, third, and fourth notes respectively.

2d period: canonic imitation at the octave between the clarinet and the horn. The pizzicati of the basses always continues in dactyls. A warm harmony – a vulgar and outdated banging – of diminished seventh and tritone (7 + 4), brings a ravishing melodic cadence in the style of Mozart, first in A, then in tonic major. The canonic imitation in tonic continues with a grand descending scale, and the dominant (E), in three registers: strings (low), brass (medium), winds (high). They introduce the return of the 1st theme. III) 4th variation of the theme in minor. The expressive counter-melody moves to the highest voices (flute, oboes, bassoon). The theme is low (pizzicati in the bass). Counterpoint in double eighth-note quartuplets (detached). The counter-melody is a bit languid with suppressed sixteenth-notes and the use of eighth-note triplets. A third period is added to the counter-melody and borrows from the subdominant (D minor), then melts away in the following section. IV) The 5th variation of the theme is immediately a fugal development. The subject of the fugue is taken from the 2d period of the theme. 2d period:



The subject originates from two counter-subjects, one in detached sixteenth-notes and the other syncopated. Normal exposition with four entrances: subject, answer, subject, answer. Short diversion of three measures, with symmetric entrances in fifths, on two fragments, in reversible counterpoint, taken from the last measure of the subject and of the counter-subject. Subject to the relative (C major), that purposely enters a quarter-note too early. Escorted by its two counter-subjects, it passes through minor, F major, D minor, and one long diminished seventh brings back the theme fortissimo and tutti with the counter-subject in sixteenth-notes, reduced to eight measures. The codetta at the end of the theme connects it again to the middle section. V) Reprise of the theme from the Middle in major, 1st period alone concluding in A. Borrowing from D minor (subdominant), only the dactyls, in the winds, then in the trumpets and the kettledrums, are detached over the calm,

sustained strings. A luminous modulation to the relative (C major), recalling the end of the 1st period of the theme, to the tutti fortissimo, opposes the minor cadence of the pianissimo quartet which is a sort of restatement of the entire theme. 6th variation of the theme alone, without counterpoint or counter-melody, delivers the dactyls and spondees in their primitive nudity. The two periods of the theme are complete. This is a variation of registers and timbres. The theme is cut into small fragments, distributed to the different sections of the orchestra – the flutes in treble, the reeds in medium high register, the horns and bassoons in the middle, and pizzicato in the bass. The excerpt finishes (like it began) on a fourth and a sixth in the winds with the horns (perfect minor). The A in the bass, played previously by the strings, remains implied.

2) Hölderlin

Hölderlin, a German poet, novelist, and playwright (1779-1843), author of *Lyric Poetry*, of a historic novel, *Hyperion*, and of beautiful German translations of Sophocles, has written several poems with Greek rhythms. I have procured the following quotations through my friend Elmar Seidel.

Sonnenuntergang (Sunset). Here are the metrics of each verse, notated in longs and shorts (— ∪).

```

∪      ∷—∪  ∷—∪  ∷—∪∪ ∷—∪  ∷—  |
∪      ∷—∪  ∷—∪  ∷—∪∪ ∷—∪  ∷—  |
∪      ∷—    ∷—∪  ∷—∪  ∷—∪  ∷
— ∪ ∪  ∷—∪∪ ∷—∪  ∷—∪  |

```

This is an Alcaic strophe. It is followed by a second strophe which is also Alcaic.

Lebenslauf (Path of Life). Metrics of each verse, in longs and shorts:

```

— —  ∷—∪∪ ∷—    ∷—∪∪ ∷—∪  ∷—  |
— —  ∷—∪∪ ∷—    ∷—∪∪ ∷—∪  ∷—  |
— —  ∷—∪∪ ∷—∪  |

```

— u u | — u u | — u | — |

This is the second asclepiadean strophe (at the beginning of the final glyconic: dactyl, instead of spondee).

We can also find the use of Greek meters in Hungarian poetry.





Kisfalerdy (Karoly), Hungarian poet, from the 18th century, has used the *dactylic hexameter* and the *dactylic pentameter*.

Vörösmarty, one of the greatest Hungarian poets (19th century), has used the *dactylic hexameter*.

Berzsenyi, a Hungarian poet from the 18th century, has written *alcaic*, *asclepiadean*, and *sapphic* strophes.

3) Romanian Peasant Music





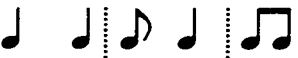

In a very curious etude on Romanian peasant music entitled *le giusto syllabique bichrone*,⁸ C. Brailoiu has devised tables of shorts and longs classified by tripodies, then by tetrapodies. These ensembles can only be grouped into four Greek rhythms:

pyrrhic:  | iamb:  | trochee:  | spondee:  |




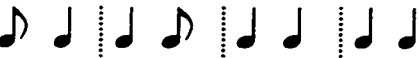





By combining these different rhythms in tripodies, we obtain 64 different versions. If combined in tetrapodies, we obtain 256 different versions. These commonly used tables are an ideal graphic of all that can be found in Romanian folk poetry using two types of verse: verses with three feet and verses with four feet, and verses with only the aforementioned four feet. Romanian peasant music follows the rhythms of the verses by transforming them through changes, substitutions, and variations of all sorts. I will cite a few of the "possible" interesting rhythms classified by Brailoiu.

⁸*The Correct Bichronal Syllabic.*

1st Type (tripodies)

Form 5:		at 7 unities
Form 24:		at 10
Form 31:		at 10 unities and non-retrogradable
Form 36:		at 9 (Peon I, spondee)
Form 53:		at 9
Form 62:		at 11 unities

2d Type (tetrapodies)

Form 7:		at 10 unities
Form 20:		at 11 (Peon IV, ionic minor)
Form 92:		at 13 (diamb, Epitrite II)
Form 112:		at 14
Form 185:		at 12 (Epitrite II, Peon I)
Form 206:		at 13 (ionic major, Epitrite III)
Form 228:		at 13
Form 247:		at 14
Form 254:		at 15 unities

bacchius (U — —) and **antibacchius** (— — U):



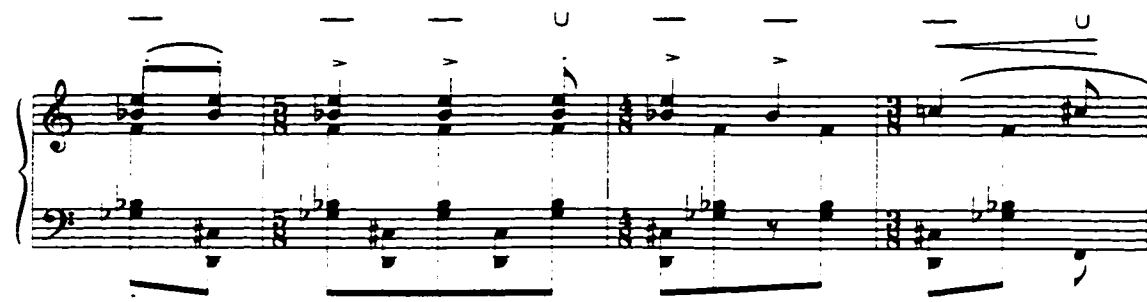
(Igor Stravinsky, *Petrouchka*)

A musical score for the song "The Rose Tree". The score is written for voice and piano. The key signature has one sharp (F#), indicating D major or B minor. The time signature is 3/4. The vocal melody begins with a treble clef and a key signature change from one sharp to no sharps or flats. It features a triplet of eighth notes, followed by a half note and a quarter note, then a colon indicating a repeat. The piano accompaniment starts with a bass clef and a key signature change from one sharp to no sharps or flats. It includes a series of chords and single notes, some marked with accents (^) and slurs. There are two measures of piano solo, each indicated by a thick black bar under the staff. Above the second piano solo, there are markings for breath or phrasing: a bracket labeled 'C' over two measures, and another bracket labeled 'S' over two measures, both with vertical lines pointing down to specific notes.

(Igor Stravinsky, *Petrouchka*)

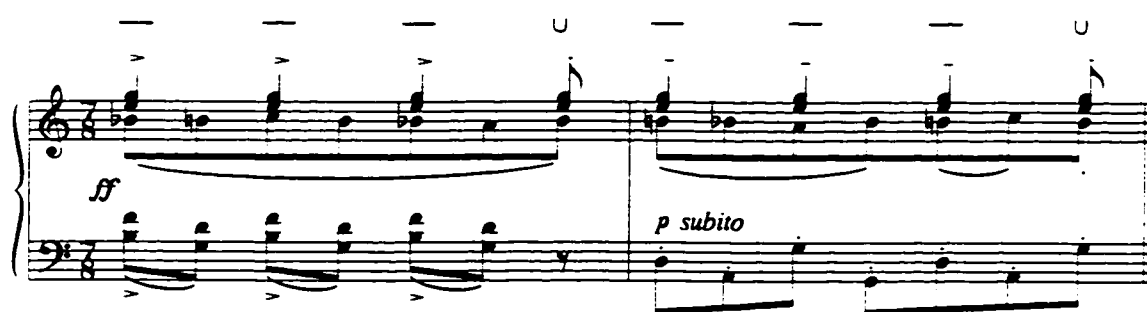
152

Epitrite IV (— — — U)



(Igor Stravinsky, *Histoire du Soldat*: "Dance du diable")

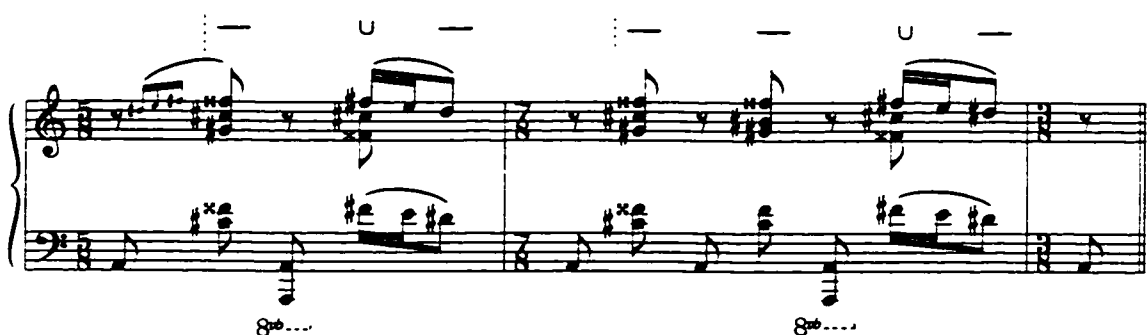
again Epitrite IV (— — — U)



(Igor Stravinsky, *Histoire du Soldat*: "Dance du diable")

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amphimacer (— U —) and Epitrite III (— — U —)



(Igor Stravinsky, *Le Sacre du Printemps*: "Glorification de l'Élue")

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Epitrite III:

Bass Voice solo

Eh bien, mon à - (me) ma dou - ceur.

(Igor Stravinsky, *Les Noces*)

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Epitrite II:

Andantino Tranquillo

pp *p espr.*

(Manuel de Falla, *El amor brujo* - "The Love Sorcerer")

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This final example, taken from the "Danse générale" (or the Bacchanale!) that ends Maurice Ravel's *Daphnis et Chloé*, is interesting on more than one level:



(Maurice Ravel, *Daphnis et Chloé*, "Danse générale")

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It could be said, perhaps, that it contains the 51st Hindu mode, "Kânavârdini":



which was used by Albert Roussel in his third *Joueur de flûte*. We can also say that it is based on this polytonal sonority:

To be fair, I must end all these citations of Greek rhythms used among contemporary musicians with an analysis of the first excerpt of my *Messe de la Pentecôte* for organ, entitled: "Les langues de feu."¹⁰ Similarities to all Greek rhythms can be found here, but they are connected, transformed, changed, elided, diminished, augmented, and (horror!) they use irrational values. I prefer to reserve this analysis (and that of the second number, "Pièce en trio" from my *Livre d'Orgue*, which also utilizes Hindu rhythms in irrational values) for other chapters where I will provide a complete analysis of the *Messe de la Pentecôte* and the *Livre d'Orgue*. In reading these chapters, please forgive me if I have been a bit coquettish by unnecessarily using irrational values with Hindu and Greek rhythms, as if to say that I, too am capable of being self-serving. I have neither used irrational values through laziness, nor to place Greek or Hindu rhythms in isochronal measures, but on the contrary – and despite the irrational values – I have always respected the *spirit* of these rhythms.*

5) *Gaspard de la Nuit* by Maurice Ravel

Gaspard de la Nuit by Maurice Ravel is without a doubt, along with Albeniz's four books of "Iberia" and Chopin's "Etudes," one of the highest points in piano composition. The three pieces that comprise the collection – *Ondine*, *le Gibet*, and *Scarbo* – are inspired by the poems of Aloysius Bertrand, a French writer from the 19th century. Ravel's work has borrowed its title from a book of prose poems by Bertrand, which is also entitled: *Gaspard de la Nuit*. This *Gaspard de la Nuit* is a demonic incarnation that would have been so self-promoting as to offer the poetry of Bertrand to Bertrand himself. Bertrand's book has a subtitle: *Fantaisies à la manière de Rembrandt et de Callot*.¹¹ In other words, here the outlaws, the taverns, the poetry of noise (Callot), alternate with mystery, meditation, and the poetry of silence (Rembrandt). Bertrand's poems are bathed in a romantico-gothic


¹⁰ *Languages of Fire*

* The *Livre d'Orgue* will be analyzed in Volume III. The *Messe de la Pentecôte* will be analyzed in Volume IV.

¹¹ *Fantasies in the manner of Rembrandt and Callot*

atmosphere, Middle Age convention, effects of night, and diverse sorceries. Ravel has admirably expressed this black and purple brilliance in *Gaspard de la Nuit*, which was not customary for him. We will leave aside the exquisite *Ondine*, that streams forth in such refined harmonies. Only *Le Gibet* and *Scarbo* interest us here, for they use Greek rhythms.

Le Gibet. Ravel has utilized three very short motifs: 1) the setting sun, the night, and the death that falls on all things (third measure); 2) "the nocturnal north wind that yelps" and "the hanged person that sighs on the hangdog fork," an expressive motif that necessitates a feminine rhythm (6th and 7th measures), and 3) the converging cluster of chords (from the 20th measure) that perhaps represent the horrible "sling" slowly embroidered by the spider around the neck of the hanged. The grand effect of the piece is obtained by the use of a rhythmic pedal on an inexorable B-flat, a rhythmic pedal that pursues itself during the entire excerpt and evokes at once "the bell that rings at the walls of the town," the unbearable repetition of the fly's buzzing "coming from the horn and sounding on the deaf ears" of the hanged, and the dead who do the work. This pedal reunites two Greek rhythms, iamb (— ◡) and bacchius (◡ — —):

 iamb, through repetition of the bacchius being the elongation of the long. (Iamb + bacchius: this is the reversal of the second dochmiach verse form: bacchius + iamb.) Because the bells were formerly rung by human hands, there are several rhythmic variants. The rhythmic pedal is constant to itself in the entire first page of the excerpt. On pages 3-4 iambic successions appear, and the piece ends with two iambs. The most sensational variant is found on the second page when the marches converge. The first converging march (10th and 21st measures of the excerpt) is established on a single chord, the 9th of the dominant with an added augmented 4th, first reversal:



The second converging march – which seems to utilize a large quantity of chords passing over the bass line (23d and 24th measures), and a dominant 7th in the bass which is consistently provided by a B-flat, enharmonically spelled as A-sharp in the middle register pedal point – is, in reality, written in the second mode of limited transposition, mode 22 (see volume VII):



Because the rhythmic variant is the same in the two converging marches, I cite only the second (with the Debussian chords that precede it) and the march with a dominant seventh (7) with added notes that follows it.

+





(Maurice Ravel, *Le Gibet*)

This composition for piano – arpeggiated in two sections because it is impossible to play it all simultaneously – has provoked the change of rhythm. To facilitate the task of executing it, Ravel writes an attack one sixteenth-note too early in the rhythmic pedal. The result is astonishing. Instead of:

we have:
 then
 then again the normal rhythm:

After the dotted eighth-note (a sixteenth-note too short) all the durations are attacked a sixteenth too early. The value of five, being too long for a sixteenth-note, reestablishes the equilibrium. After that, the attacks and durations are normal.

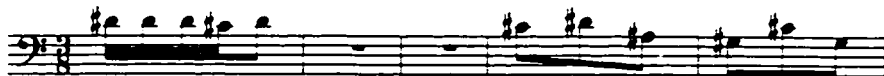
1st transformation: subtraction of a quarter from the penultimate of the bacchius

2d transformation: addition of a quarter to the long of the initial iamb

Scarbo – This character appears at several reprises in Bertrand's book. In "la Nuit et ses prestiges,"¹² the third part of the work, four poems speak of him. What Ravel has chosen as a pretext is the before-after poem in the book. *Scarbo* is a *gnome* – a deformed, supernatural dwarf, who, according to the Jewish cabalists, lives in the earth's breast where he guards treasures. In this atmosphere, at once poetic and terrifyingly supernatural, *Scarbo* comes to torment the night sleepers. With this added harmonic sparkling typical of Ravel, which responds well to Bertrand's precious images, we are not very far from the terrors of Hoffmann or of Edgar Poe. Summary of the form: XI sections. I) Introduction. Midnight. A mysterious rumbling from the kettledrums, and a trilled chord evoking the well-known orchestral effect of chord trills united to a cymbal roll in a crescendo-decrescendo. II) Theme A:



Theme B, similar to a muted trumpet:



Theme C, in which the repeated notes suggest a guitar: "So many times have I heard its buzzing laugh in the shadows of my alcove, and *its scraping claw* on the silk of my bed curtains!"



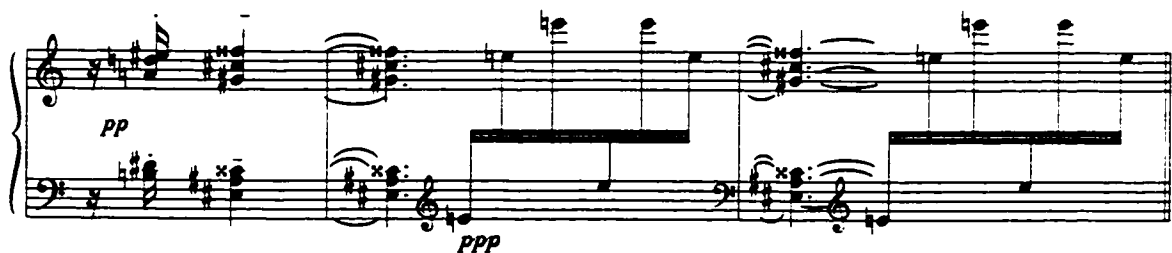
Section III) Principal Theme D in an iambic rhythm: ♪ ♫ We will also see the detail of this passage which is the best of the work and contains a rather new use of the Greek iamb. IV) Theme B. V) Development of Theme C. VI) Development of Theme A. VII) Intense

¹²"The Night and Its Illusions."

fortissimo of principal Theme D in C major. "The dwarf became enlarged between the moon and myself like the bell of a gothic cathedral." A rumbling of the bass drum brings the augmentation of theme A to the trombones: "This is Scarbo who bites me on the neck, and who, to cauterize my bleeding wound, plunges his reddened iron finger into the furnace!" ("the gothic chamber") VIII) Reprise of the Introduction. IX) Page 13, fifth system. Very muddled piano because of pedal and trilled chords. The augmentation of Theme B seems to characterize the moaning of a child. "And of the shadowy crypt where I will sleep with you standing up against the wall, you will hear at your leisure little children crying among the trees." (another poem by Bertrand, also entitled Scarbo) Here it builds entirely in ascending seconds. The soul's horrible ride by the dwarf... X) Development of Theme D ending on a new fortissimo in A-flat major. XI) Coda. "His face paled like the wax of a candle – and suddenly extinguished."

Let us return to Section III, page 4, last measure of the second system. The irrational anguish, the mysterious fear, the supernatural fright are at their limit. "The moon detangles its hair with an ebony comb" and soon Scarbo is going "to pirouette on one foot and roll through the room like a spindle fallen from the staff of a sorceress!" For an instant – we can not yet see – we know only that *he* is there... Principal Theme D expresses all this with three successive transformations of the iambic rhythm:

short, long: ♩ — 1) Short and very long: short = ♪ Very long = the value of 29 eighth-notes and one sixteenth-note. The very long will gradually become shorter and will diminish to ten eighth-notes and one sixteenth-note.



The chord for the long duration can be analyzed as a leading-tone 6th chord (+6)¹³ with added notes, and an E pedal. I hear instead a mode 2²:



The same thing, later, in the chord:



I hear the mode 2¹:



The pianistic writing of the E pedal is effective because the E occurs on three different rhythmic divisions of the beat: a) the ♩ of the right hand, b) the ♩s of the left hand, and c) the circled Es in the example, played by the thumbs in ♩s



2) Short and medium long, the long varies between three, four, five, and seven sixteenth-notes:



¹³ This is a chord of which the sixth above the bass is the leading tone of the tonality; in other words the second inversion of the dominant chord, or the first inversion of any chord on the leading tone.

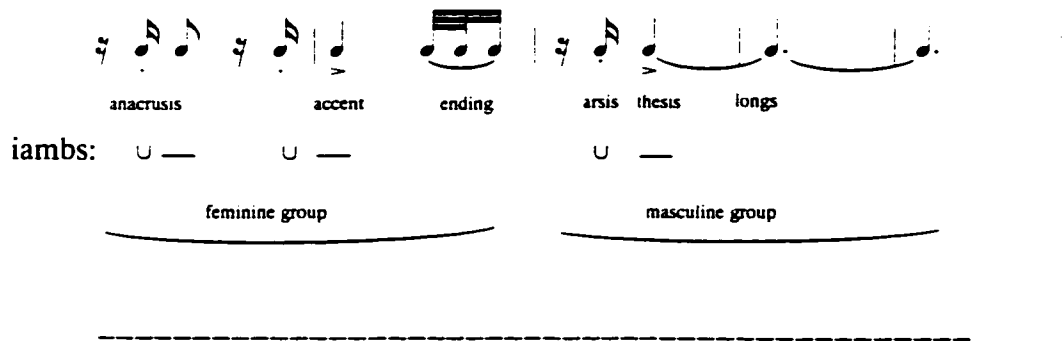
3) The principal Theme in its definitive form



can lead back to the following harmonic scheme:



in other words, to a perfect minor chord with embroidery that becomes more and more disjointed. Rhythmically, our iambs are coupled in the fashion of forming "feminine and masculine groups."



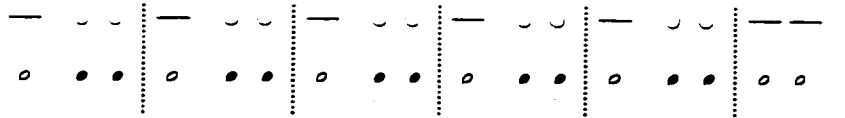
APPENDIX I

COMPARISON BETWEEN GREEK AND LATIN METRICS

APPENDIX I: COMPARISON BETWEEN GREEK AND LATIN METRICS

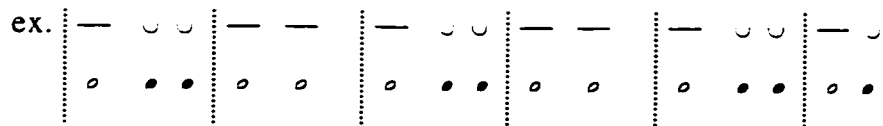
Dactylic Hexameter

Pure Form: five dactyls, spondee substituted for the last foot.



Substitutions Among the Greeks and the Latins:

four prime feet: dactyl or spondee, 5th foot pure, 6th foot spondee or trochee.



This is the old Homer who used the most varied substitutions.

1st foot: iamb, trochee, anapest. Feet 2, 3, 4: sometimes tribrach.



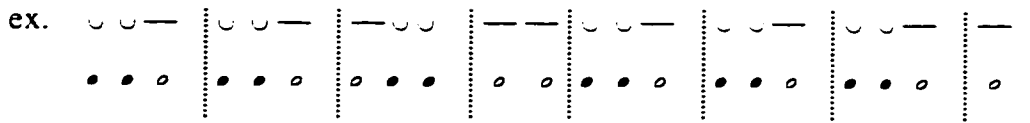
The hexameter first appeared with Homer, Hesiod, and the Lyric Greeks. It has maintained all its perfection, suppleness, and variety. No verse has more dignity, majesty, or grace. With Ennius, it is used with all the brazenness and force of the Roman character. It is often heavy and almost always energetic. Virgil was its master in Rome. His verse contains a very expressive harmony, an infinite sweetness; and yet, it has not retrieved the freshness and the fecundity of Homer, even from a strictly metric point of view. (Laurand)

Catalectic Anapestic Tetrameter

1) Greeks

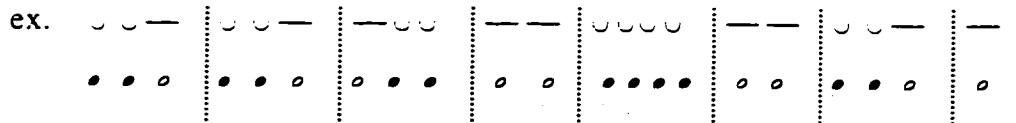
used frequently by Aristophanes

8 feet – 6 prime feet: anapest, spondee, or dactyl – 7th foot pure – 8th foot: 1 indifferent syllable.

ex. 

2) Latins

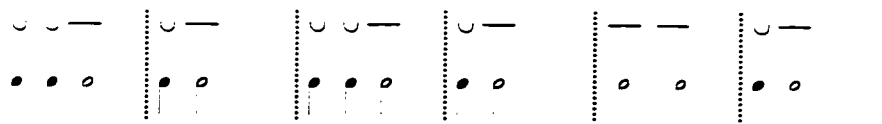
with Plautus, the proceleusmatic is used as a substitute:

ex. 

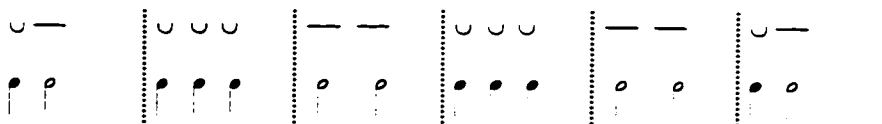
Iambic Trimeter

Among the tragic Greeks:

6 feet: anapest in the 1st foot – feet 2 and 4: iamb – feet 1, 3, 5: dactyl and spondee – 6th foot pure:



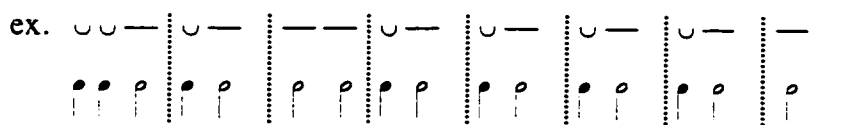
Among Aeschylus and Sophocles the tribrach is very rare. We find several examples of it with Euripides in the second and fourth feet:

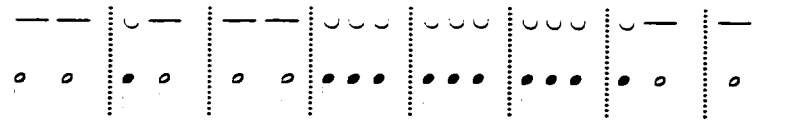


Catalectic Iambic Tetrameter

Among the Greeks:

8 feet: 6th foot – iamb or tribrach, seventh foot pure, 8th foot catalexis:

ex. 

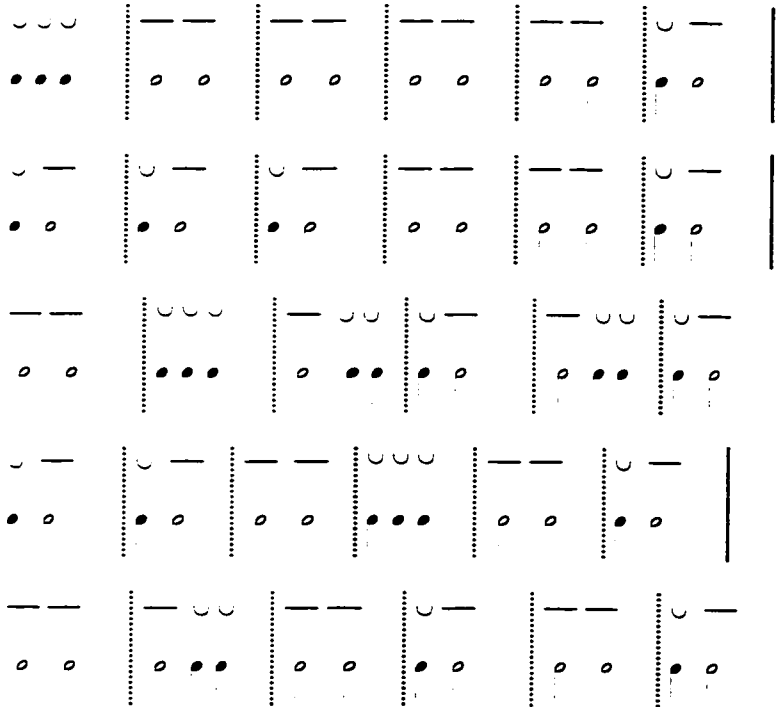


Among the Latins:

Iambic Senarius from *Phaedra*

6 feet | Throughout (except for the 6th foot): iamb, spondee, dactyl, anapest

Feet 1, 2, 3, 4: tribrach, 6th foot pure:



Catalectic Trochaic Tetrameter

1) Among the Greeks:

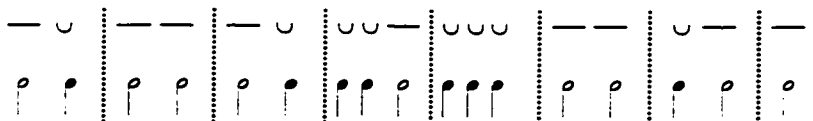
8 feet | tribrach and trochee throughout – feet 2, 4, 6: trochee, spondee, anapest; 7th foot pure, 8th foot catalexis.

Tribrach and anapest substitutions are rare.

ex.



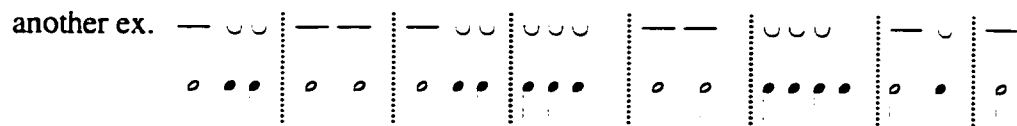
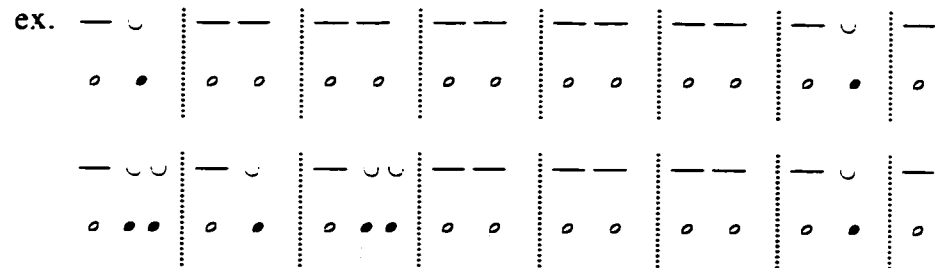
another ex.



2) Among the Latins:

For the 1st 6 feet: trochee, tribrach, spondee, anapest, dactyl (exception: proceleusmatic),

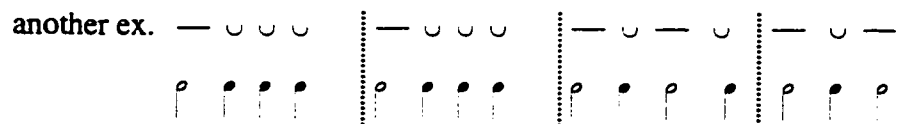
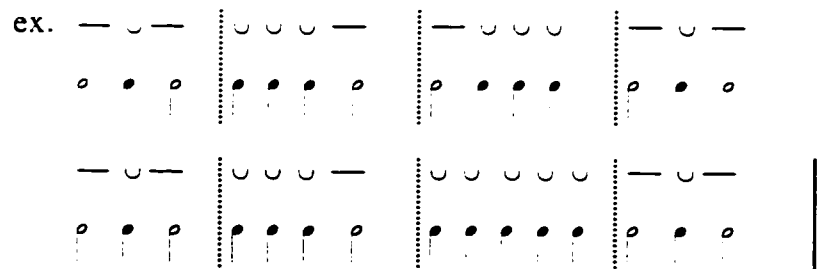
7th foot pure, 8th foot catalexis.



Cretic Tetrameter

1) Among the Greeks:

4 feet | 3 prime feet: amphimacer (cretic), Peon I, Peon IV, and dissolution of the amphimacer into 5 shorts, 4th foot pure:

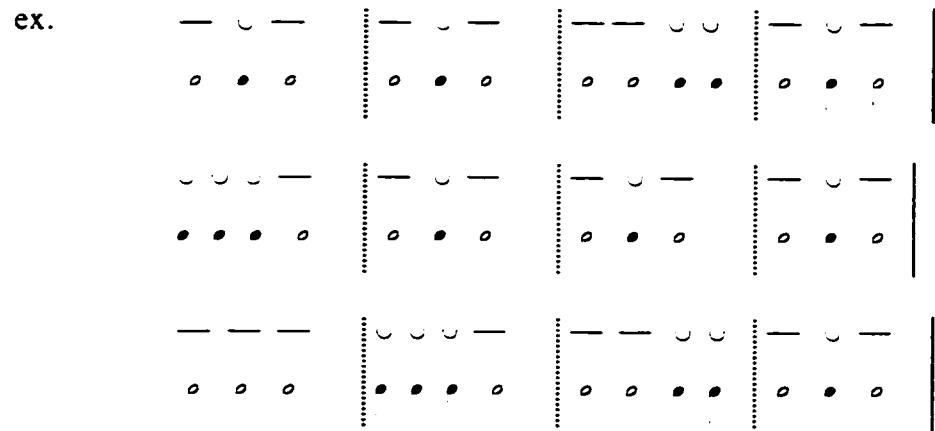


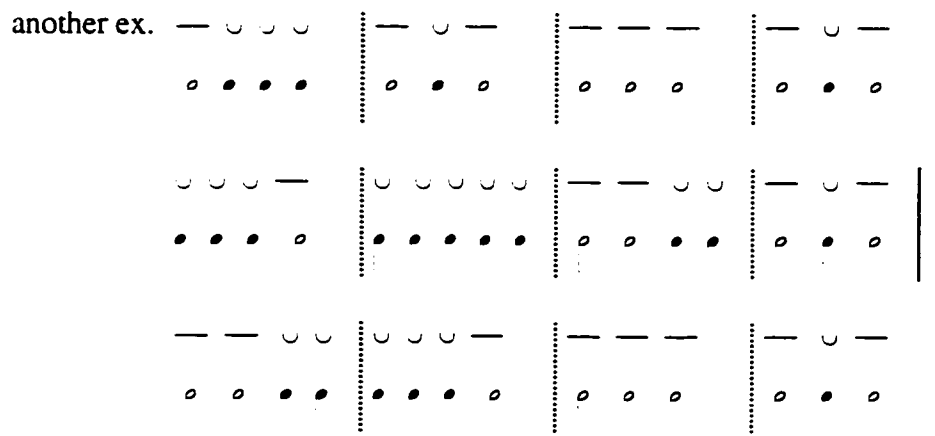
Two Peon Is (1 foot composed of 6 metrons, forming a ditrochee, an exceptional substitution, and an amphimacer)

2) Among the Latins:

4 feet | 3 prime feet: each long can be dissolved into 2 shorts, which gives Peon I and

Peon IV, or 5 shorts. 1st and 3rd feet: amphimacer or molossus, or ionic major. 4th foot pure.

ex. 

another ex. 

Bacchiac Tetrameter

1) Among the tragic Greeks: almost always four bacchius:



2) Among the Latins:

Three prime feet. The initial short can be replaced by one long or two shorts. Each long can be dissolved which gives: molossus, ionic minor, Peon IV, five metrons, or even ◡ — ◡ ◡ (Peon II), or better yet — ◡ ◡ ◡ ◡ (dissolution of the molossus. Fourth foot pure).

ex.

another ex.

Logaedic Meters

(N.B. The disposition of this table of *Logaedic Meters* is borrowed from Bornecque. It has the advantage of being logical and easy to remember.)

1) Logaedic Dipody

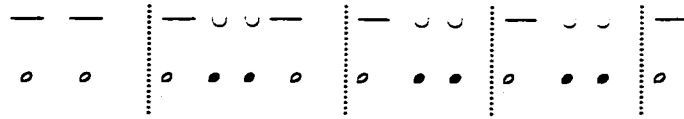
1 dactyl, 1 trochee. This is the *adonic*.

Preceded by a base (spondee). This is the *pherecratean*.

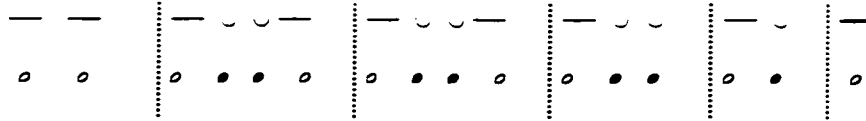
2) Catalectic Logaedic Tripody

1 dactyl, 1 trochee, a catalexis. Preceded by a spondaic base, it is the *glyconic*.

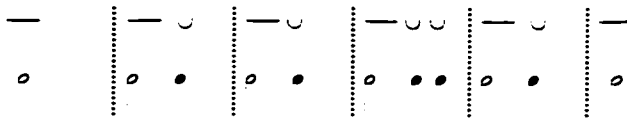
preceded by a spondaic base and a choriamb. This is the *asclepiadean minor*.



preceded by a spondaic base and two choriamb. This is the *asclepiadean major*.

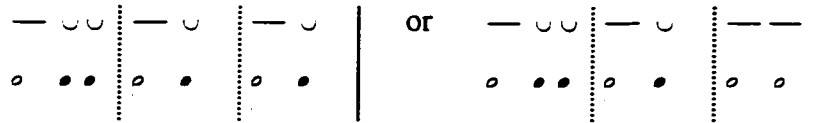


preceded by a long anacrusis and a trochaic dipody. This is the *alcaic hendecasyllable*.

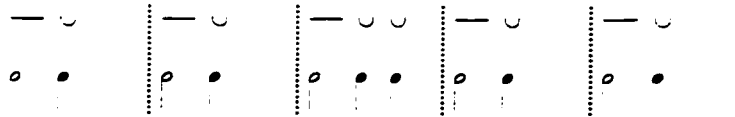


3) Logaedic Tripody

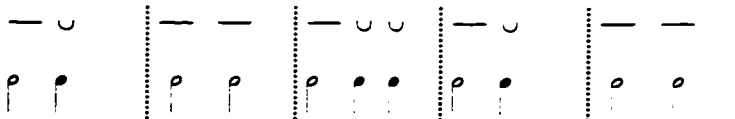
1 dactyl, 1 trochee, a second trochee or a spondee. This is the *aristophanean*.



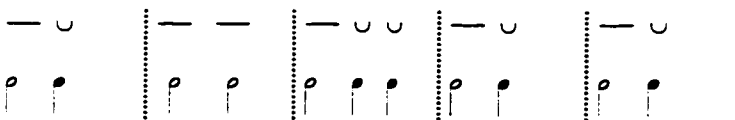
preceded by a trochaic dipody. This is the *sapphic minor*.



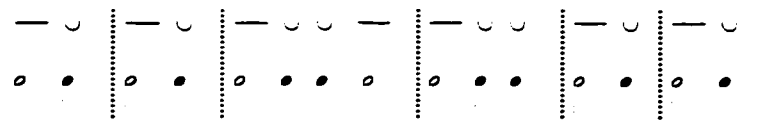
Among the Greeks (Alcea, Sappho): the pure form is shown directly above – 2 trochees, 1 dactyl, 2 trochees. Sometimes a spondee is substituted for the 2d and last feet:



With Horace, the second foot is always a spondee:

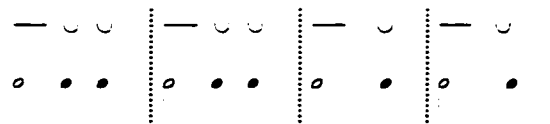


Preceded by a trochaic dipody and a choriamb. This is the *sapphic major*.



4) Logaedic Tetrapody

2 dactyls, 2 trochees. This is the *Alcaic decasyllable*.

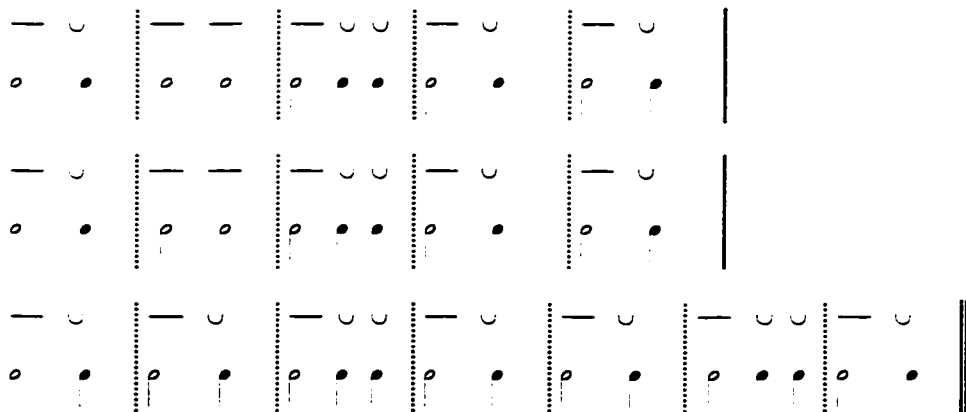


Sapphic Strophe

1) Greeks

Among Alcea and Sappho:

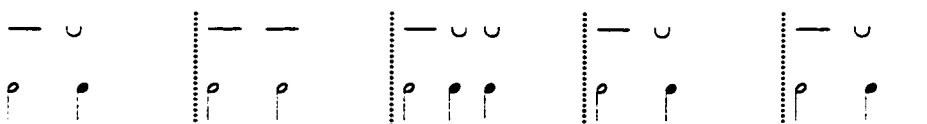
Three verses. 1st verse: sapphic minor. 2nd verse: sapphic minor. 3rd verse: very long, juxtaposing a sapphic minor and an adonic.

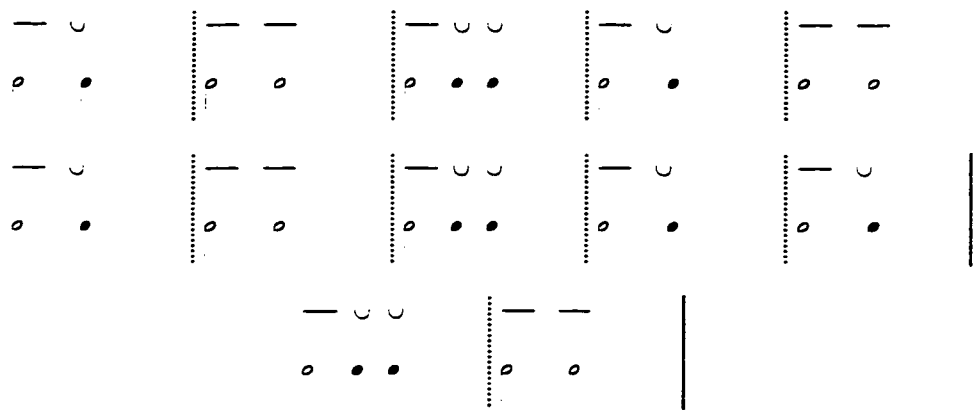


2) Latins

With Horace:

Four verses. The third Greek verse has been cut in two. Form: 1st, 2d, 3d verses – sapphic minor – 4th verse, shorter: adonic. The second foot of each sapphic minor is always a spondee. The last foot of the adonic is also a spondee.





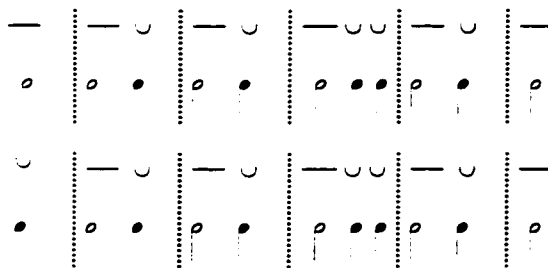
(Notice the spondee substitute at the end of the second sapphic.)

Alcaic Strophe

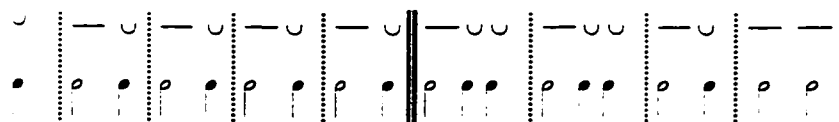
1) Greeks

Among Alcea and Sappho:

Three verses. 1st and 2nd verses: alcaic hendecasyllables. 3rd verse: very long, juxtaposing an alcaic enneasyllable and an alcaic decasyllable.



(short anacrusis in the second alcaic hendecasyllable)



(spondee substitute at the end of the alcaic decasyllable)

2) Latins

With Horace:

Four verses. In the first two verses (alcaic hendecasyllables) the anacrusis is always long, the second foot is always a spondee. As for the sapphic strophe, the third Greek verse has

been cut in two: the alcaic enneasyllable and the alcaic decasyllable are separated in the third and fourth verse. The alcaic enneasyllable contains one long anacrusis and two spondee substitutes for the second and fourth feet. The entire verse could then be analyzed

as one 1 long and 2 Epitrite IIs: $\overline{\quad} \quad \overline{\quad} \cup \overline{\quad} \overline{\quad} \quad \overline{\quad} \cup \overline{\quad} \overline{\quad} \quad$
 $\circ \quad \circ \bullet \circ \circ \quad \circ \bullet \circ \circ$

The alcaic decasyllable may contain a spondee substitute in the last foot.

$\overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \overline{\quad} \quad \overline{\quad} \cup \cup \quad \overline{\quad} \cup \quad \overline{\quad}$
 $\circ \quad \circ \bullet \quad \circ \circ \quad \circ \bullet \bullet \quad \circ \bullet \quad \circ$

$\overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \overline{\quad} \quad \overline{\quad} \cup \cup \quad \overline{\quad} \cup \quad \overline{\quad}$
 $\circ \quad \circ \bullet \quad \circ \circ \quad \circ \bullet \bullet \quad \circ \bullet \quad \circ$

$\overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \overline{\quad}$
 $\circ \quad \circ \bullet \quad \circ \circ \quad \circ \bullet \quad \circ \circ$

$\overline{\quad} \cup \cup \quad \overline{\quad} \cup \cup \quad \overline{\quad} \cup \quad \overline{\quad}$
 $\circ \bullet \bullet \quad \circ \bullet \bullet \quad \circ \bullet \quad \circ \circ$

The alcaic strophe was preferred by Horace. He used it in 37 Odes. Here are two examples:

$\overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \cup \quad \overline{\quad} \quad \overline{\quad}$
Dis solve frigus ligna su per fo co | Lavarenne Translation: "Dissolve the
 cold by putting ample wood on the fire,

$\overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \cup \quad \overline{\quad} \cup \quad \overline{\quad}$
Lar ge re ponens atque be nigni us | and take more generously, o Thalarque,
 from a Sabine vase, the wine of
 four years."

$\overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \overline{\quad}$
De prome quadri mum Sa bina |

$\overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \cup \quad \overline{\quad} \cup \quad \overline{\quad} \cup \quad \overline{\quad} \overline{\quad}$
O Thali arche me rum di ota. | (Last syllable short – indifferent – in the
 (Horace, Odes) second verse)

$\overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \overline{\quad} \quad \overline{\quad} \cup \quad \overline{\quad} \cup \quad \overline{\quad} \quad \overline{\quad}$
Huc vina et unguen ta et nimi um brev es | Lavarenne Translation: "Bring forth

<p>— — — — — — — — — — </p> <p><i>Flor</i> <i>es</i> <i>a</i> <i>moenae</i> <i>ferre</i> <i>ju</i> <i>be</i> <i>ros</i> <i>æ</i> </p> <p>— — — — — — — — — — </p> <p><i>Dum</i> <i>res</i> <i>et</i> <i>aetas</i> <i>et</i> <i>So</i> <i>rorum</i> </p> <p>— — — — — — — — — — </p> <p><i>Fila</i> <i>tri</i> <i>um</i> <i>pati</i> <i>untur</i> <i>atra</i> </p>	<p>wine, perfume, and the ephemeral</p> <p>flowers of the sweet rose, while the</p> <p>circumstances, our age, and the terrible</p> <p>sons of the three sisters permit it."</p> <p>(the thread of human life held by the three</p> <p>Fates.)</p>
---	--

(Horace, Odes)

1st verse: there is an elision due to "vina" and "unguenta." End of the alcaic enneasyllable

(3rd verse): trochee, as with the Greeks. Alcaic decasyllable (4th verse): pure form: 2

dactyls, 2 trochees. For the sake of curiosity, here is an Alcaic Strophe in French:

— | — | — | — | — | — | — | — | — | — |

O | *Sainte* | *Vertu!* | *Ceux* | *qui* | *t'a* | *vance* | *ront*,

— | — | — | — | — | — | — | — | — | — |

Ga | *gnant* | *à* | *leur* | *nom* | *perpétu* | *el* | *hon* | *neur*,

— | — | — | — | — | — | — | — | — | — |

Tou | *jours* | *vi* | *vront* | *dans* | *notre* | *chanson*.

— | — | — | — | — | — | — | — | — | — |

Tes | *enne* | *mis* | *abol* | *is* | *s'oub* | *lieront*.

(*A la Vertu*,¹⁴ by Antoine de Baïf – 16th century)

(Except for the short anacrusis at the beginning of the second verse, this last text follows Horace's model exactly.)

The Asclepiadean strophes of Horace

There are five of them. The first strophe is formed with four asclepiadean minors. The second strophe is comprised of three asclepiadean minors and one glyconic. The third strophe aligns two asclepiadean minors, one pherecratean, and one glyconic. The fourth strophe alternates between glyconic and asclepiadean minor, for instance: glyconic,

¹⁴*To Virtue*

asclepiadean minor, glyconic, asclepiadean minor. The fifth strophe is comprised of four asclepiadean majors.

Asclepiadean Strophe A

asclepiadean major	— —	— — — —	— — — —	— — — —	—
	o o	o . . .	o . . .	o . . .	o
id.	— —	— — — —	— — — —	— — — —	—
	o o	o . . .	o . . .	o . . .	o
id.	— —	— — — —	— — — —	— — — —	—
	o o	o . . .	o . . .	o . . .	o
glyconic	— —	— — — —	— — — —	—	
	o o	o . . .	o . . .	o	
asclepiadean major	— —	— — — —	— — — —	— — — —	—
	<i>Quis de</i>	<i>siderio</i>	<i>sit pudor</i>	<i>aut mo</i>	<i>dus</i> (final syllable indifferent)
id.	— —	— — — —	— — — —	— — — —	—
	<i>Tum car</i>	<i>i capitis?</i>	<i>Praecepte</i>	<i>lugu</i>	<i>bres</i>
id.	— —	— — — —	— — — —	— — — —	—
	<i>Cantus,</i>	<i>Melpomene</i>	<i>cui liqui</i>	<i>dam pa</i>	<i>ter</i>
glyconic	— —	— — — —	— — — —	— — — —	
	<i>Vocem</i>	<i>cum citha</i>	<i>ra de</i>	<i>dit.</i>	(final syllable indifferent)
		(Horace, Odes)			

Lavarenne Translation: "What modesty, what measure would one guard in the regret of a heart so dear? Begin the songs of mourning, Melpomene, you to whom your father has given, along with the zither, a limpid voice."

For the sake of curiosity, here is an asclepiadean Strophe A, in French.

— —	— — — —	— — — —	— — — —	—
<i>O Franç</i>	<i>ais, si tu veux</i>	<i>sur toute</i>	<i>nati</i>	<i>on</i>
— —	— — — —	— — — —	— — — —	—
<i>Vainqueur</i>	<i>mettre le joug,</i>	<i>range ton</i>	<i>esper</i>	<i>it,</i>

— — — — — — — — — — — — — —
Sous rai son le dressant. Quand te se ra con nu,
 — — — — — — — — — — — — — —
Ton Dieu, tant que tu dois, con nais,

(*Au peuple français*, by Antoine de Baïf – 16th century)¹⁵

Asclepiadean Strophe B

asclepiadean minor	— — — — — — — — — — — — — — —	o o o . . . o . . o . o
asclepiadean minor	— — — — — — — — — — — — — — —	o o o . . . o . . o . o
pherecratean	— — — — — — — — — — — — — — —	o o o . . o .
glyconic	— — — — — — — — — — — — — — —	o o o . . o . o
asclepiadean minor	<i>Dia</i> — — — — — — — — — — — — —	<i>nam tenerae dicite vergi nes.</i>
asclepiadean minor	<i>Inton</i> — — — — — — — — — — — — —	<i>sum, pueri, dicite Cynthi um</i> (final syllable short)
pherecratean	— — — — — — — — — — — — — — —	<i>Lato namique su premo</i> (spondee substituted for the final trochee)
glyconic	— — — — — — — — — — — — — — —	<i>Dilec tam penit us Jo vi.</i> (Horace, Odes)

Lavarenne Translation: "Sing Diane, young girls. Sing, long-haired God of Cynthe, boys, and Leto, deeply cherished by sovereign Jupiter."

(N.B.): the long-haired God of Cynthe = Apollo.

¹⁵*To the French people.*

asclepiadean minor	$\overline{\text{Hic}} \overline{\text{bel}}$ $\overline{\text{lum}} \cup \cup \overline{\text{lacrimo}}$ $\overline{\text{sum}}, \text{hic} \cup \cup \overline{\text{mise}}$ $\overline{\text{ram}} \cup \overline{\text{fa}}$ $\cup \overline{\text{mem}}$
-----------------------	---

asclepiadean minor	$\overline{\text{Pestem}}$ $\overline{\text{que}} \cup \cup \overline{\text{a populo et}}$ $\overline{\text{principe}}$ $\overline{\text{Cesa}}$ $\overline{\text{re in}}$
-----------------------	--

pherecratean	$\overline{\text{Persas}}$ $\overline{\text{atque}} \cup \overline{\text{Bri}}$ $\overline{\text{tannos}}$
--------------	--

glyconic	$\overline{\text{Vestra}}$ $\overline{\text{motus}} \cup \cup \overline{\text{a}}$ $\overline{\text{git pre}}$ $\cup \overline{\text{ce.}}$
----------	---

(Horace, Odes)

1st verse: lacrimosum, hic: elision. Last syllable short.

2nd verse: three elisions.

3rd verse: spondee substitute in the last foot.

4th verse: last syllable short.

Translation: "Apollo, moved by your prayers, sends away war and every source of tears.

He will send insufferable famine and plague far from our people and from Caesar, our prince among the Persians and the Bretons."

APPENDIX II

LATIN METRICS

APPENDIX II: LATIN METRICS

Dactylic Hexameter

The most frequently used verses in Latin. Employed by Virgil, Lucretius, and also Horace (Satires, Epistles) and Ovide (Metamorphoses).

Composition: 6 dactyls. The 5th foot is always pure.

Dactyl: from the Greek word: dactulos = finger. Doubtlessly because the dactyl is composed of one long and two shorts (— ∪ ∪) and the finger of one long phalanx and two short...

— — ∪ ∪ ∪ ∪ ∪ ∪
In fon | dum, re | gina, ju | bes reno | vare do | lorem (Vergile, *Æniad*)

Translation: "You invite me, O queen, to renew an inexpressible sorrow."

1st and 2d feet: spondee substitute. Feet 3, 4, 5: pure.

6th foot: catalectic (trochee)

∪ ∪ | ∪ ∪ | ∪ ∪ ∪ ∪ | ∪ ∪ ∪ ∪ | ∪ ∪ ∪ ∪ | ∪ ∪ ||

The association of a dactylic hexameter with a dactylic pentameter creates the *dystich elegiac*. The dactylic pentameter is comprised of 5 feet. Composition: 2 dactyls (or spondees), 1 isolated long, 2 dactyls, final long (or short)

— ∪ ∪ | — ∪ ∪ | — | — ∪ ∪ | — ∪ ∪ | — |
∪ ∪ ∪ ∪ | ∪ ∪ ∪ ∪ | ∪ | ∪ ∪ ∪ ∪ | ∪ ∪ ∪ ∪ | ∪ |

Thus we have, quite simply, two groups of 10 unities (or 10 metrons), or two measures of $\frac{5}{2}$

∪ ∪ ∪ ∪ | ∪ ∪ ∪ ∪ || ∪ ∪ ∪ ∪ | ∪ ∪ ∪ ∪ ||

Metricists have been given a lot of trouble for their explanation of this verse. Their work has ended in improbable scansion (analysis of verse into metrical patterns), like this one from Quintilian (end of 3d century AD):

2 dactyls, 1 spondee, 2 anapests

— ◡ ◡ ◡ | — ◡ ◡ ◡ | — — | ◡ ◡ — | ◡ ◡ — |
or this one, used by the metricists of the 19th century:

— ◡ | — ◡ ◡ | — \nearrow | — ◡ ◡ | — ◡ ◡ | — \nearrow | the sign: \nearrow indicates a silence of one long.

This use of the "added silence," transforms a simple and charming rhythm in $\frac{5}{2}$ into a ridiculous and heavy rhythm in $\frac{6}{2}$:

◡ ◡ ◡ | ◡ ◡ ◡ | ◡ \nearrow \nearrow | ◡ ◡ ◡ | ◡ ◡ ◡ | ◡ \nearrow \nearrow |

All musicians will agree that the only valid scansion is the first:

— ◡ ◡ | — ◡ ◡ | — | — ◡ ◡ | — ◡ ◡ | — ||
◡ ◡ ◡ | ◡ ◡ ◡ | ◡ | ◡ ◡ ◡ | ◡ ◡ ◡ | ◡ ||

Archilochean minor

Composition: 2 dactyls and 1 indifferent final (catalectic):

◡ ◡ ◡ | ◡ ◡ ◡ | ◡ or ◡ ◡ ◡ | ◡ ◡ ◡ | ◡

— ◡ ◡ | — ◡ ◡ | ◡ |
Pulvis et umbra su mus | (Horace, Odes)

Translation: "We are but shadow and dust."

Logaedic Verses

Glyconic: composition: spondaic base, 1 dactyl, 1 trochee, indifferent final:

—	—		—	∘	∘		—	∘		—
o	o		o	•	•		o	•		o
—	—		—	∘	∘		—	∘		—
Sic	te		diva	po		tens	Cy	pri.		(Horace, Odes)

Translation: "In this the mighty goddess of Cyprus!"

Asclepiadean Minor (or *Small Asclepiadean*):

Between the spondee and the dactyl of the glyconic, a choriamb is inserted:

—	—		—	∘	∘	—		—	∘	∘		—	∘		—
o	o		o	•	•	o		o	•	•		o	•		o

Asclepiadean Major (or *Grand Asclepiadean*):

Between the spondee and the dactyl of the glyconic, two choriamb are inserted:

—	—		—	∘	∘	—		—	∘	∘	—		—	∘	∘		—	∘		—
o	o		o	•	•	o		o	•	•	o		o	•	•		o	•		o

Pherecratean: This is a glyconic stripped of its last syllable:

—	—		—	∘	∘		—	∘		
o	o		o	•	•		o	•		

Priapean: The priapean verse is composed of a glyconic followed by a pherecratean:

—	—		—	∘	∘		—	∘		—	∘	∘		—	∘	∘		—	∘		—
o	o		o	•	•		o	•		o	•	•		o	•	•		o	•		o
Tantum			dem	omnia			senti			ens			quam	si			nulla	sit			usquam

(dem omnia: elision) Translation: "Everything is nonsense as if his wife did not exist!"

Phalecean: Employed among the Greeks by Sappho, Anacreon, Calimachus, Theocritus, and the great tragedians (Aeschylus, Sophocles, Euripides). Employed among the Latins by Varro, Catullus, Petronius, Statius, Martial, and Ansonius.

Phalecean: Composition: spondaic base, dactyl, 3 trochees.

— — | — — | — — | — — | — — ||
 o o | o . . | o . | o . | o . ||

— — | — — | — — | — — | — —
Mortis | perdomi | tor, sa | lutis | auctor. (Prudence)

Translation: "Conqueror of death, author of our salute."

Here is a phalecean in French:¹⁶

— — | — — | — — | — — | — —
O toi, | Gat, favo | ri de | Mars et | Phoebus |

(*Au Seigneur du Gat*,¹⁷ by Antoine de Baïf – 16th century)

(spondee substitute in the last foot).

And here is a succession of four phaleceans:

— — | — — | — — | — — | — —
Issa est | passere | nequi | or Ca | tulli,

— — | — — | — — | — — | — —
Issa est | purior | oscu | lo co | lumbae,

— — | — — | — — | — — | — —
Issa est | blandior | omni | bus pu | ellis,

— — | — — | — — | — — | — —
Issa est | carior | indi | cis la | pillis. (Martial)

Issa is: elided (in each verse). spondee substitute for all the final feet. Issa is the name of a small dog. Lavarenne Translation: Issa is naughtier than the sparrow of Catullus, Issa is purer than a dove's kiss, Issa is more pleasing than any other girl, Issa is dearer than India's precious stones."

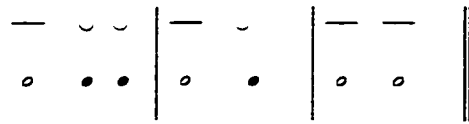
Aristophanean: Composition: 1 dactyl, 2 trochees.

— — | — — | — — ||
 o . . | o . | o . ||

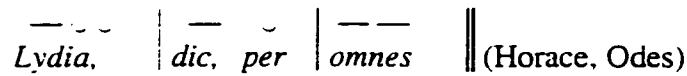
¹⁶ O you, Gat, favorite of Mars and Phoebus...

¹⁷ *To the Savior of Gat*

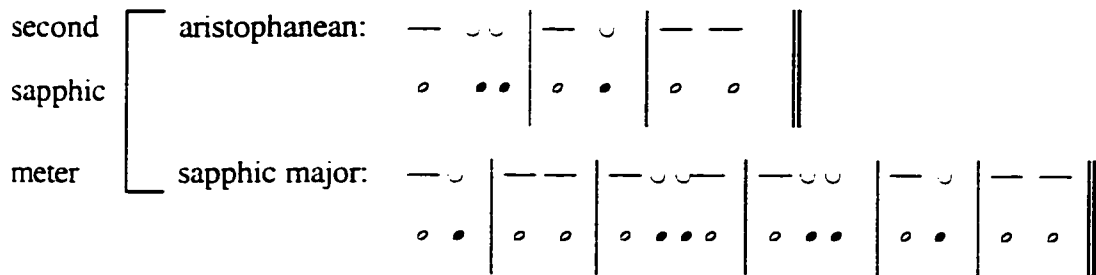
The 2d trochee is frequently replaced by a spondee:



This is the case for this celebrated verse by Horace:



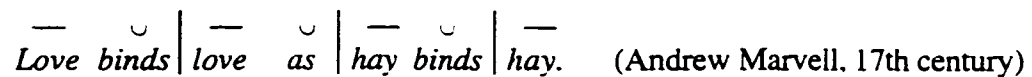
(Translation: "Lydia, tell me, by the gods..." of which the composition is: dactyl, trochee, spondee. The Ode where this verse is found is written in distichs, formed by an aristophanean and a sapphic major. It is called the "*second sapphic meter*."



Trochaic Verses

We have already examined them with care, among the Greeks and the Latins alike. These verses have survived. Here are two examples from modern language poets:

a) trochaic verse in English:



b) trochaic verse in German:

Eine grause Nacht, mein vater!

Kalt und dunkel wie das Grab.

(Franz Grillparzer, 19th century)

Translation: "A horrible night, my father! Cold and dark, as the grave!"

Let us return to Latin metrics:

Archilochean Major

Verses in compound meters, constituted by a first member that is comprised of four dactyls, and a second member that is comprised of three trochees. The first three dactyls and the third trochee can be replaced by spondees.

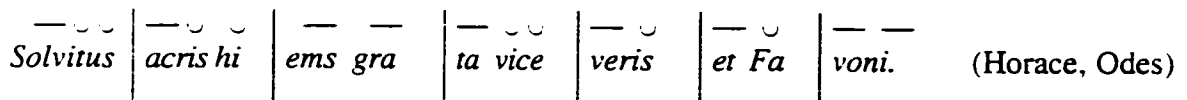
pure archilochean major:



with substitutes:



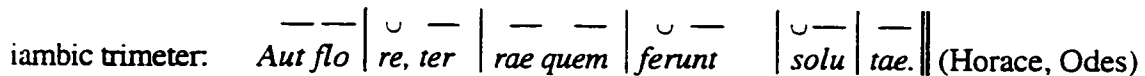
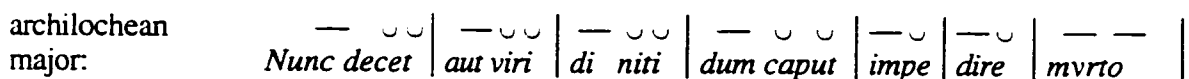
same arrangement with Horace:



Translation: "The harsh winter dissolves into the sweet return of Spring and of the Favonius."

Followed by a catalectic iambic trimeter, this verse forms a distich which is called the

fourth archilochean meter:



Except for the spondee substitute in the last foot, the archilochean major is pure. In the iambic trimeter, Horace substitutes the spondee for the iamb in the first and third feet. With the catalexis of the sixth foot, one can hear: Epitrite III ($\rho \rho \rho \rho$), Epitrite III

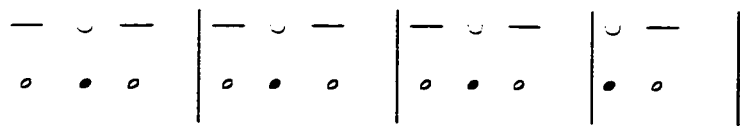
($\rho \rho \rho \rho$) bacchius ($\rho \rho \rho \rho$).

Lavarenne translation: "Now is the time to entwine our brilliant heads with green myrtle and flowers brought from far away lands."

Teliambic Cretic Tetrameter.

"We find with Plautus a verse formed with three cretics followed by an iamb. Certain metricists call it *teliambic cretic tetrameter*, in other words terminated by an iamb."

(Lavarenne)

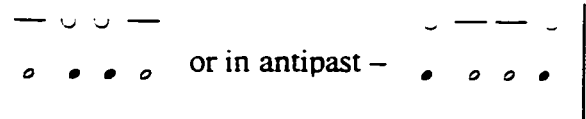


Anacclasis

The anacclasis causes a break in the meter through permuted durations. Laurand gives the

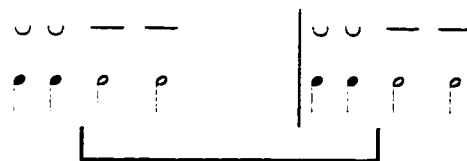
following example in an iambic succession. 2 successive iambs: can

be transformed by an anacclasis in choriamb:

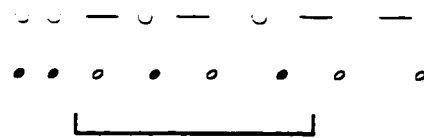


All three cases (diiamb, choriamb, antipast): are always heard as two longs and two shorts – but they are not in the same places. Lavarenne gives a much more extraordinary example of this, borrowed from piece 63 by Catullus. It consists of two successive ionic minors, but here the anacclasis does not operate on an ionic or on the two ionics. It positions its permutation machine *between* the two ionic minors and is added, at once, to the end of the first and the beginning of the second.

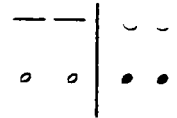
2 ionic minors:



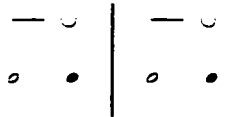
transformation through anacalasis:



The 2 longs of the 1st ionic and the 2 shorts of the 2d ionic, for instance:



became 2 trochees:



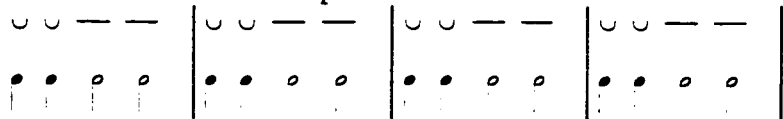
We can enlarge the principle of the anacalasis by applying it to modern music: by applying it to the following durations (which are more complex than the simple longs and shorts), and to the series of timbres, sounds, and intensities, and especially by applying it *anywhere* and *at any time*, like a blind and unruly infernal mechanism that unexpectedly intervenes in the precise places where it can *break something*.

Galliambs

These verses figure into piece no. 63 by Catullus. They have been given the name galliambs because the piece by Catullus is consecrated to the Gallus, priests of Cybele.

It consists of *catalectic ionic minor tetrameters*, with changes, substitutions, and anacalasis.

Ionic minor tetrameters in their pure state: four ionic minors.

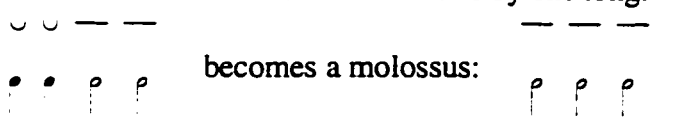


Transformation of the 2d long of the ionic minor:

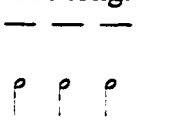


becomes

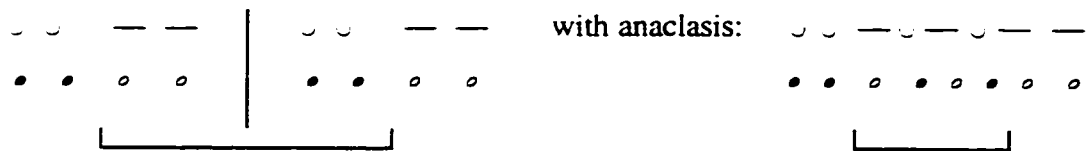
Replacement of the ionic minor's two shorts by one long:



becomes a molossus:

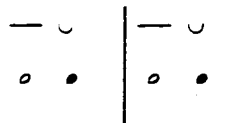


We will see that the anacalasis consists of a break in the meter, which operates here by inverting the longs and shorts at the beginning and end of the two coupled feet. Here are two ionic minors:



The 2 longs of the 1st ionic, and the 2 shorts of the 2d ionic, for instance: — — | v v

are transformed into 2 trochees:

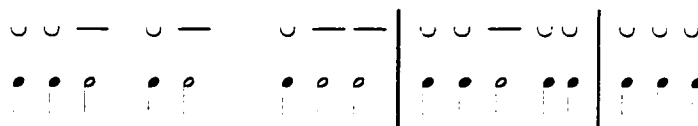


Super alta vectus Attis | celeri rate | maria. (Catullus)

Super alta vectus Attis: counts as two ionic minors | *alta vectus* These 2 trochees constitute the anacalasis | *rate* is the transformation of the 2d long of the 3d ionic minor | finally the last foot is catalectic: *maria* (tribrach)

Translation: "Over the deep sea, Attis is swiftly carried on a boat."

The rhythmic disposition of the verse above:



is the one most commonly used by Catullus in his galliambs. "This verse is considered to be comprised of two parts: the first hemistich (ionic minor dimeter with anacalasis) forms an *Anacreontic*; the second forms a *catalectic Anacreontic*." (Lavarenne)

Another example:

Lustravit aethera album, | sola dura, ma | re ferum. (Catullus)



(aethera album: elision)

The two shorts of the first ionic are replaced by one long: • • ◦ ◦ becomes ◦ ◦ ◦
 However, we do not hear the entire molossus because there is an immediate anacalasis, and
 again, ◦ ◦ | • • is replaced by ◦ • ◦ • so that the two ionic minors
 become one long, two trochees, and one spondee. In the second hemistich, the second
 long of the ionic is transformed into: • • ◦ • • | last foot catalectic (tribrach).

Translation: "the sun shone through the whitening sky, the earth closes, the savage sea."

another example:

◦ ◦ ◦ ◦ ◦ — ◦ — —		◦ ◦ — ◦ ◦		◦ ◦ —	
<i>ubi capita Maenades vi</i>		<i>jaciunt eder</i>		<i>igerae.</i>	(Catullus)
• • • • • ◦ • • ◦		• • • • •		• • ◦	

After the two shorts of the first ionic minor, we have again an anacalasis. But the long
 of the first trochee is transformed into two shorts, which makes us hear five shorts, the
 second trochee of the anacalasis, and the two longs of the second ionic minor. At the second
 hemistich, the second long of the third ionic is transformed:

• • ◦ • • and the last foot is catalectic with a final long: • • ◦ |

Sotadean Verse (or Sotadic)

Composition: 2 ionic majors (◦ ◦ • •) followed by three trochees (◦ •)

— — ◦ ◦		— — ◦ ◦		— ◦		— ◦		— ◦		— ◦
◦ ◦ • •		◦ ◦ • •		◦ •		◦ •		◦ •		◦ •

— — ◦ ◦		— — ◦ ◦		— ◦		— ◦		— ◦
<i>Ter corripu</i>		<i>-i terribi</i>		<i>em ma</i>		<i>nu bi</i>		<i>pennem.</i>

— — ◦ ◦		—		—		◦ ◦		— ◦		◦ ◦ ◦ ◦		— ◦
<i>Nec jam pote</i>		<i>ram</i>		<i>quod</i>		<i>modo</i>		<i>confi</i>		<i>cere li</i>		<i>bebat.</i>

(Petronius, *Satiricon*)

$\circ \circ \circ \circ \circ \circ \circ \circ \mid \circ \circ \mid \circ \circ \mid \circ \circ \parallel$ 1st verse completely regular

$\circ \circ \circ \circ \mid \circ \circ \circ \circ \circ \circ \mid \circ \circ \circ \mid \circ \circ \parallel$ 2d verse: The before-after foot transforms the trochee into a tribrach.

Lavarenne translation: "Three times has my hand seized the terrible ax. But I could no longer execute that which at that instant I desired."

$\overline{\text{Has}} \text{ cum } \overline{\text{gemi}} \mid \overline{\text{na}} \text{ compede } \overline{\text{dedi}} \mid \overline{\text{cat}} \text{ ca } \overline{\text{tenas}} \mid$ (Martial, *Epirgrams*)
 $\circ \circ \circ \circ \mid \circ \circ \circ \circ \mid \circ \circ \mid \circ \circ \mid \circ \circ \parallel$

spondee substitute in the last foot.

Translation: "He dedicates these oaks to you with a double shackle."

$\overline{\text{Pede}} \text{ tendite, } \overline{\text{cursum}} \text{ addite, } \overline{\text{convo}} \mid \overline{\text{late}} \mid \overline{\text{planta}} \mid$ (Petronius, *Satiricon*)
 $\circ \circ \circ \circ \mid \circ \circ \circ \circ \mid \circ \circ \mid \circ \circ \mid \circ \circ \parallel$

1st ionic major: the first long is transformed into two shorts. Cursum addite: elision.

spondee substitute in the last foot.

Translation: "Run your course, run, fly."

Choriambic Verses

There are different combinations of choriambic with other feet. Here is a quintuplet

(or pentapody) which juxtaposes 2 choriambic $\overline{\text{ }} \overline{\text{ }} \mid \overline{\text{ }} \overline{\text{ }} \mid \overline{\text{ }} \overline{\text{ }} \mid \overline{\text{ }} \overline{\text{ }} \parallel$ and
 $(\circ \circ \mid \circ \circ \mid \circ \circ \mid \circ \circ) \parallel$

a logaedic tripody comprised of 1 dactyl and 2 trochees: $\overline{\text{ }} \overline{\text{ }} \overline{\text{ }} \mid \overline{\text{ }} \overline{\text{ }} \mid \overline{\text{ }} \overline{\text{ }} \parallel$
 $(\circ \circ \circ \mid \circ \circ \mid \circ \circ) \parallel$

or dactyl, trochee, spondee: $\overline{\text{ }} \overline{\text{ }} \overline{\text{ }} \mid \overline{\text{ }} \overline{\text{ }} \mid \overline{\text{ }} \overline{\text{ }} \parallel$
 $(\circ \circ \circ \mid \circ \circ \mid \circ \circ) \parallel$ in other words an
 aristophanean.

— ◡ ◡ — <i>Delicium,</i>	— ◡ ◡ — <i>blanditiae,</i>	— ◡ ◡ ◡ <i>ludus, a</i>	— ◡ ◡ <i>mor, vo</i>	— — <i>luptas.</i>	(Ausonia)
◡ ◡ ◡ ◡	◡ ◡ ◡ ◡	◡ ◡ ◡	◡ ◡	◡ ◡	

Translation: "Delight, flattery, games, love, pleasure."

— ◡ ◡ — <i>Barbara, sed</i>	— ◡ ◡ — <i>quae Latias</i>	— ◡ ◡ ◡ ◡ <i>vincis alumna</i>	— — <i>pupas.</i>	(Ausonia)
◡ ◡ ◡ ◡	◡ ◡ ◡ ◡	◡ ◡ ◡ ◡ ◡	◡ ◡	

Translation: "Foreign child who brings it upon the small daughters of Latium."

Notice the numbers in this rhythm. The ensemble of the verse has 23 unified values, divided into 12 + 11. The number 23 is a prime number. The number 12 is the number of space. The Zodiac separates celestial space into six pairs of signs. Our two choriambes separate the 12 into 2 x 6. The number seven is the number of metron. The number four includes the three kingdoms of nature (mineral, vegetable, animal) and the superior kingdom of man who reigns over the three others; in other words the tetrad: rock, plant, animal, man. We can then find the disposition of the number 23 as follows –

12 (6 + 6) + 11 (7 + 4) = 23 – a symbol of space, of time, and of beings.

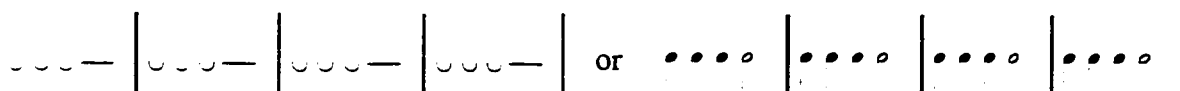
APPENDIX III

SURVIVAL OF GREEK METRICS IN BULGARIAN FOLKLORE

APPENDIX III: SURVIVAL OF GREEK METRICS IN BULGARIAN FOLKLORE

"Ancient Greek verse reveals all or part of its integral rhythm through its text alone. It is almost certain that the verbal rhythm and the musical rhythm are confused in the Delphic Hymns where no rhythmic indication accompanies the notes: they accept and follow the quantity of syllables." (Maurice Emmanuel)

I cite this peonic tetrapody (4 Peon IVs) borrowed from *Eumenides* by Aeschylus:



It lacks only one small thing that would allow such a rhythmic series to become melodic – and this small thing is musical intonation. Where will the ancient Greek poet find it? There, where he has already found the rhythmic scheme, or the oral text. The phonetic particulars of this text, the vocal inflections, and the tonic and logical accents of words are all sources of musical intonation. Thus the melody of the song is almost entirely contained in the acoustic elements of the verbal text. (Stoyan Djoudjeff)

The musical practice of people brings about another phenomenon. Not only can primitive words be replaced by other poetic texts, but the fundamental intonation of a melody can be replaced by other sonorous material without endangering the rhythmic scheme. This rhythmic scheme sheds its melodic and verbal skin and takes on the existence of a pure rhythmic entity, always ready to reappear in a new poetic and musical form. (idem.)

Here is, for example, a Bulgarian song from the western collection *Still Life Painting of Thrace*, near ancient Pione:¹⁸

allegro



¹⁸ Pione is the old French name for what is now called Pivoine.

for which the rhythmic scheme – an abstraction made from several transformations – is evidently the same as the peonic tetrapody of *Eumenides* by Aeschylus cited above:

— — — — | — — — — | — — — — | — — — — | These are 4 Peon IVs.

Almost all of the Greek feet, and also a certain number of Greek verses, are found elsewhere in Bulgarian folklore. But the great originality of Bulgarian folklore is that these feet and verses were often written in "hemiola" form, in other words by using the relationship of 2-3 or 3-2 in such a way that the long no longer doubles the short and the short is no longer half of the long. For instance:

Peon I: — — — — = ♩ ♩ ♩ ♩ | Peon IV: — — — — = ♩ ♩ ♩ ♩

but with the long equaling 1 1/2 shorts, and the short equaling 2/3 of the long.

Peon I: — — — — = ♩. ♩ ♩ ♩ | Peon IV: — — — — = ♩ ♩ ♩ ♩.

Peon IV: — — — — or ♩ ♩ ♩ ♩ is used in the musical rhythms of popular melodies among modern Greek musicians. It is also used among Albanians, Macedonians, Serbs, Rumanians, and in particular, Bulgarians.

The "hemiola" variety of Peon IV: ♩ ♩ ♩ ♩. can be found in a great number of popular Bulgarian melodies. Here is an example from the Bulgarian song "Nakladose sedenkjutu,"

très vif



which aligns two peonic tetrapodies using Peon IV in "hemiola" form. I must point out

that the Bulgarian hemiola Peon IV is the exact same thing as the Hindu "gajalīla":

$\overset{C}{| | |}$ or ♪♪♪♪ . which is no. 18 from the 120 "Deçī-Tālas" of ancient India, using the

principal of adding a dot to the final value. In the sixth volume of *Mikrokosmos* (fifth dance in a Bulgarian rhythm), Béla Bartók has notated this rhythm ♪♪♪♪ using

one measure of uneven time: $\frac{2 + 2 + 2 + 3}{8}$

Stoyan Djoudjeff has put together a table of Greek feet with their Bulgarian "hemiola" form correspondences. Here it is, going (for the Bulgarian rhythms) from the measures in $\frac{5}{16}$ to measures in $\frac{15}{16}$, including all the meters in between (except $\frac{14}{16}$).

TABLE

Greek feet notated in longs and shorts		the same, in modern notation using quarter notes and half notes	the same, in Bulgarian "hemiola"
trochee	— ♩	♪ ♩	$\frac{5}{16}$ ♩. ♩
iamb	♩ —	♩ ♩	$\frac{5}{16}$ ♩ ♩.
spondee	— —	♪ ♩	$\frac{6}{16}$ ♩. ♩
dactyl	— ♩ ♩	♪ ♩ ♩	$\frac{7}{16}$ ♩. ♩ ♩
anapest	♩ ♩ —	♩ ♩ ♩	$\frac{7}{16}$ ♩ ♩ ♩.
amphibrach	♩ — ♩	♪ ♩ ♩	$\frac{7}{16}$ ♩ ♩. ♩
bacchius	♩ — —	♪ ♩ ♩	$\frac{8}{16}$ ♩ ♩. ♩.
amphimacer (or cretic)	— ♩ —	♪ ♩ ♩	$\frac{8}{16}$ ♩. ♩ ♩.
$\frac{5}{16}$	— — ♩ —	♪ ♩ ♩	$\frac{8}{16}$ ♩. ♩. ♩
Peon I	— ♩ ♩ ♩	♪ ♩ ♩ ♩	$\frac{9}{16}$ ♩. ♩♪♪

TABLE (continued)				
Peon II	○ — ○ ○		$\frac{9}{16}$	
Peon III	○ ○ — ○		$\frac{9}{16}$	
Peon IV	○ ○ ○ —		$\frac{9}{16}$	
ionic major	— — ○ ○		$\frac{10}{16}$	
ionic minor	○ ○ — —		$\frac{10}{16}$	
choriamb (trochee + iamb) (compound foot)	— ○ ○ —		$\frac{10}{16}$	
antipast (iamb + trochee) (compound foot)	○ — — ○		$\frac{10}{16}$	
Epitrite I	○ — — —		$\frac{11}{16}$	
Epitrite II	— ○ — —		$\frac{11}{16}$	
Epitrite III	— — ○ —		$\frac{11}{16}$	
Epitrite IV	— — — ○		$\frac{11}{16}$	
adonic (dactyl + trochee) (simple logaedic verse)	— ○ ○ — ○		$\frac{12}{16}$	
Dochmius I (iamb + cretic) (compound foot or dochmiach verse)	○ — — ○ —		$\frac{13}{16}$	
Dochmius II	— ○ — ○ —		$\frac{13}{16}$	
And these 2 particular combinations:			(no measures of $\frac{14}{16}$)	
dactyl + antibacchius:	— ○ ○ — — ○		$\frac{15}{16}$	
amphimacer + anapest	— ○ — ○ ○ —		$\frac{15}{16}$	

I will now give a few examples of these different rhythms in Bulgarian folklore, by

following the order of presentation in the preceding table.

a) example of *trochaic series* with substitutes:

tribrach spondee iamb trochee catalexis tribrach spondee

trochee catalexis tribrach spondee anapest iamb

tribrach spondee trochee catalexis

b) *iamb*s ("hemiola" type):

c) *dactyls* ("hemiola" type):

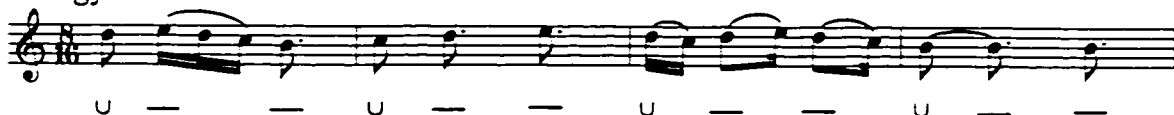
d) *anapests* ("hemiola" type):

e) *bacchius* Chanson "grozdo le, noma hubava," from the Rhopode countryside:



In the third measure: amphimacer substitute. In the last measure: coagulation of the short and the long into a single dotted-quarter.

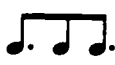
Bacchius ("hemiola" form). Chanson "Deno le mari hubava," from a collection by Panagyriscus:



f) *amphimacers* or *cretics* ("hemiola" type):


Très vif



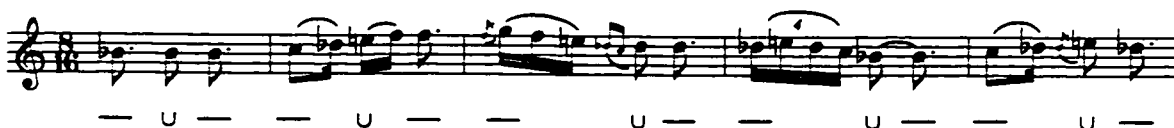
Remark: The "hemiola" form of the amphimacer among the Bulgarians is exactly the same as the Hindu *Mātsya Tīshra* rhythm:  from the "karnātic theory." This rhythm is itself the diminution of the 51st Deçi-Tāla in the "Çârngadeva" system:

"Vijaya": $S \setminus S \setminus S \setminus = \text{quarter note, eighth note, quarter note}$ (non-retrogradable rhythm like the Greek

amphimacer, simple or "hemiola"). In the "Fourth Dance in Bulgarian Rhythm," from the sixth volume of "Mikrokosmos" for piano, Béla Bartók has utilized the Bulgarian

hemiolan amphimacer in Hindu Vijaya notation  with one uneven measure: $\frac{3+2+3}{8}$

Another series of "hemiolan amphimacers":



In the fourth and 12th measures: irrational transformation of the first long (quartuplet).
 Penultimate measure: irrational transformation of the first long (duple). Eighth and 16th measures: coagulation into a single long.

g) peons

Here is a peonic series on Peon II in "hemiola" form:



I have already given (at the beginning of this section) an example that aligns two peonic tetrapodies, on Peon IV in "hemiola" form.

Here is another use of this hemiolan Peon IV, aligning two tetrapodies, each one comprised of Peon IV (hemiola), anapest (hemiola), iamb (hemiola), and another iamb (hemiola) in one large measure of $\frac{26}{16}$:

By progressively suppressing the shorts, each measure's duration shrinks in

relation to the preceding one:

$$\begin{array}{l} \frac{9}{16} = 3 \text{ shorts and 1 long} \\ \frac{7}{16} = 2 \text{ shorts and 1 long} \\ \frac{5}{16} = 1 \text{ short and 1 long} \end{array}$$

The following example aligns four pentapodies, each one comprised of two Peon IVs (hemiola), two anapests (hemiola), a Peon IV (hemiola). The long duration in the penultimate foot (anapest) is always transformed (dissolution). The final Peon IV is always replaced by a grand long of the same value (coagulation). Each pentapody makes one long measure of $\frac{26}{16}$:

Peon IV Peon IV anapest anapest Peon IV

Peon IV Peon IV anapest anapest Peon IV

Peon IV Peon IV anapest anapest Peon IV

Peon IV Peon IV anapest anapest Peon IV

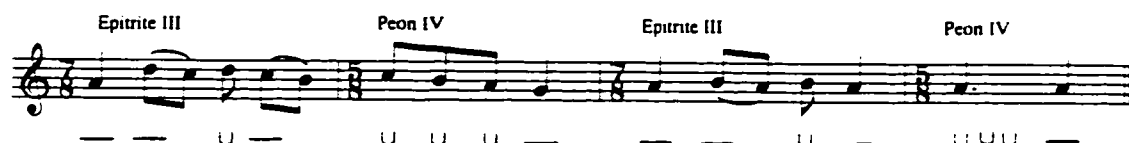
h) epitrites

Epitrite II was used throughout Greece, in Macedonia, and in southern Bulgaria. Here is a melody established on Epitrite IIs, collected by V. Stoin in Samokov, bordering between Thrace and Macedonia:

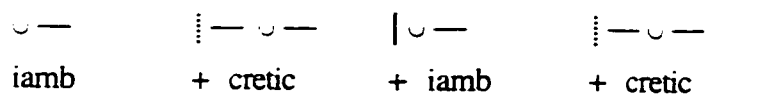
The Bulgarian song "Stapja Neda na daskata," collected by V. Stoin in Pirdop (northern Thrace), is built on the Epitrite III:



Here is a curious mix of Epitrite III and Peon IV:



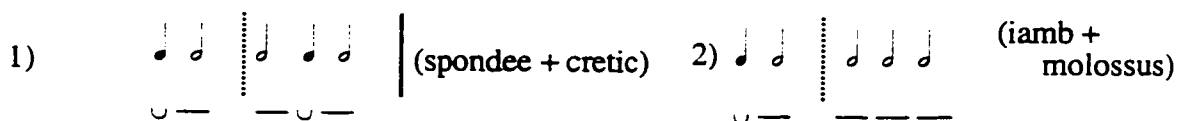
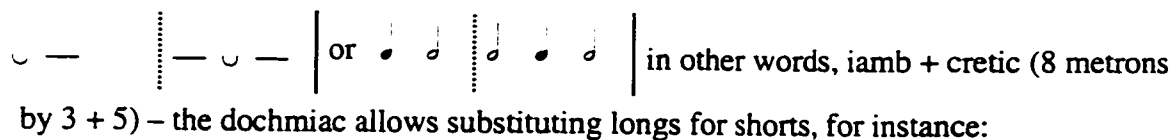
i) dochmiac: at the end of the preceding table of Greek and Bulgarian feet, the reader will notice a certain number of *compound feet*, plus a *simple logaedic verse*: the *adonic* and the *dochmius* or *dochmiac* verse. Here is the rhythm of a verse from Euripides' *Orestes*, that Maurice Emmanuel considers to be a *dochmiac dimeter*:



The song "Tokala j gana vino carveno," collected by V. Stoin on the outskirts of Chorlou, in oriental Thrace, is founded on the same dochmiac dimeter.



Stoyan Djoudjeff is of the opinion that the added iamb in the fourth measure, which is inserted after the cut off as a refrain in the middle of the melody, "is a secondary decorative element," that he must eliminate for analysis. Consequently, this passage must be analyzed as a dochmiac dimeter. In its principal form:



and even: 3) $\circ \circ \circ \circ \circ$ (spondee + molossus)
 — — — — —

Maurice Emmanuel gives an example of these substitutions:

$\circ \circ \circ \circ \circ$ (verse 781 of *Eumenides* by Aeschylus)
 — — — — — (spondee + cretic)

$\circ \circ \circ \circ \circ \circ \circ \circ \circ \circ \circ$ (verse 395 of *Philoctete* by Sophocles)
 — — — — — (iamb + molossus | dactyl + molossus)
 or partial transformation of the 5 longs

"The musical rhythm coming from the first of these dochmius variants $\circ \circ \circ \circ \circ$, has been expanded quite a bit in the folklore of the Balkanic countries, especially in Turkey and in Bulgaria," says Stoyan Djoudjeff. Here is a sample, collected from the same author by Panagyrus:



With regard to the dochmius, Stoyan Djoudjeff again cites the popular song "Pita li, Tinke, majka si," which is very fashionable in southern Bulgaria:



Stoyan Djoudjeff sees in this text a particular and original dipody, formed from an Epitrite I ($\circ \text{—} \text{—} \text{—}$) and a dochmius ($\circ \text{—} \text{—} \text{—} \text{—} \text{—}$), of which the repetitions in the series continually alternate between $\frac{7}{8}$ and $\frac{6}{8}$ creating one large measure of $\frac{15}{8}$.

j) aristophanean

Pure form among the ancient Greeks: (1 dactyl and 2 trochees)

2nd form, with spondee substitute for the last foot: (1 dactyl, 1 trochee, and 1 spondee, make 11 unities, a prime number.)

This second form has been found in the Horatian Odes:

Lydia, dic, per omnes || ("Lydia, tell me, by the gods...")

and in *Le Printemps*¹⁹ by Claude Le Jeune:

(*Le Printemps*, 8th chorus)

or even:

(*Le Printemps*, 28th chorus: "Si Jupiter s'avizoit"²⁰ on (the words "la Rose")

Example in Bulgarian folklore:

un peu vif

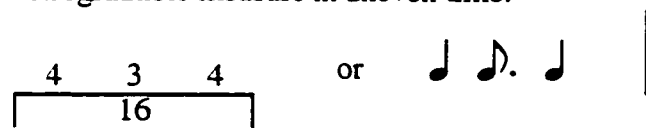
¹⁹ *Springtime*

²⁰ "If Jupiter Could See Himself"



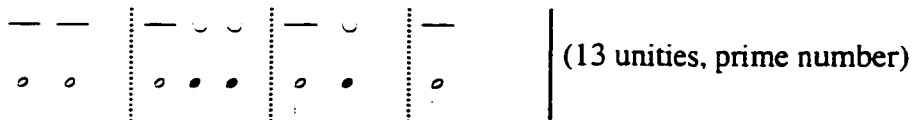
Despite the numerous "coagulations," the rhythm *dactyl, trochee, spondee*, seems evident to me. It is otherwise expressed in all the values of measures 6, 13, and 15.

Unifying several shorts into a single long gives this text originality: the rapport 4 - 3 - 4, which creates a non-retrogradable measure in uneven time:



k) glyconic

Composition: dactyl preceded by a spondaic base and followed by two trochees of which the second is catalectic. Or, more simply, spondaic base and catalectic aristophanean. For instance:



In this form, he concludes the two asclepiadean strophes A and B. It is used in this form by Horace:

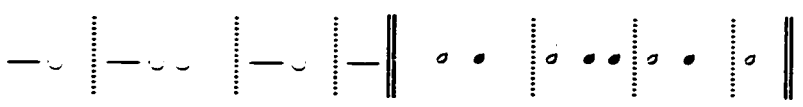
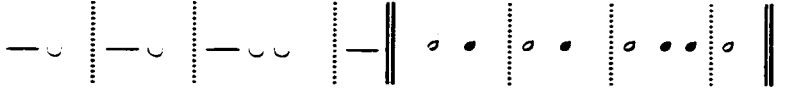

Sic te || diva po || tens Cy || pri. (Horace, Odes)

("in this the mighty goddess of Cyprus!")

We find this form again in *Le Printemps* by Claude Le Jeune:



According to Louis Nougaret, the glyconic allows for other variants:

- 1) with a trochaic base: 
- 2) replacing the dactyl: 
- 3) doubling the dactyl: 

In the first variant:

trochee	dactyl	trochee	catalexis

Maurice Emmanuel sees the juxtaposition of a ditrochee and of a diiamb:

ditrochee	diiamb	in short, a choriamb with doubled feet.

Stoyan Djoudjeff cites the song "Kumicale sa kumici," from the collection in northwestern Bluragia:

vif	glyconic	glyconic

There is a repeated glyconic, 1st variant.

In effect, the division of the durations and their succession stay the same. It would be written:

trochee	dactyl	trochee	catalexis

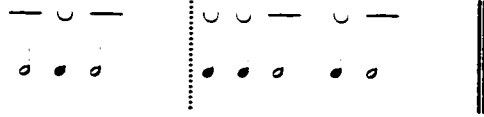
as I have done above

or:

ditrochee	diiamb

like Maurice Emmanuel

or even: amphimacer Epitrite III (with a transformation)



like Stoyan Djoudjeff

These always use the same durations in the same order and come from the glyconic, first variant. The tonic or logical accents of the words have changed: the accents of the music, the melodic line, perhaps the dynamics, and surely the cinematic or alternation of arsis and thesis – but the quantity remains the same, and maintains the same divisions. It then most definitely consists of two glyconics.

APPENDIX IV

MODERNIZATION OF ANCIENT METERS

APPENDIX IV: MODERNIZATION OF ANCIENT METERS

Antoine de Baïf and Claude Le Jeune have invented "*new Greek verses*."

That I could be premitted to do as much!...

Here is a completely invented *Triad* (Strophe, Antistrophe, Epode):

Invented Triad

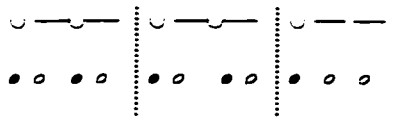
Strophe

cretic pentapody		25 unities
phalecean		17 unities
cretic pentapody		25 unities
catalectic pherecratean		10 unities

Antistrophe

cretic pentapody		25 unities
asclepiadean minor (without catalexis)		20 unities
cretic pentapody		25 unities

iambic trimeter
(catalectic)



18 unities

Epode

cretic pentapody



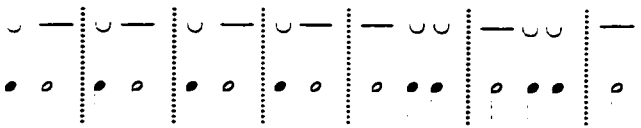
25 unities

phalcean
(with a substitution)



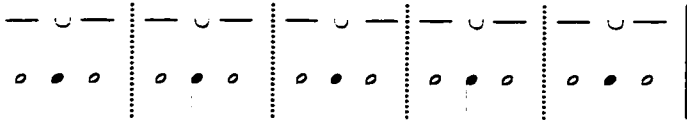
18 unities

elegiamb



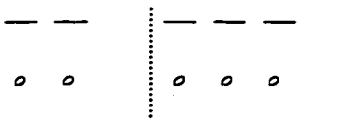
22 unities

cretic pentapody



25 unities

dochmiac
(with a substitution)

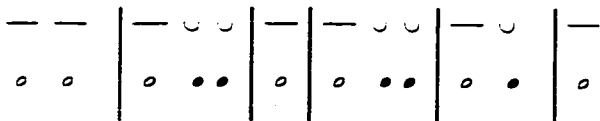

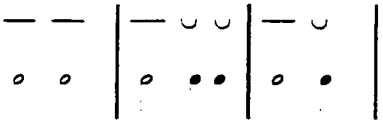
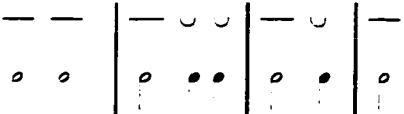


10 unities

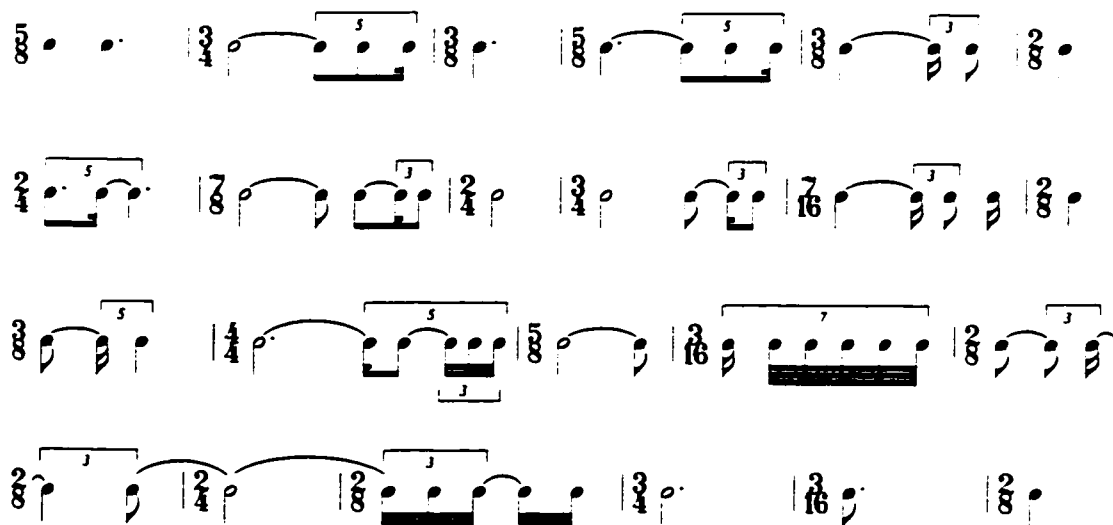
"The foundation of Greek versification is the distinction between two kinds of syllables, some *long* and others *short*. The pronunciation of a long syllable lasts twice as long as the pronunciation of a short one." (Laurand) However, the conception – "one long equals two shorts" – was more theoretical than practical. "One must not assume an absolute mathematical regularity. This pertains only to the approximate evaluated duration." (Laurand) In fact, there were longs that were a little longer or shorter, and shorts that were a little longer or shorter. We are then permitted, without being heretics, to look for new Greek rhythms with longs and shorts of variable length. We can elongate that which is too short or cut that which is too long. In short we can pass Greek metrics to the bed of Procrustes. To be completely modern and "make nice with the enemy," let us transform

them into irrational values – respecting the relationship between durations, in other words by arranging them so that the long and the short appear long and short, no matter what happens.

To begin with, here is the *second asclepiadean strophe*:

asclepiadean minor		19 unities
id.		19 unities
pherecratean		11 unities
glyconic		13 unities

the same, irrationalized:



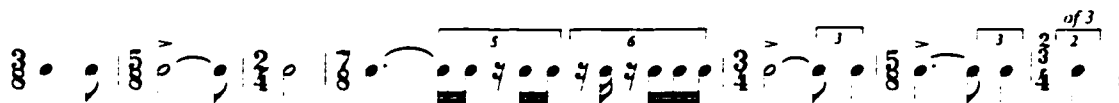
Now, a sapphic strophe:

sapphic minor		17 unities
---------------	--	------------

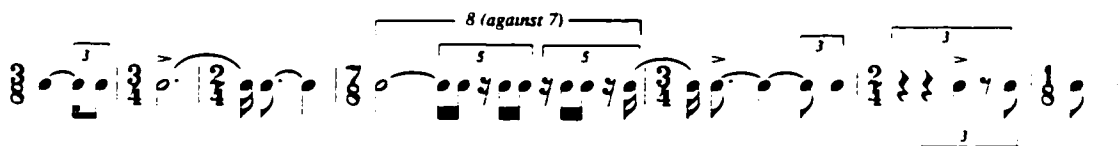
id.		17 unities
id.		17 unities
adonic		7 unities

the same, irrationalized:

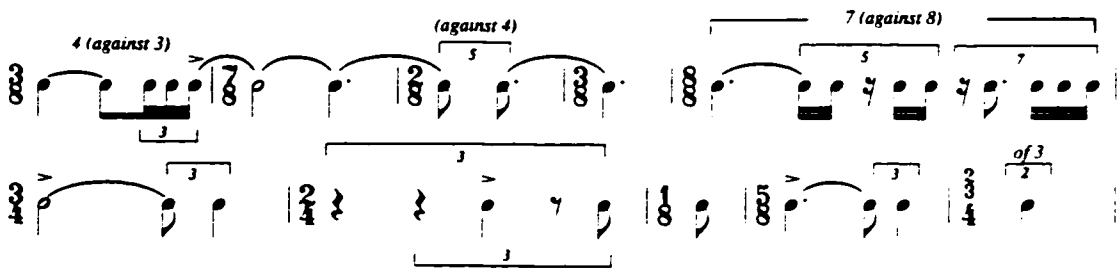
1) sapphic minor



2) sapphic minor



3) sapphic minor



adonic

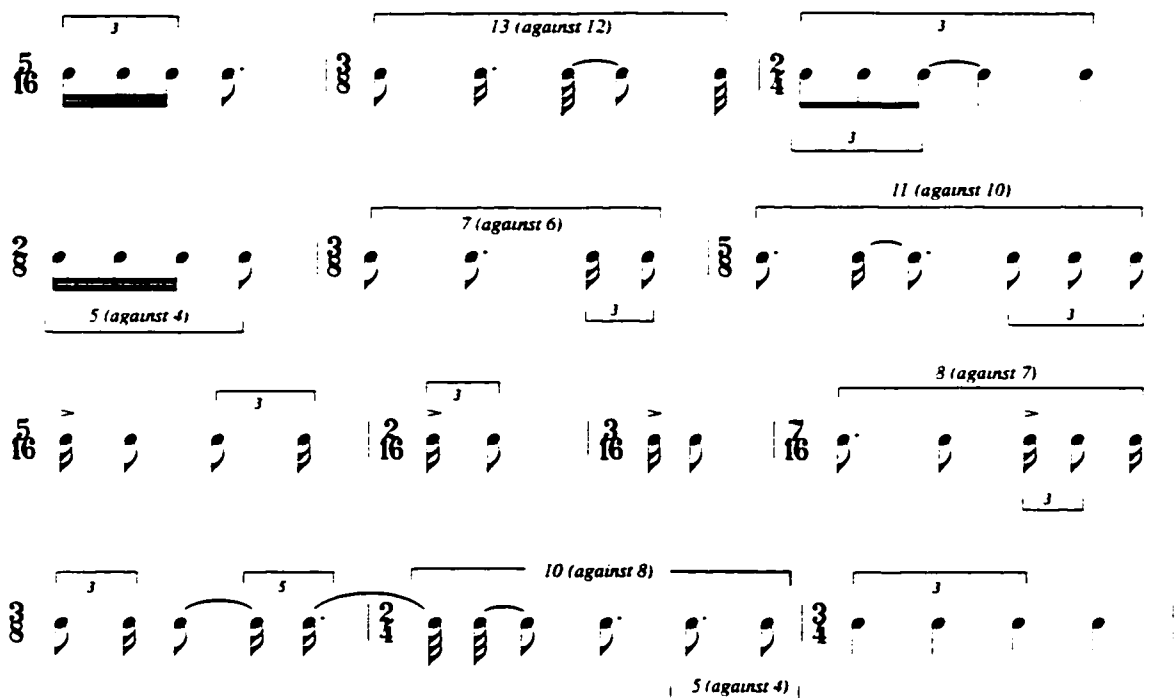


Now an *essay on Greek rhythms at six metrons* – and also at five, seven, and even eight metrons, with a predominance of six metrons:

antipast > • •	 • •	diiamb > • •	 • •	molossus • • •
choriamb • •	 • •	ditrochee • •	 • •	molossus • • •
Peon IV • • • •		amphimacer • • •		ionic minor • • • •
antipast > • •	 • •	diiamb > • •	 • •	choriamb • • •
ditrochee • •	 • •	Epitrite IV • • • •		dispondee • • • •

The same thing, in irrational values:

$\frac{5}{16}$ > ♩ ♩	$\frac{3}{16}$ > ♩ ♩	$\frac{3}{16}$ > ♩ ♩	$\frac{2}{4}$ > ♩ ♩
$\frac{7}{16}$ (against 4) 5 ♩ ♩	$\frac{6}{16}$ 5 (against 6) ♩ ♩ ♩	$\frac{5}{8}$ 11 (against 10) ♩ ♩ ♩ ♩	



In conclusion, one long *invented strophe*. It is derived from the *cretic tetrameter* (with Latin substitutions):



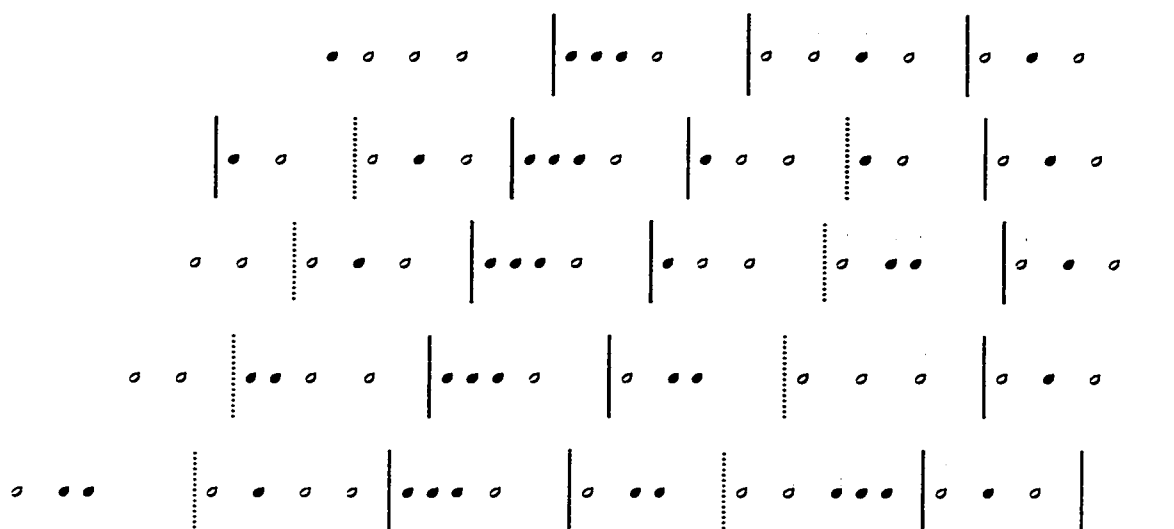
The verses that follow become longer and longer in a crescendo of durations. Beginning with the seventh verse, they *retrograde, meter by meter*. (Only the *order* of the meters is retrograde – each isolated meter remains the same – and I hear the amphimacer or cretic by meter as well as the transformed Dactylo-epitrite.) Consequently, the first and the sixth verses become longer and longer, the seventh and the twelfth verses become shorter and shorter. This crescendo-decrescendo of durations makes me think of the famous poem by Victor Hugo, *Les Djinns*,²¹ which utilizes the same process.

Invented strophe (with $\leftarrow \rightarrow$ in the fashion of Victor Hugo's *Djinns*)

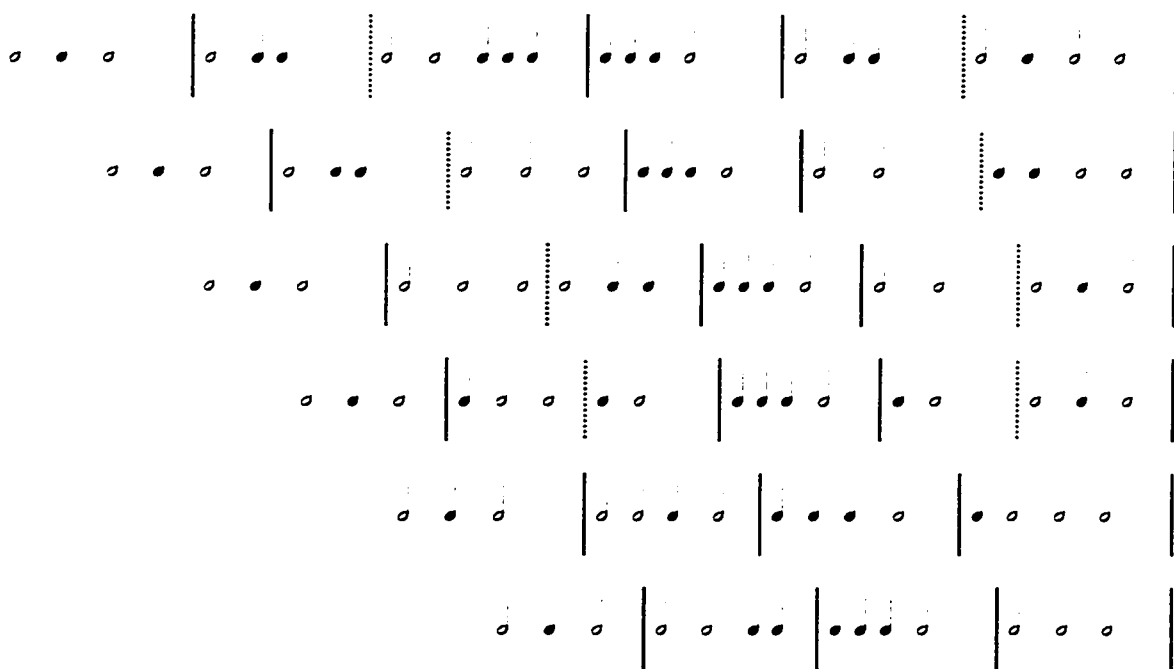
Latin cretic tetrameter



²¹ *Genies*



retrograde by meter



the same invented strophe *irrationalized*:



The musical score for 'The Great Eastern' by John Cage is a complex composition featuring a variety of time signatures and rhythmic patterns. The score is written for a single melodic line, with time signatures including 3/8, 16/8, 8/8, 4/8, 3/4, 2/4, 3/2, 4/4, 5/4, 6/4, 7/4, 8/4, 9/4, 10/4, 11/4, 12/4, 13/4, 14/4, 15/4, 16/4, 17/4, 18/4, 19/4, 20/4, 21/4, 22/4, 23/4, 24/4, 25/4, 26/4, 27/4, 28/4, 29/4, 30/4, 31/4, 32/4, 33/4, 34/4, 35/4, 36/4, 37/4, 38/4, 39/4, 40/4, 41/4, 42/4, 43/4, 44/4, 45/4, 46/4, 47/4, 48/4, 49/4, 50/4, 51/4, 52/4, 53/4, 54/4, 55/4, 56/4, 57/4, 58/4, 59/4, 60/4, 61/4, 62/4, 63/4, 64/4, 65/4, 66/4, 67/4, 68/4, 69/4, 70/4, 71/4, 72/4, 73/4, 74/4, 75/4, 76/4, 77/4, 78/4, 79/4, 80/4, 81/4, 82/4, 83/4, 84/4, 85/4, 86/4, 87/4, 88/4, 89/4, 90/4, 91/4, 92/4, 93/4, 94/4, 95/4, 96/4, 97/4, 98/4, 99/4, 100/4, 101/4, 102/4, 103/4, 104/4, 105/4, 106/4, 107/4, 108/4, 109/4, 110/4, 111/4, 112/4, 113/4, 114/4, 115/4, 116/4, 117/4, 118/4, 119/4, 120/4, 121/4, 122/4, 123/4, 124/4, 125/4, 126/4, 127/4, 128/4, 129/4, 130/4, 131/4, 132/4, 133/4, 134/4, 135/4, 136/4, 137/4, 138/4, 139/4, 140/4, 141/4, 142/4, 143/4, 144/4, 145/4, 146/4, 147/4, 148/4, 149/4, 150/4, 151/4, 152/4, 153/4, 154/4, 155/4, 156/4, 157/4, 158/4, 159/4, 160/4, 161/4, 162/4, 163/4, 164/4, 165/4, 166/4, 167/4, 168/4, 169/4, 170/4, 171/4, 172/4, 173/4, 174/4, 175/4, 176/4, 177/4, 178/4, 179/4, 180/4, 181/4, 182/4, 183/4, 184/4, 185/4, 186/4, 187/4, 188/4, 189/4, 190/4, 191/4, 192/4, 193/4, 194/4, 195/4, 196/4, 197/4, 198/4, 199/4, 200/4, 201/4, 202/4, 203/4, 204/4, 205/4, 206/4, 207/4, 208/4, 209/4, 210/4, 211/4, 212/4, 213/4, 214/4, 215/4, 216/4, 217/4, 218/4, 219/4, 220/4, 221/4, 222/4, 223/4, 224/4, 225/4, 226/4, 227/4, 228/4, 229/4, 230/4, 231/4, 232/4, 233/4, 234/4, 235/4, 236/4, 237/4, 238/4, 239/4, 240/4, 241/4, 242/4, 243/4, 244/4, 245/4, 246/4, 247/4, 248/4, 249/4, 250/4, 251/4, 252/4, 253/4, 254/4, 255/4, 256/4, 257/4, 258/4, 259/4, 260/4, 261/4, 262/4, 263/4, 264/4, 265/4, 266/4, 267/4, 268/4, 269/4, 270/4, 271/4, 272/4, 273/4, 274/4, 275/4, 276/4, 277/4, 278/4, 279/4, 280/4, 281/4, 282/4, 283/4, 284/4, 285/4, 286/4, 287/4, 288/4, 289/4, 290/4, 291/4, 292/4, 293/4, 294/4, 295/4, 296/4, 297/4, 298/4, 299/4, 300/4, 301/4, 302/4, 303/4, 304/4, 305/4, 306/4, 307/4, 308/4, 309/4, 310/4, 311/4, 312/4, 313/4, 314/4, 315/4, 316/4, 317/4, 318/4, 319/4, 320/4, 321/4, 322/4, 323/4, 324/4, 325/4, 326/4, 327/4, 328/4, 329/4, 330/4, 331/4, 332/4, 333/4, 334/4, 335/4, 336/4, 337/4, 338/4, 339/4, 340/4, 341/4, 342/4, 343/4, 344/4, 345/4, 346/4, 347/4, 348/4, 349/4, 350/4, 351/4, 352/4, 353/4, 354/4, 355/4, 356/4, 357/4, 358/4, 359/4, 360/4, 361/4, 362/4, 363/4, 364/4, 365/4, 366/4, 367/4, 368/4, 369/4, 370/4, 371/4, 372/4, 373/4, 374/4, 375/4, 376/4, 377/4, 378/4, 379/4, 380/4, 381/4, 382/4, 383/4, 384/4, 385/4, 386/4, 387/4, 388/4, 389/4, 390/4, 391/4, 392/4, 393/4, 394/4, 395/4, 396/4, 397/4, 398/4, 399/4, 400/4, 401/4, 402/4, 403/4, 404/4, 405/4, 406/4, 407/4, 408/4, 409/4, 410/4, 411/4, 412/4, 413/4, 414/4, 415/4, 416/4, 417/4, 418/4, 419/4, 420/4, 421/4, 422/4, 423/4, 424/4, 425/4, 426/4, 427/4, 428/4, 429/4, 430/4, 431/4, 432/4, 433/4, 434/4, 435/4, 436/4, 437/4, 438/4, 439/4, 440/4, 441/4, 442/4, 443/4, 444/4, 445/4, 446/4, 447/4, 448/4, 449/4, 450/4, 451/4, 452/4, 453/4, 454/4, 455/4, 456/4, 457/4, 458/4, 459/4, 460/4, 461/4, 462/4, 463/4, 464/4, 465/4, 466/4, 467/4, 468/4, 469/4, 470/4, 471/4, 472/4, 473/4, 474/4, 475/4, 476/4, 477/4, 478/4, 479/4, 480/4, 481/4, 482/4, 483/4, 484/4, 485/4, 486/4, 487/4, 488/4, 489/4, 490/4, 491/4, 492/4, 493/4, 494/4, 495/4, 496/4, 497/4, 498/4, 499/4, 500/4, 501/4, 502/4, 503/4, 504/4, 505/4, 506/4, 507/4, 508/4, 509/4, 510/4, 511/4, 512/4, 513/4, 514/4, 515/4, 516/4, 517/4, 518/4, 519/4, 520/4, 521/4, 522/4, 523/4, 524/4, 525/4, 526/4, 527/4, 528/4, 529/4, 530/4, 531/4, 532/4, 533/4, 534/4, 535/4, 536/4, 537/4, 538/4, 539/4, 540/4, 541/4, 542/4, 543/4, 544/4, 545/4, 546/4, 547/4, 548/4, 549/4, 550/4, 551/4, 552/4, 553/4, 554/4, 555/4, 556/4, 557/4, 558/4, 559/4, 560/4, 561/4, 562/4, 563/4, 564/4, 565/4, 566/4, 567/4, 568/4, 569/4, 570/4, 571/4, 572/4, 573/4, 574/4, 575/4, 576/4, 577/4, 578/4, 579/4, 580/4, 581/4, 582/4, 583/4, 584/4, 585/4, 586/4, 587/4, 588

C) CLAUDE LE JEUNE

LE PRINTEMPS

(analysis of the 39 choruses)

C) ANALYSIS OF 39 CHORUSES FROM *LE PRINTEMPS* BY CLAUDE LE JEUNE

Claude Le Jeune (or Claudin), born in Valenciennes in 1530, died in Paris in 1600. was in the service of the Duke of Anjou, then became "composer of chamber music for the King of France, Henry IV." Claude Le Jeune was a master of harmony. His chord chains are a refined mixture of major and minor tones, chromaticism, and the modes of plain-chant. He was also a master of writing for more than four voices. (See the last three parts of the 13th chorus of *Printemps*: "ma Mignonne" for six, seven, and eight voices.) What interests us here, however, is that he was the principal musician of an Academy of music and poetry for the restoration of antique meters, founded during the Renaissance. "Le Jeune is the most eloquent propagator of ancient rhythms in music," says Joseph Samson. Claude Le Jeune's masterpiece is his monumental *Printemps*, 39 a capella choruses on the poems of Antoine de Baïf. Antoine de Baïf (1532-1589) took part in the Pleiade, a reunion of seven French Renaissance poets, of whom at least the first two are known by all – Ronsard, du Bellay, Baïf, Dorat, Rémy, Belleau, Jodelle, and Ponthus de Thyard. The collaboration between Baïf and Le Jeune must have been quite brief. Baïf wrote two kinds of verse: normal rhymed verse, which must have furnished Le Jeune with more contrapuntal sections; and verse in ancient meters, in other words written in the feet, meters, and strophes of Greco-Latin antiquity. For this, one might think that Le Jeune greatly influenced his poet. Baïf notated in shorts and longs according to conventional notation (short: \cup long: $—$), and these notations were respected and scrupulously followed by Le Jeune in his music. Thus *Printemps* was born. The verses in ancient meters here are much less numerous than the others: chorus nos. 1, 7, 12, 13, 33, and 39 are in rhymed verse whereas all the others are written using Greek rhythms. The choruses in rhymed verse are very long and are divided into several parts. "Du trist' hyver" is in six parts, "Ma

Mignonne" is in eight parts; they are contrapuntal, and in modern meters that alternate between $\frac{2}{2}$ and $\frac{3}{2}$. Two of these choruses, "le chant de l'alouette"²² and "le chant du rossignol"²³ are by Jannequin. Le Jeune has added a fifth voice to Jannequin's four voices, along with entirely new sections of music. These choruses in rhymed verse, situated at the beginning, middle and end of the work, are like the pillars that sustain the edifice – they relieve the listener from the particular style of the other choruses. The choruses in antique meters are songs with refrain. Each section is comprised of a refrain and a couplet, the couplet is called Chant, the refrain is called Rechant. The section can present an arrangement that is doubled such as: Rechant for three voices, Chant for three voices, and so on for each section (form A, A, B); or even Rechant for three voices, Chant for three voices, Chant for five voices (form A, B, B), etc. This is a throw-back to the Greek triads. The music of the choruses in ancient meters is unirhythmic, which means that all the voices have the same rhythm, with a chord change at each syllable and, consequently, on each duration. This is also a very harmonic music. Le Jeune permitted himself numerous transformations of brevis and semi-brevis (reading quarter notes as eighth notes), and he has further transformed some into sixteenth notes by mixing the transformations without forgetting the dotted values, but he has not dared to *superimpose* the Greek rhythms. Even so, his work is of great interest. In analyzing it, we must never forget that it does not consist of a reconstruction of Greek rhythms, but of a *Rebirth*. In other words, Baïf and Le Jeune used these Greek rhythms not as a plagiarism or a *return to...* but as an edification of an original work. My analysis then will not be the same as that used for the verses of Sophocles or Aeschylus...

To begin the analysis of *Printemps*, here is the extraordinary preface from the beginning of the work. Placing Rhythm above Harmony, it compares Harmony to the body and rhythm to the soul. This Preface is so in line with my own sentiments on music and

²²"The Song of the Lark"

²³"The Song of the Nightingale"

rhythm in general, it is so indisputable, (and it is written in an old French so charming, so ridiculous) it is so right, so true, that I cite it in extenso (in modern orthography).

Ancient composers divided Music into two parts, Harmonic and Rhythmic: one consisting of the proportioned accumulation of high and low sounds, the other of short and long durations. Harmony was so little known to them that they did not use consonant intervals other than the octave, the fifth, and the fourth. From these they composed chords on the lyre to accompany their sung verses. By contrast, their music possesses such Rhythmic perfection that they have achieved marvelous effects (moving the souls of men to such passions as they desired). What they wanted to represent in the fables of Orpheus and of Amphion softened the treacherous courage of savage beasts and animated the woods and rocks until they were made to move to a place that suited them. Since then, this Rhythmic aspect became so neglected that it was completely lost, and the Harmonic aspect, so precisely researched for 2 hundred years that it became perfect and was making beautiful and grand effects, but not so much that antiquity would recount them. What astonished many, however, was that the ancients only sang with one voice, and that we have melodies for several voices together. Perhaps a few had discovered the cause: but none could be found to remedy the situation. None, that is, until Claudin Le Jeune. He was the first one bold enough to bring this poor Rhythmic aspect back from the tomb into which it had long ago been deposited, and to couple it with the Harmonic aspect. What he did with such art and such success! From the first beat he has taken our music to the height of perfection. There will follow many more admirers than imitators, rendering it equal only to that of the ancients, but much more excellent, and more capable of beautiful effects insomuch as it hears the marriage of the body to its soul, even in this past from which it has been separated. Because the Harmonic aspect alone, with its agreeable consonances, can surely stop the more subtle spirits in true admiration. Animated by the Rhythmic aspect, however, it can also animate, move, and lead all souls – for the crude vulgarity that they possess – where it pleases by the sweet violence of its regular movements. The proof of this will be seen in the metered songs of this Printemps, a few of which miss sampling this excellence from the first beat, either because of the unusual style of the verses or the style of singing. The cantor is accused rather than the songs, and judgement is not passed until they are sung well, or until they are heard sung well to others.

1st chorus: "Voicy du gay printemps"²⁴ (isochronal)

For four voices, in two parts. Notice the chromatic harmonies on the words "le Rossignol se plaint."²⁵

2d chorus: "Revey venir du printans"²⁶


Le Jeune took pains to write music that is varied at each couplet.

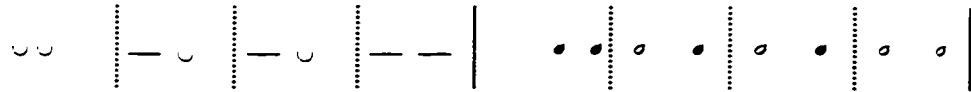
²⁴"Gay Spring is Here"

²⁵"The Nightingale Laments"

²⁶"Receive the Gifts of Spring"

Form: Rechant for five voices – Chant for two voices – Rechant for five voices – new Chant for three voices – Rechant for five voices – new Chant for four voices – longer Rechant which forms a Coda for five voices.

This chorus is monostich, which means that all the verses are scanned in the same fashion. Except for the third verse of the first Chant: , the rhythm is consequently identical for the entire piece:



base, trochee, trochee, spondee: this is a trochaic tripody, preceded by a base of two shorts, with a spondee substituted for the trochee in the last foot: in all 12 unified values.

*3d chorus: "la bel'Aronde"*²⁷

L'Aronde = swallow. The poet gives us distinctive signs of it: "I see it, I recognize the black back, – I see there the white belly that glistens in the sun." Black back, white belly: these two particulars exist among our two most common swallows – the Window Swallow (*Delichon urbica*) and the Chimney Swallow (*Hirundo rustica*). The Chimney Swallow is seen in large numbers in the country. It has a red neck and a dark blue head. The tail is large, V-shaped, chiseled, in "threads." The Window Swallow, friend to villages, possesses a white rump. The tail is shorter and less V-shaped. Other indications from the poet refer to the two swallows indifferently: "Elle vole mouchetées, elle vole mouchérons."²⁸ – "And when you fly below, it rains, hide yourself." Both feed on insects and, through rough times, fly flush with the sun the water, where the rain has beaten a path. The poet even poses the agonizing question of migration: "When we leave you depart, – Swallow, but where do you go?" (Response now known to be: to tropical South Africa for the "Chimney Swallow;" to Central West and South Africa for the "Window Swallow"). A last detail more precisely situates the chimney Swallow: "ingenious, you

²⁷"The Beautiful Swallow"

²⁸"It flies speckled, it steals gnats." I have left this text in the original language to illustrate the poetic device stemming from the similarity between the words "mouchetées" and "mouchérons."

know how / To flatten your air, sometimes / under the parallel beams, sometimes / To the accomodating chimney."

Rhythms of the Rechant:

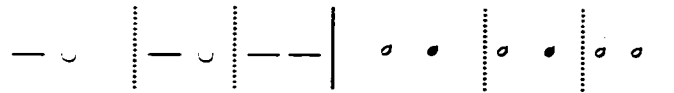
1st verse:

20 unities



Peonic tetrapody. Peon IV (· · · ·), four metrons. At the fourth occurrence, substitution of a bacchius (· · ·).

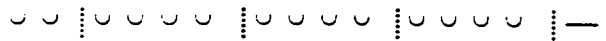
2d verse:



10 unities

Trochaic tripody, spondee substitute in the third foot.

3d verse:



Amusing effect because of its rapidity and volubility that "adhere" to the text: "Elle vole mouchelètes, elle vole mouchérons." Nothing to see with Greek metrics. Verses using only shorts, by dissolutions of longs or accumulation of proceleusmatics, however, can be found with Aristophanes (and also among certain Latin poets).

4th verse:

18 unities




Verse in compound meters. Anapestic dipody (· · · ·) and trochaic tripody with transformation of the first trochee into a tribrach (· · ·) trochee (· ·), and spondee substitute in the last foot (· ·).

5th verse:

20 unities




Peon III, amphimacer, Peon IV, amphimacer. Cretic tetrapody (with Peon III and Peon IV substitutes for the first and third feet).

6th verse:  24 unities

These are the two anapests from the fourth verse combined with the third verse.

Rhythms of the Chant:

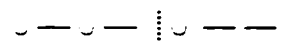
1st verse:  10 unities

Catalectic dactylic tripod (also called *penthemimers*)

2d verse  11 unities

Trochaic tripod, with short anacrusis, and spondee substitute in the last foot.

This initial scansion seems the most natural, and follows the accents of French. A second scansion

 aligns diamb and bacchius: this is a catalectic iambic dimeter, employed by Anacreon.

The third verse is identical to the second.

4th verse:  11 unities

This rhythm with 11 morae is frequent among Baïf and Le Jeune. It aligns: dactyl, trochee, spondee. It is an *aristophanean*. Remember, in passing, that 11 is a prime number, and that verses two, three, and four of the chant, all have 11 morae.

Before leaving "la bel'Aronde," I would like to signal the reader to the rhythmic resemblance which exists between this chorus, and the pretty "chanson de mai"²⁹ by the trouvère Moniot d'Arras (13th century), that certain transcribers read in peonic rhythm (like a succession of Peon IVs). Here is the melodic line from Claude Le Jeune:

²⁹"May Song"



And here is the text from Moniot d'Arras:



4th chorus: "Quand le soleil se vient lever"³⁰

Chant for three voices, Rechant for three voices, and reprise of the Rechant for five voices.

Chant:

1st verse: — U U — | U — U — | ♩ ♩ ♩ ♩ | ♩ ♩ ♩ ♩ | 12 unities

Choriambic dimeter, comprised of choriamb + diiamb.

2d verse: — U U | — U | — — | ♩ ♩ | ♩ ♩ | ♩ ♩ | 11 unities

Dactyl, trochee, spondee: this is an *aristophanean*.

Third verse like the first, fourth verse like the second. Thus this strophe alternates between two numbers: 12, 11, 12, 11.


Rechant:

1st verse: — U U — — | U U — U | — U — — | ♩ ♩ ♩ ♩ | ♩ ♩ ♩ ♩ | ♩ ♩ ♩ ♩ | 18 unities (by 6 + 5 + 7)

³⁰"When the Sun Begins to Rise"

Ionic minor trimeter (three ionic minors, with *anacalasis* between second and third ionics).

for instance: ionic minor, Peon III, Epitrite II)

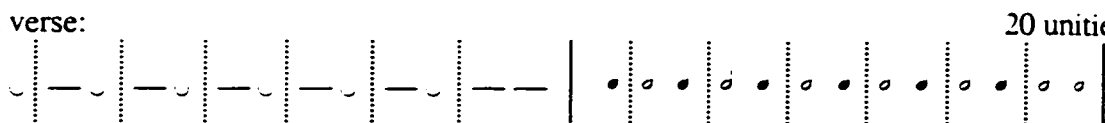
2d verse:  18 unities

Ionic minor trimeter (three ionic minors, pure form).

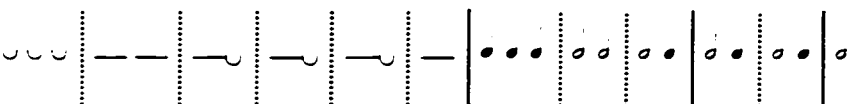
5th chorus: "Ce n'est que fiel, ce n'est qu'amer"³¹

Rechant for three voices, Rechant for five voices, Chant for three voices. Then reprise of the Rechant for three voices and for five voices.

Rechant:

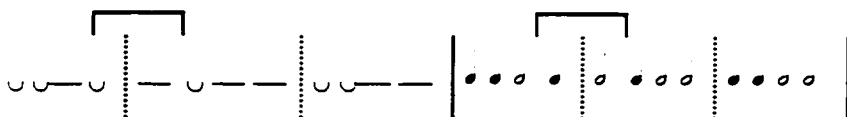
1st verse:  20 unities

Short anacrusis. Trochaic hexapody, with spondee substitute for the last foot.

2d verse:  18 unities

Trochaic hexapody. Tribach and spondee substitutes for the first two trochees. The sixth trochee is catalectic.

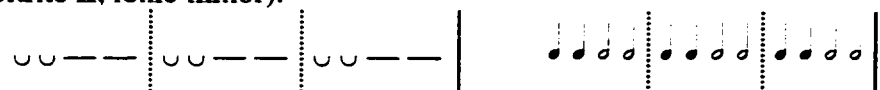
Chant:

1st verse:  18 unities
(by 5 + 7 + 6)

Ionic minor trimeter (Three ionic minors, with *anacalasis* between the first two, for

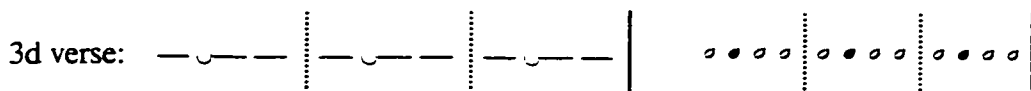
instance:

Peon III, Epitrite II, ionic minor).

2d verse:  18 unities

Ionic minor trimeter (Three ionic minors, pure form)



³¹"There is Nothing but Gall, Nothing but Bitterness"







3d verse:  21 unities

Three Epitrite IIs. (Epitritic trimeter employed by Pindar)

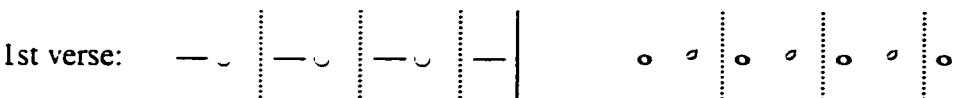

The ascending three notes, the descending three notes and the second and third lines of the Chant, along with the Rechant's noble harmonization for three, then for five voices, makes the fifth chorus one of the most magnificent moments in *Printemps* by Claude Le Jeune.

6th chorus: "Bien fol est qui perd le sens"³²


Rechant for three voices, Chant for three voices, same Chant for five voices. Here Claude Le Jeune has changed the tempo of the longs and shorts three times in a row. At the beginning of the Rechant, long =  short = 

thus: long =  short =  at the end of the Rechant: long =  short =  We must add the transformation of  into  !

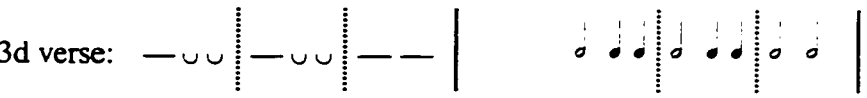

Rechant:

1st verse:  (1st tempo, long = )

Catalectic trochaic tetrapody

2d verse: 

Short anacrusis, trochee, dactyl, two trochees. This is a acephalic sapphic minor minus the first long). 14 unities, non-retrogradable rhythm.

3d verse:  (2d tempo, long = )

³²"Crazy is He Who Loses his Senses"

Dactylic tripody, with spondee substitute for the last foot.

4th verse: — ◡ ◡ | — ◡ ◡ | — ◡ | — — | ◡ ◡ ◡ | ◡ ◡ ◡ | ◡ ◡ | ◡ ◡ |

Alcaic decasyllable: two dactyls, two trochees (the second trochee replaced by a spondee)

Chant:

1st verse: — ◡ ◡ | — ◡ ◡ | — ◡ | — — | ◡ ◡ ◡ | ◡ ◡ ◡ | ◡ ◡ | ◡ ◡ |

Alcaic decasyllable, like the preceding verse.

2d verse: — ◡ — — | ◡ ◡ — — |  |  | (3d tempo, short = )

The longs (—) are transformed into shorts (◡) by the musician. The first long is even transformed into three shorts (equal in duration to the other shorts)! Ionic dimeter aligning Epitrite II and ionic minor.

7th chorus: "le chant de l'alouette" by Jannequin. Le Jeune has added a fifth voice (first tenor). In addition, of the three parts that divide the work, the second part is entirely by Le Jeune.

8th chorus: "Voicy le verd et beau May"³³

Chant for four voices, Rechant for four voices, reprise of the Rechant for six voices.

Chant:

1st verse: — ◡ ◡ | — ◡ | — — | ◡ ◡ ◡ | ◡ ◡ | ◡ ◡ | 11 unities

Aristophanean: one dactyl, one trochee, one spondee


2d verse: — ◡ | — ◡ | — ◡ | — — | ◡ ◡ | ◡ ◡ | ◡ ◡ | ◡ ◡ | 11 unities

Catalectic trochaic tetrapody

3d verse: ◡ | — ◡ | — ◡ | — — | ◡ ◡ | ◡ ◡ | ◡ ◡ | ◡ ◡ | 11 unities

³³"Green and Beautiful May is Here"

Trochaic tripod: short anacrusis, two trochees, one spondee substitute for the last foot.

4th verse:  11 unities

Catalectic choriambic dimeter: choriamb + cretic

Rechant:

1st verse:  11 unities

Short anacrusis, trochaic tripod, third trochee replaced by a spondee.

2d verse:  18 unities

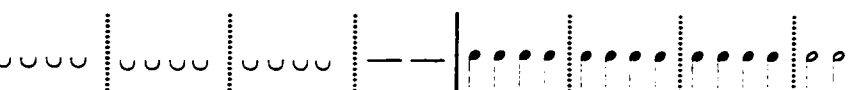
Ionic minor trimeter. Three ionic minors. Anacalasis between the first two. Result: Peon III, Epitrite II, Ionic minor. The musician has utilized the following transformation:

All the verses of this piece have 11 morae, except the last verse of the Rechant which has 18. In linking Chant, Rechant, and reprise of Rechant, we obtain the numbers: 11, 11, 11, 11 – 11, 18 – 11, 18.

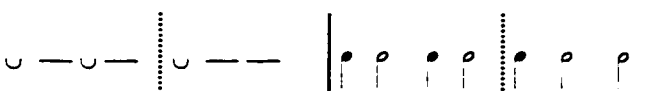
9th chorus: "Brunelette, ioliette, m'amourette, mon tout"³⁴

Chant for three voices; Rechant for three voices; Reprise of the Rechant for five voices, with the principal melody in the tenor. And thus for the six triads.

Chant:

1st verse:  16 unities

Three proceleusmatics and a spondee

2d verse:  11 unities

Catalectic iambic dimeter (diamb + bacchius)

3d verse: like the second 11 unities

³⁴"Pretty Little Brown Flower, My Little Love, My All"

4th verse: ◡ ◡ | — ◡ | — — | • • | ◡ • | ◡ ◡ | 9 unities

Base of two shorts, trochee, spondee

These four verses are in a shortened rhythm. They give, for the first through the fourth, 16, 11, 11, and 9 unified values.

Rechant (which yields none of its rhythmic humor and grace to the Chant):

1st verse: ◡ ◡ | — ◡ | — ◡ | — | • • | ◡ • | ◡ • | ◡ • | 10 unities

Base of two shorts, three trochees (the third is catalectic)

2d verse: ◡ | — ◡ ◡ | ◡ ◡ ◡ | — | • | ◡ • • | • • • | ◡ | 10 unities

Glyconic acephalus or *telesilleion*: short anacrusis, dactyl, trochee, resolved into tribrach, catalexis

3d verse: ◡ — ◡ — | ◡ — — | ◡ • ◡ • | ◡ • ◡ | 11 unities

Catalectic iambic dimeter (diiamb + bacchius), like the second and third verses of the Chant

4th verse: — ◡ | — ◡ | — ◡ | — | ◡ • ◡ • | ◡ • ◡ | 11 unities

Catalectic trochaic dimeter

Le Jeune has written thus the principal melody of the fourth verse:



10th chorus: "O rôze, reyne des fleurs"³⁵

The rose, queen of the flowers?...And the hyacinth, blue, violet, mauve? and the colorful tulips, red, violet, orange-red? and the violet irises? and the red gladiolas? and the fuschias? and the cyclamens? and the azaleas? and the lilies of Japan (*lilium auratum*), white, striped with yellow and spotted with blood? and the tiger lily (*lilium tigrinum*)

³⁵"O Rose, Queen of Flowers"

splendens), salmon red, with black speckles, with petals shaped like a turban? And the sublime orchids, of which the petals and sepals, in tormented forms, shine in the half-light of the Amazon jungle?

And especially the beautiful colors of the rose: white, yellow, carmine red – and rose! rose of all roses! without speaking of its intoxicating perfume...It is she "Who this morning has disclosed / Her purple dress to the sun" as Ronsard says...And it is she again who Rilke has chosen for his Epitaph: "Rose, o pure contradiction, delight in being no one's sleep under so many lids."³⁶

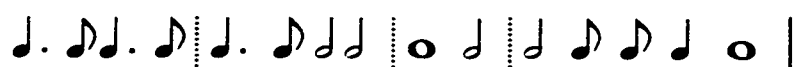
Also the "Ode à la Rose"³⁷ by Baïf is a true love poem. And the Chant is built on these ionics: "meters associated with the ecstatic cults of Asiatic origin in honor of Bacchus and of the Grand Mother of the Gods." (Koster) And Claude Le Jeune has adorned this poem with his most beautiful chords. Form: Rechant for two, then for three voices; Chant for four voices; reprise of Rechant for five voices, with different harmonies.

Rechant:

1st verse: — | — ◡ | — ◡ | — — | ◡ | ◡ ◡ | ◡ ◡ | ◡ ◡ |

Long anacrusis, two trochees, spondee. Le Jeune has changed the tempo of this verse by making the long a whole note and the sort a half note. For all the rest of the text he has kept his usual orthography: ◡ = long, ◡ = short. This 1st verse is written for two women's voices which cross each other. The writing for two voices – the modal color, the stop on the secondary dominant (tertian: A, C sharp – in G minor), and the *pp* nuance – all go along with the anticipation and the mystery...Additionally, Le Jeune has made so many changes to the longs and shorts that the Greek feet have almost disappeared, which creates a contrapuntal "blur" in opposition with the verticalism that follows. Here is the rhythm of the first Dessus:

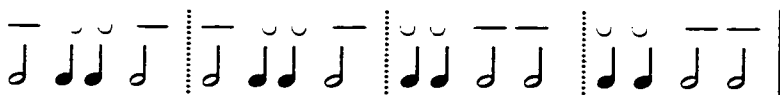
³⁶Rainer Maria Rilke, *Uncollected Poems*, trans. Edward Snow. New York: North Point Press, 1996, 225.
³⁷"Ode to the Rose"



and of the second Dessus:



2d verse:

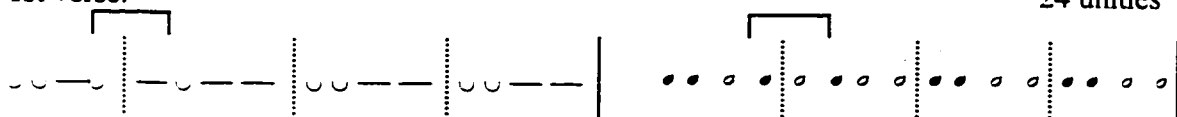


Two choriambes, two ionic minors. False relations, minor and major thirds, borrowed from the key of A transposed to C. We have changed from two voices to three voices.

The Chant is for four voices. Same rare harmonies, augmented from an altered chord, borrowing from the key of D transposed into A minor, from another in the key of F transposed to B-flat minor.

Chant:

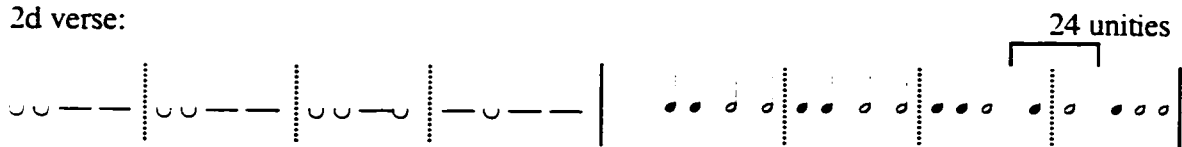
1st verse:



Ionic minor tetrameter. Four ionic minors, with anacalasis between the first two. Result:

Peon III. Epitrite II, pure two ionic minors.

2d verse:



Ionic minor tetrameter. Four ionic minors, pure form. The three verses of the Chant are all three at 24 morae, with the divisions: 5 + 7 + 6 + 6 || 6 + 6 + 5 + 7 || 6 + 6 + 6 + 6 ||

The reprise of the Rechant is for five voices. The first verse always has the tempo change (o = long, d = short), but the transformation is no longer the same = neither is the drive of the chords. The second verse retrieves the normal tempo - its harmonies are also completely new: there remains only the returned chromaticism of the upper voice for the last words:

"en amour fin tu me confis."³⁸

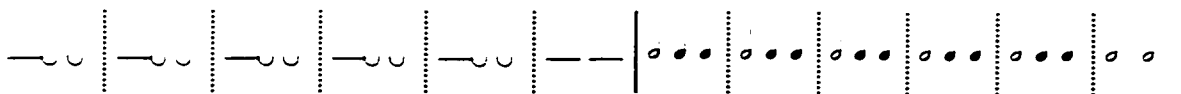
11th chorus: "Francine, rôzine"³⁹

Rechant for four voices: Chant for four voices; reprise of Rechant for six voices: at the second and third verses, the principal melody is in the Taille (first Tenor)

Rechant:

1st verse:

24 unities



Dactylic hexameter: six dactyls, with spondee substitute for the last foot



10 unities

Choriambic acephalic dimeter, containing amphibrach and choriamb



11 unities

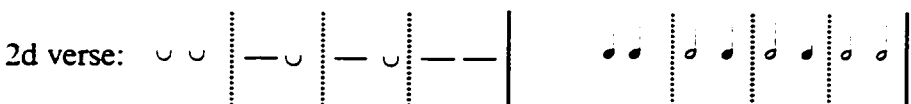
Short anacrusis, trochaic tripody, with spondee in the place of the third trochee

Chant:



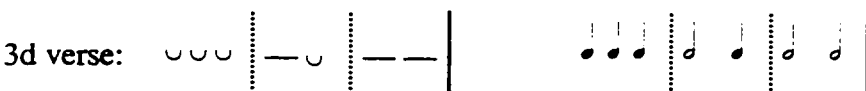
11 unities

Like the preceding



12 unities

Base of two shorts, trochaic tripody, with spondee in the place of the third trochee



10 unities

Trochaic tripody: the first trochee is transformed into a tribrach, the third trochee is replaced by a spondee.

³⁸"For love at Last You Prepare Me"

³⁹"Rosy Francine"

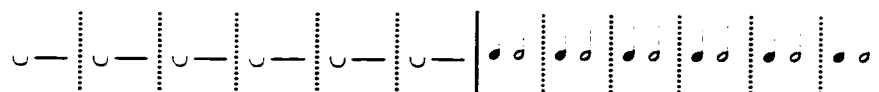
12th chorus: "le chant du rossignol," by Jannequin, to which Le Jeune has added a fifth voice. The fourth, fifth, and sixth parts of this chorus are entirely by Claude Le Jeune.

13th chorus: "Ma mignonne" (isochronal). Fugal entrances (sometimes overlapping), on a kind of popular song in two short characteristic phrases: "Ma mignonne, ie me plain," and "Allés, allés, mon amy."⁴⁰ First part for four voices. The following parts are for two, three, four, five, six, seven, and eight voices. Each part being a new variation and adding one more voice than the preceding. The ensemble is very well written, and the voices that are added augment the angry lover's powers of recrimination in a very pleasing fashion.

14th chorus: "ie l'ai, ie l'ai, la belle fleur"⁴¹

Rechant for three voices; Chant for three voices; reprise of Rechant for five voices, with new harmonies. And the same for the four triads.

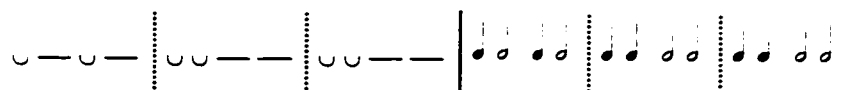
Rechant:

1st verse:  18 unities


Iambic trimeter (six iambs)

2d verse:  12 unities

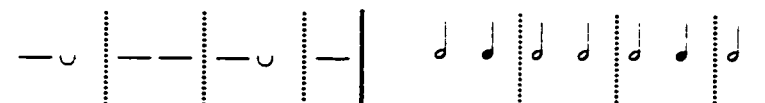
Dactylic tripod: with spondee substitute for the third foot

3d verse:  18 unities

Ionic minor trimeter: Three ionic minors, the first is transformed into a diiamb by anacalasis.

4th verse:  11 unities

Short anacrusis, trochaic tripod, with spondee in place of the third trochee


5th verse:  12 unities

⁴⁰"My darling, I lament" and "Go, go my friend."

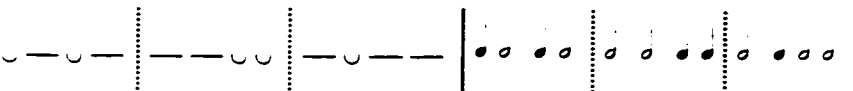
⁴¹"I have it, I have it, the beautiful flower"

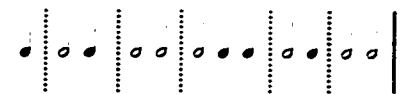
Catalectic trochaic dimeter or *lecythium*: trochee, spondee substitute, trochee, catalexis. The poem of the Chant addresses a catalogue of aberrant phenomena. Just as these absurdities will never occur, it is impossible that love should forget its beauty. The strangeness of the proposed images has authorized the poet and the musician to use a formerly unused meter.

Chant:

1st verse:  18 unities

Ionic minor trimeter. Anacsis throughout. Result: diiamb, Peon III, Epitrite II

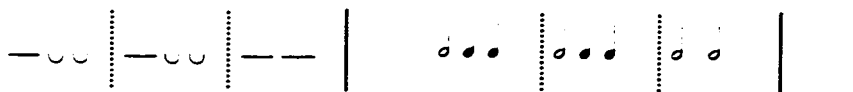
2d verse:  19 unities

Sapphic minor with anacrusis and two spondee substitutes: 

for instance: short anacrusis, trochee, spondee, dactyl, trochee, spondee.

3d verse:  18 unities

Ionic minor trimeter: three ionic minors, the first is transformed into a diiamb by anacsis.

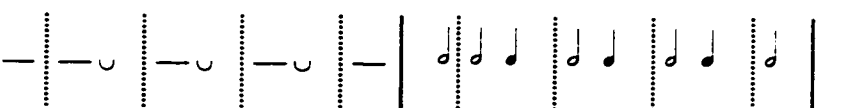
4th verse:  12 unities

Dactylic tripod, with spondee substitute for the third foot. The third verse of the Rechant and the third verse of the Chant have similar rhythms. The fourth verse of the Chant again takes its rhythm from the second verse of the Rechant.

15th chorus: "Mes yeux ne cesseront i'point"⁴²

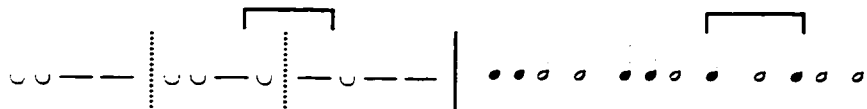
Chant for three voices; Rechant for three voices, reprise of Rechant for five voices. In this reprise the principal melody shifts to the second Dessus then to the Haute-Contre. In addition all the durations are doubled, which is equivalent to a slower tempo.

Chant:

1st verse:  13 unities

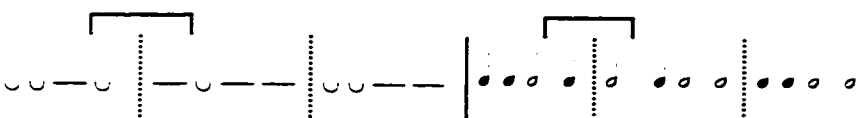
⁴²"My Eyes Will Not Stop There"

Catalectic trochaic dimeter: long anacrusis, three trochees, catalexis

2d verse:  18 unities

Ionic minor trimeter. Three ionic minors. Anacsis between the second and third.

Result: ionic minor, Peon III, Epitrite II.

3d verse:  18 unities


Ionic minor trimeter. Three ionic minors, anacsis between the first and second.

Result: Peon III, Epitrite II, ionic minor.

4th verse:  18 unities

Ionic minor trimeter. Pure form: three ionic minors

Rechant:

Unique verse:  21 unities

Trochaic hexapody: short anacrusis, six trochees (with dactyl substitute for the fourth foot and spondee substitute for the last foot)

Notice in the 15th chorus – the ascent, in three differently harmonized endings, that terminates the Chant. The consequence of this ascent is the descent, the return of the Rechant. Finally the reprise of the Rechant for five voices, with a harmonic change, principal melody in the second Dessus then in the Haute-Contre, and a slower tempo (except for the anacrusis which remains a quarter note. All durations are doubled: short = σ , long = \circ). This terminal slowness and the strong diminuendo ending at the pianissimo on the major third all concur and render the mystery of love that wants "ever to flee" and that is "always taken" and retaken.

16th chorus: "Dame ie viens fér' homag' à ta beauté"⁴³

Chant for three voices; Rechant for three voices; reprise of the Rechant for five voices, same rhythm, but the music is different.

Chant:

1st verse: — ◡ ◡ | — ◡ ◡ | — ◡ ◡ | — — | ◡ ◡ ◡ | ◡ ◡ ◡ | ◡ ◡ ◡ | ◡ ◡ | 16 unities

Dactylic tetrapody, spondee substitute for the last foot. This is the *Metrum Archilochium*.

2d verse: ◡ | — ◡ | — ◡ ◡ | — ◡ | — — | ◡ | ◡ ◡ | ◡ ◡ ◡ | ◡ ◡ | ◡ ◡ | 15 unities

Acephalic sapphic minor. Short anacrusis (instead of the first trochee), trochee, dactyl, trochee, and spondee substitute for the last foot.

Rechant:

1st verse: 1st verse: 1st verse:

Dactylic hexapody, with spondee in the last foot. The musician has altered the first four feet by diminution (long = ◡ | short = ◡), at a brisk *Più Mosso*, the long returns to:

long = ◡ for the fifth and sixth feet.

2d verse: — ◡ ◡ | — ◡ | — — | ◡ ◡ ◡ | ◡ ◡ | ◡ ◡ | 11 unities

Aristophanean: a dactyl, a trochee, a spondee.

17th chorus: "Cigne ie suis de candeur"⁴⁴

Rechant for three voices; reprise of the Rechant for five voices, with different harmonies; Chant for three voices; Rechant for five voices; Chant for three voices, with two supplementary verses, giving place to two new interpolated musical periods; Rechant for five voices. Monostic text. As in the 28th chorus, "si Iupiter s'avizoit," it consists of a

⁴³"Lady I Come To Pay Hommage To Your Beauty"

⁴⁴"I Am a Snow-White Swan"

rhythm at 11 morae, identical for the entire piece, and composed of a dactyl, a trochee and a spondee.



It is a succession uninterrupted by *aristophaneans*.

18th chorus: "A sa chut' il se va dejetér"⁴⁵

Rechant for three voices; Chant for three voices; Reprise of Rechant for five voices with counterpoint in eighth notes (and even two sixteenth note passing tones twice) in the first verse, and new harmonies for the second verse. And the same for the five triads.

Rechant:

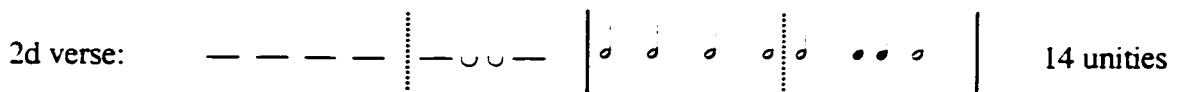


Choriambic dimeter divided into ditrochee + choriamb (The first trochee of the ditrochee is transformed into a tribrach by dissolution of the long.)

2d verse: identical to the preceding verse

Chant:

1st verse: identical to the preceding verse



Choriambic dimeter comprised of dispondee + choriamb

These two choriambic dimeters have been used by the Beotian poetess: Corinna. "A sa chut' il se va dejetér / Celi qui monte plus qu'i ne doit,"⁴⁶ the Rechant says. In the poem of each Chant, the first verse evokes some illustrious effort, and the second verse the deplorable fall of the hero. Thus is expressed a desired for the inaccessible, annihilated by too much light. "A high love I have purchased, / But pity it gives me and sorrow." Alone, beauty: "is nothing but the beginning of awesomeness which we can barely endure and we marvel at it so because it calmly disdains to destroy us." (Rilke, "First Elegy of Duino")

⁴⁵"At His Downfall He Will Spring"

⁴⁶"At his downfall he will spring / and ascend more than he should"

This text aligns four conceited protagonists from Greek mythology: Phaethon, who wanted to drive the chariot of fire for a day, and fell dead in the Eridanus river; Icarus, whose wax wings melted while flying toward the sun; Typhon, a terrifying giant, the son of Earth, who wanted to climb the sky, threw thunderbolts at Jupiter, and found shelter under Mount Aetna in Sicily; and Bellerophon, who wanted to take a place among the immortals by mounting Pegasus, the winged horse, and was bucked off by his carrier. All these mysterious ascensions are depicted by the rapid rhythm (rich with short durations) of the Rechant and the beginning of the Chant. The fall and the mortal overwhelming that follows are expressed by the second verse of the Chant, where the two spondees and the first value of the choriamb oppose their first hopes with a discouraged slowness by aligning five dismal and gloomy longs like a cadaver. The musician has underlined the highly symbolic character of the poem by the strange open fifth in Dorian mode (key of E) that closes the Rechant, and by the solemn major third (G-sharp) that concludes his Reprise.

*19th chorus: "Perdre le sens devant vous"*⁴⁷

Chant for three voices, Rechant for three voices, reprise of the Rechant for five voices.

Chant:

1st verse — ◡ ◡ | — ◡ | — — | ◡ ◡ ◡ | ◡ ◡ | ◡ ◡ | 11 unities

Chants two and three are similar. They are three *aristophaneans* (a dactyl, a trochee, and a spondee).

Rechant:

1st verse: ◡ — ◡ — | ◡ — — | ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ | 11 unities


Catalectic iambic dimeter (diiamb and bacchius, or three iambs and catalexis)

2d verse: identical to the preceding 15 unities

3d verse: ◡ ◡ ◡ — | ◡ ◡ ◡ — | ◡ — — | ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ | ◡ ◡ ◡ | 15 unities

⁴⁷"I Lose My Senses Before You"

11 quarter notes total

1st verse:  16 unities

2d verse:  16 unities

Unique verse: — u u | — u u | — u | — — |  15 unities

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Alcaic decasyllable: two dactyls, two trochees, with spondee substitute for the last foot

21st chorus: "Laisse faire, laisse faire"⁴⁹

Rechant for three voices, Chant for three voices, reprise of the Rechant for five voices.

Rechant:

1st verse: — ◡ | — ◡ | — ◡ | — ◡ | ◡ ◡ | ◡ ◡ | ◡ ◡ | ◡ ◡ | 12 unities with Baïf
(21 unities with Le Jeune)

Trochaic tetrapody, in a slow tempo until the last excluded foot. The last trochee returns to long = ◡, and short = ◡

2d verse: ◡ — | ◡ — | ◡ — | — | ◡ ◡ | ◡ ◡ | ◡ ◡ | ◡ ◡ | 11 unities

Catalectic iambic tetrapody

Chant:

1st verse: ◡ ◡ — ◡ | — ◡ — — | ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ | 12 unities

Ionic minor dimeter. The two ionic minors have submitted to the anaclassis. Result: Peon III, Epitrite II.

2d verse: identical to the 1st

3d verse: — ◡ | — ◡ | — ◡ | — — | ◡ ◡ | ◡ ◡ | ◡ ◡ | ◡ ◡ | 13 unities

Trochaic tetrapody, spondee substitute for the last foot

4th verse: — ◡ ◡ | — ◡ | — — | ◡ ◡ | ◡ ◡ | ◡ ◡ | 11 unities

Aristophanean: a dactyl, a trochee, a spondee

⁴⁹"Leave be, leave be"

Chant for three voices, Rechant for three voices, reprise of the Rechant for five voices. All the music of this chorus is a mixture of F major and the mode of F. Notice the cadence in A major in the middle of the Reprise of the Rechant.

Chart:

1st verse:

● ● ● —	● ● ● —	● ● ● —	● — —
● ● ● ●	● ● ● ●	● ● ● ●	● ● ●

20 unities

Three Peon IVs, a bacchius (*bacchiach tetrameter*, with resolution of the first long in the three first bacchius)

2d verse: — 0 0 | — 0 0 | — | 0 0 0 | 0 0 0 | 0 | 10 unities

Catalectic dactylic tripod or *penthemimers* (In other words in five parts because of the five longs)

3d verse: 0 0 0 — | 0 — — | • • • • | • • • | 10 unities

Peon IV, a bacchius (bacchiach dimeter with resolution of the first long in the first bacchius)

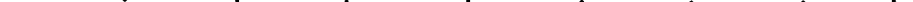
Rechant:

1st verse: — | — u | — u | — — | o | o o | o o | o o | 12 unities

Trochaic tripod: Long anacrusis, two trochees, a spondee


2d verse: — o o | — o | — — |

Aristophanean: a dactyl, a trochee, a spondee

3d verse:  20 unities

⁵⁰"I Sigh, and I Cry"

Three Peon IVs, amphimacer. This is a *cretic tetrameter*, with resolution of the first long in the first three amphimacers.

4th verse:  10 unities

A Peon IV, an amphimacer (*cretic dimeter*, with resolution of the first amphimacer)

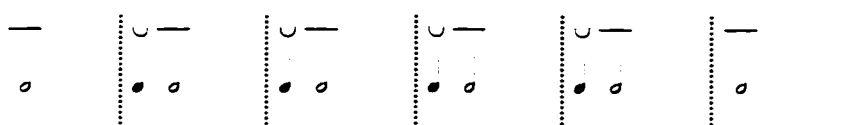
23d chorus: "A l'aid', à l'aid' hélas"⁵¹

Rechant for three voices; Chant for three voices; reprise of Rechant for five voices with different music and completely different harmonies for the second verse.

Rechant:

1st verse:  18 unities

Iambic trimeter (six iambs)

2d verse:  20 unities

Hypercatalectic iambic trimeter (with an additional long)

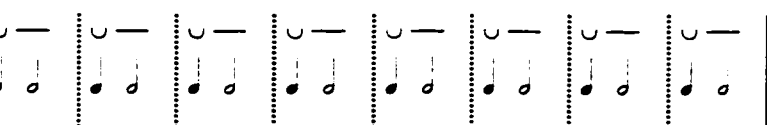
Chant:

1st verse:  12 unities

Ionic minor dimeter in an unused form: diiamb, ionic minor

2d verse:  13 unities

Another ionic minor dimeter in an unused form: Epitrite II, ionic minor

3d verse:  24 unities


Iambic tetrameter (eight iambs)

⁵¹"Help, Help, Alas"

24th chorus: "Le bandoulier vole l'argent"⁵²

Chant for three voices; Rechant for three voices; reprise of Rechant for five voices with new harmonies.

Chant:

1st verse:  12 unities

Ionic minor dimeter in an unused form: diiamb, ionic minor

2d verse:  11 unities

Catalectic iambic dimeter (three iambs and one long)


3d verse: like the preceding

Rechant:

1st verse:  12 unities

Ionic minor dimeter comprised of Peon III, Epitrite II (The two ionic minors have been transformed by the anaclassis.)

2d verse: like the preceding.

3d verse:  7 unities

Monometer: one Epitrite II

25th chorus: "Quiconq' l'amour noma l'amour"⁵³

Chant for four voices. No Rechant.

1st verse:  12 unities

Iambic dimeter (four iambs)

2d verse: idem.

3d verse:  11 unities

⁵²"The Bandit Steals the Money"

⁵³"Whoever Loves Names Love"

Catalectic iambic dimeter (three iambs and one long)

4th verse: like the preceding

N.B. The poem utilizes three Chants (or couplets), each one based on a "precious" pun:

l'amour and la mort – l'amant and lament – métresse and détresse.⁵⁴

26th chorus: "La brunelette violette reflat" ⁵⁵

Chant for three voices; Rechant for three voices; reprise of the Rechant for five voices. At the third verse of the Rechant, the melody ascends a step and the new harmonies are more luminous. The entire piece is in peonic rhythm.

Chant:

1st verse:  15 unities

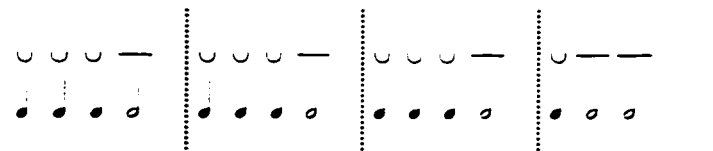
Three Peon IVs

2d verse:  15 unities

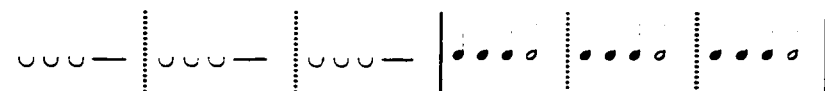
Two Peon IVs, one bacchius: bacchiach trimeter

3d and 4th verse: like the preceding. (The melody of the third verse comes from the second, but is a third higher, the melody of the fourth verse descends again.)

Rechant:

1st verse:  20 unities

Three Peon IVs, one bacchius: bacchiach tetrameter

2d verse:  15 unities

Three Peon IVs

3d verse:  15 unities

Two Peon IVs, one bacchius: bacchiach trimeter

⁵⁴"love" and "death" – "lover" and "lament" – "well-being" and "distress"

⁵⁵"The Little Brown Violet Flowers Again"

27th chorus: "L'un émera le violet"

First remark: The poem is a small catalogue of colors, to the glory of orange. Violet, white, black, gray, tan, green, flesh color, and orange are listed. Strange catalogue! Black is not a color, but the absence of light. White, the color of milk and of snow, contains virtually all colors, and is identified with light. Two of the three primary colors – blue and yellow – are absent, and are replaced by their complements – orange and violet. Red is called flesh color (the color of skin and blood, between cherry and rose). It is followed by its complement: green. Gray is obtained by a mixture of colors, and as there are thousands of possible mixtures, there are thousands of different grays. Tan is the color of fur, or better, the color of tanbark: a powder from the bark of a tree used to prepare fur. To justify his love of orange, the poet enumerates the sun, the helianthemum flower, the golden sunflower, and the golden apples of Hippomenes and Atlantas. This choice is perhaps not very fortunate: a simple orange would have been better. Personally, I thank Antoine de Baïf for beginning with violet and ending with orange, my two favorite colors. Violet, a mixture of calm blue and furious red, is a union of extremes and the most strangest, most mysterious, and most surreal color. It is the color of my *second mode* of limited transpositions. Orange – issued from the fusion of yellow and red, the two most dynamic colors – is a warm, rich color of oriental character. It is the color of my *third mode* of limited transpositions.

Second Remark: "L'un émera le violet." This first verse is addressed especially to me. Being Sagittarius, I am predestined to love violet – and I love it in effect above all other colors! and in all forms! purple (a mixture of red and blue, red – which symbolizes Love and Truth – being dominant) as well as hyacinth (a mixture of red and blue, blue – which symbolizes Truth and Love – being dominant), as violet (mixture of red and blue in equal quantities), and all the nuances of mauve and violet that can be found in flowers (from violet to orchid, in the lily, the fuschia, the campanula and the purple digitalus, not to mention the glycocol and the flowers of bougainvillea).

Third Remark: Claude Le jeune has colored Baïf's proposed rhythms with modal harmonies, and with light and especially refined chromaticisms. The successions of choriamb, dactyls, Epitrite IIs, and Peon IVs, have given place to ravishing harmonies. The form is: Rechant for three voices; Chant for three voices; reprise of Rechant for five voices. For the reprise, a very different presentation: in the first, fourth, and fifth verses, the principal melody passes to the tenor. Light contrapuntal changes are added or substituted and the harmonies are completely transformed.

4th Remark: The rhythms are quite extraordinary. More than ever, Baïf and Le Jeune have made "new with the words of the tribe" (I mean with Greek feet). Let us attempt an analysis of this exquisite rhythmic monument.

Rechant:

1st verse: — ◡ — | ◡ ◡ — It has 11 morae (11, prime number, especially dear to Baïf and Le Jeune)

Choriamb and Peon IV: ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ |

This is a *catalectic choriambic dimeter*. The classic form is choriamb + bacchius

(— ◡ — | ◡ — —) Here the bacchius is transformed into a Peon IV.

2d verse: — ◡ — | — ◡ — | — ◡ — | ◡ — — | 23 unities (23, prime number)

Three choriamb and a bacchius: ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ |

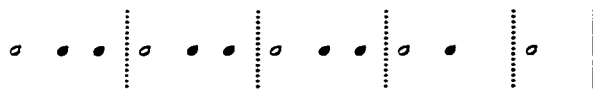
This is a *catalectic choriambic tetrameter*. Chant employed by Sappho and by Anacreon.

3d verse: — ◡ ◡ | — ◡ ◡ | — | 10 unities

Catalectic dactylic tripod (penthemimers) ◡ ◡ ◡ | ◡ ◡ ◡ | ◡ ◡ ◡ |

4th verse: — ◡ ◡ | — ◡ ◡ | — ◡ ◡ | — ◡ | — | 17 unities (prime number)

Chant with compound meters: dactylic tripod and catalectic trochaic dipody.



This is an *asynartetic archilochean* (smaller than the archilochean major that contains four dactyls and three trochees).

5th verse: — | — ◡ | — — | — ◡ | — | 14 unities

Long anacrusis. Trochaic dimeter, with spondee substitute for the second foot, the last trochee being catalectic: ◡ | ◡ ◡ | ◡ | ◡ ◡ | ◡ |

The *catalectic trochaic dimeter* is known under the name of *Lecythium*. The long anacrusis

that precedes it here could be taken for two Epitrite IIIs ' ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ ' ,

but this scan strikes me as incompatible with the words and the music of Baïf and Le Jeune.

6th verse: — ◡ — — | — ◡ — — | 14 unities

Two Epitrite IIs: ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ | (retrograde of the preceding verse)

7th verse: — ◡ ◡ — | — ◡ ◡ — | ◡ — — | 17 unities (prime number)

Two choriamb, one bacchius: ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ | ◡ ◡ ◡

Catalectic choriambic trimeter (is found with Anacreon – used by Aeschylus). Notice the symmetry of verses one, two, and seven are all choriambic!

1st verse: choriamb and Peon IV: ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ |

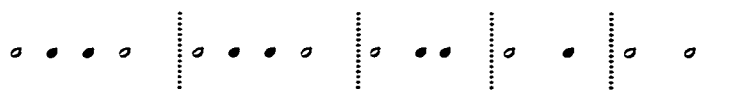
2d verse: three choriamb, one bacchius: ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ | ◡ ◡ ◡

7th and last verse: two choriamb, one bacchius: ◡ ◡ ◡ ◡ | ◡ ◡ ◡ ◡ | ◡ ◡ ◡

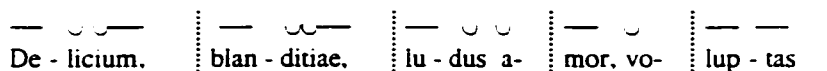
Another scansion of the second and the seventh verses of the Rechant.

2d verse: — ◡ ◡ — | — ◡ ◡ — | — ◡ ◡ | — — | — — | 23 unities (prime number)
L'au-tre le blanc, | l'au-tre le noir, | l'au-tre le gris | te | loû-ra |

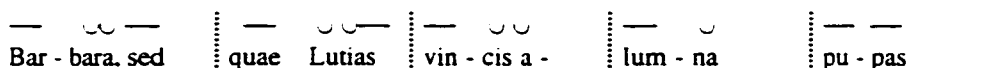
Two choriamb, a dactyl, a trochee, a spondee:



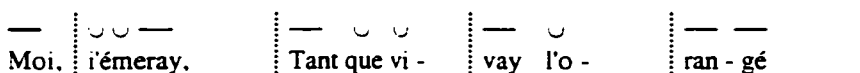
This is the exact scansion of a choriambic Latin verse (composed of two choriamb and one logaedic tripod or aristophanean) that I have found in Ausone:



and this other Latin verse, by the same author:



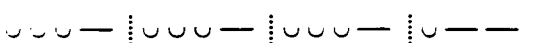
Because of symmetry with the second verse, we can scan the seventh verse in the following fashion:

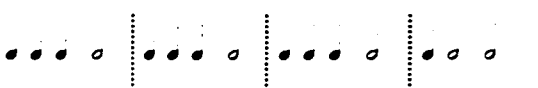


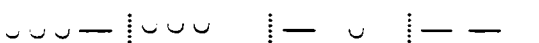
Choriamb, dactyl, trochee, spondee.


Chant:

I have, first of all, adopted the following scansions:


1st verse:  20 unities

Three Peon IVs, one bacchius: 

2d verse:  15 unities

Peon IV, tribrach, trochee, spondee: 

3d verse:  10 unities

Trochaic tripod with substitutions: 
tribrach, trochee, spondee.

4th verse:

aristophanean— dactyl, trochee, spondee.



11 unities
(prime number)

Here is a new analysis of the Chant that, although farther from the musical accents and the divisions of words, is much more symmetric and coincides reasonably with the structure of the two others.

1st verse: — — — — — | — — — — — | — — — — — | — — — — — | 20 unities

Three Peon IVs, one bacchius: • • • • • | • • • • • | • • • • • | • • • • • ||

2d verse: — — — — — | — — — — — | — — — — — | 15 unities

Two Peon IVs, one bacchius: • • • • • | • • • • • | • • • • • ||

3d verse: — — — — — | — — — — — | 10 unities

One Peon IV, one bacchius: • • • • • | • • • • • ||

4th verse: — — — — — | — — — — — | 11 unities
(prime number)

One choriamb, one bacchius: • • • • • | • • • • • || (Classic catalectic choriambic dimeter)

Thus scanned, verses one, two, and three only utilize Peon IV and the shortened bacchius: three Peon IVs and one bacchius (20 unities) / two Peon IVs and one bacchius (15 unities) / one Peon IV and one bacchius (10 unities). It is an elimination, each verse having amputated one Peon IV in relation to the preceding verses. A last particularity: verses two and seven of the Rechant end with a bacchius. All the verses of the Chant end with a bacchius.

To finish with this 27th chorus, I will cite the complete Rechant of "l'un émera le violet."

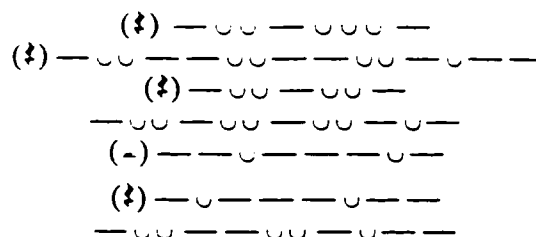
LES MAITRES MUSICIENS DE LA RENAISSANCE FRANCAISE

CLAUDE LE JEUNE - LE PRINTEMPS

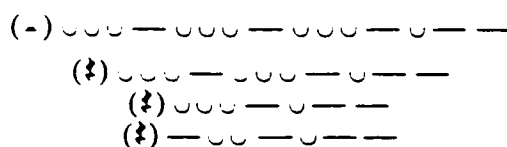
XXVII

L'UN ÉMERA LE VIOLET

Rechant



Chant



Dessus.

Cinquiesme.

Taille.

The musical notation for the three vocal parts: Dessus, Cinquiesme, and Taille. Each part is written on a five-line staff with a treble clef and a key signature of one sharp (F#). The lyrics are: L'un é - me - ra le vi - o - let.

etc.

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L'un émera le violet,
 L'autre le blanc, l'autre le noir, l'autre le gris te louïra :
 L'un se plêra de tané,
 L'autre de verte couleur sa livrê' fera,
 Quelqu'autre l'incarnât chérit.
 Moy ie louïray, moy ie portray,
 Moy i'émerai tant que vivray l'orangé.

Le radieus tout animant, vivifiant Soleil beau,
 Qui s'aprochant mené l'émable saison,
 Done l'été se haussant,
 Porte le teint orangé.

L'un émera &^a

La béle fleur, qui du Soleil éme si fort la clairté
 Qu'éle la suit et s'epanît la voyant,
 Et se reclôt le perdant,
 Porte le teint orangé.

L'un émera &^a

Le precieus et deziré riche metal qui tant vaut,
 Que tout le mond' ador' et cherche sur tout,
 Qui don' honeur et plaizir,
 Porte le teint orangé.

L'un émera &^a

L'émable fruit que le Dragon ne someillant défendrait,
 Qui reprezente le loyé de vertu,
 Qui Atlant' alenta
 Porte le teint orangé.

L'un émera &^{a56}

⁵⁶"One will love violet, / Another white, another black, yet another will praise gray. / One is pleased by tan, / Another will have green for his livery, / Someone else cherishes pink. / Myself, while I live / I shall praise, I shall wear, / I shall love orange. / The orb which animates everything, the beautiful, live-giving Sun, / Who at his approach brings the amiable season, / Gives rise to summer, / Wears an orange tint. / One will love... / The lovely flower, which loves so well the sun's brilliance / That she follows him and opens herself upon seeing him, / And recloses upon losing him, / Wears an orange tint. / One will love... / The precious and richly desired metal that has such value, / That all the world adores and pursues above all else, / Wears an orange tint. / One will love... / The desirable fruit that the unsleeping Dragon defended, / Which represents the reward of virtue, / Which caused Atlanta to slow her course, / Wears an orange tint. / One will love..."

28th chorus: "Si Jupiter s'avizoit"

An exquisite poem, exquisite music.

Rechant for five voices, Chant for four voices, Rechant for five voices, second Chant for four voices, different from the first – shorter (seven verses instead of 12) – with ravishing chromatic harmonies in the third verse. Rechant for five voices. This chorus is monostic, meaning that a single genre of verse, a single rhythm, is constantly repeated. It consists of one *aristophanean*.

Thus, the rhythm 

at 11 unities [prime number] (dactyl, trochee, spondee), is found again and is identical throughout the entire piece, with Claude Le Jeune's habitual transformations. Here is the transformation of the uppermost voice in the Rechant:

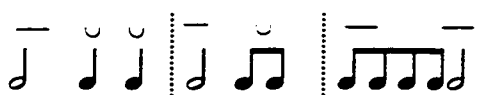



In the same Rechant, a transformation of the Cinquiesme in the second verse:



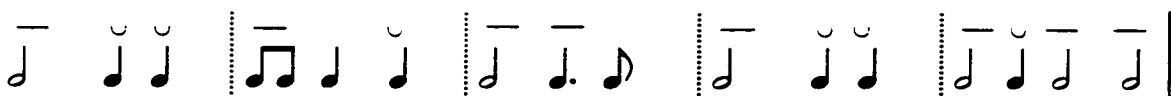
in the Taille of the same second verse:



Change of the Taille in the third verse:  See also

the Haute-Contre in the fourth verse of the second chant: 

See again the Dessus voice in the two last verses of the second Chant:



29th chorus: "Pastourelles ioliètes"⁵⁷


Rechant for three voices. Chant for three voices. Reprise of Rechant for five voices with harmonic variants. In the first Rechant (for three voices), the principal melody passes to the lower part (here to the Taille) for the second verse. It returns to the soprano for the following verses. In the reprise of the Rechant (for five voices), the melody alternates between soprano (Dessus) and tenor (Taille): Dessus (first verse) – Taille (second verse) – Dessus (third verse) – Taille (fourth verse). The text alternates between "G mixolydian" and the key of G major, with hesitation between the modal F natural and the expected F sharp. To this balance is added the opposition of A flat and A natural: minor third and major third.

Rechant:

1st verse:  16 unities

These equal and rapid values have nothing to do with Greek metrics. They belong to modern music. In the game of dissolution, however, such ancient Greek or Latin use of the process will occasionally occur to obtain an effect of joyous speed or of disquieting haste.

2d verse: idem.

3d verse:  10 unities

Choriambic acephalic dimeter (amphibrach and choriamb) These verses of 10 morae by 4 + 6 are found in Euripides.

4th verse: like the preceding

Chant:

1st verse:  11 unities (prime number)

Catalectic iambic dimeter (four iambs with catalexis presented as diiamb and bacchius)

⁵⁷"Pretty Little Pastorals"

Rechant:

1st and 2d verses: — ◡ ◡ | — ◡ ◡ | — | ♩ ♩ | ♩ ♩ | ♩ | 5 unities (prime number)

Catalectic dactylic tripod or *archilochean minor*. Le Jeune has altered these dactyls by diminution, creating a very noticeable tempo change that effectively expresses the disquiet of the words: "Ainsi ie fui qui me suit"⁵⁹ (In this faster tempo, the abundance of the i, and the permutation s, f – f, s become a veritable exercise in diction). I have indicated five unities, conserving its "mora" value for the quarter note, which is evident in the music. The advantage of this fashion of counting is that we obtain (by juxtaposing Chant, Rechant, reprise of Rechant) a perpetual succession of prime numbers for the entire piece: 13, 19, 13, 19, 5, 5, 5, 5, / 13, 19, 13, 19, 5, 5, 5, 5 etc.

31st chorus: "Que null'étoile sur nous"⁶⁰

Chant for three voices. Rechant for three voices, reprise of Rechant for five voices. The entire piece is written on the same rhythm at 11 morae, with one leisurely variant for the first verse of the Rechant (aristophanean).

Chant:

1st verse: ◡ — | ◡ — | ◡ — — | • • | • • | • • • | 11 unities (prime number)

Catalectic iambic dimeter (four iambs with catalectic, presented as diiamb and bacchius).

Verses two, three, four, and five: same analysis.

Rechant:

1st verse: — ◡ ◡ | — ◡ | — — | • • | • • | • • | 11 unities

Aristophanean: dactyl, trochee, spondee

2d verse: ◡ — | ◡ — | ◡ — — | • • | • • | • • | 11 unities

⁵⁹"Thus I flee my pursuer"

⁶⁰"There are no stars above"

Same analysis as the Chant.

32d chorus: "Tu peus de moy te passer"⁶¹

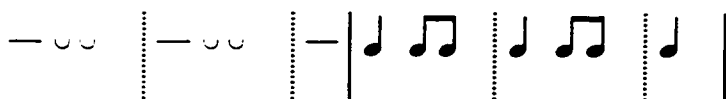
Form A, B, A. Rechant for three voices. Chant for three voices. Reprise of Rechant for five voices, with the principal melody in the Fifth voice (second soprano) for the two last verses. Notice the melodic drive in each voice, in the second verse of the Rechant for five voices.

Rechant:

1st verse:  11 unities

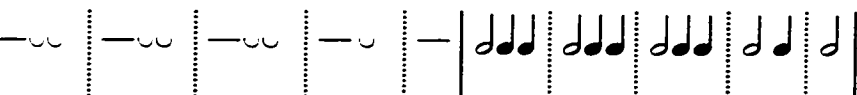
Catalectic iambic dimeter (four iambs with catalectic, presented as diiamb and bacchius)

2d verse: idem.

3d and 4th verses:  5 unities

Catalectic dactylic tripod or *archilochian minor*. change of tempo, dactyls altered by diminution

Chant:

1st verse:  17 unities

Chant in compound meters. Dactylic tripod reunited to a catalectic trochaic dipody.

Aeolian pentapody or *asynartetic archilochian*

2d verse:  12 unities



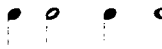

Iambic dimeter (four iambs)

33d chorus: "Du trist' hyver" (isochronal)

For five voices, in seven parts. Opposition of $\frac{2}{2}$ and $\frac{3}{2}$. At the beginning of the third part: fugal exposition with a long vocalized counter-subject in eighth notes. In this same third part, the words are "fait dissoudre la glace."⁶² Stretto on a distant note, using the dotted quarter. Beginning of the fourth part: equally fugal, with similar and contrary

⁶¹"You Can Do Without Me"

⁶²"make the ice dissolve"

dotted quarter. Beginning of the fourth part: equally fugal, with similar and contrary motion. The fifth part presents an opposition of rapid and slow rhythms:  and  then  and 

Listen also to the effect of the two plaintive, isolated, bare whole notes on the words, "Moy seul..."⁶³ in the sixth part.

*34th chorus: "Ces amoureux n'ont que douleur et tourment"*⁶⁴

Chant for three voices, Rechant for three voices, Reprise of Rechant for five voices.

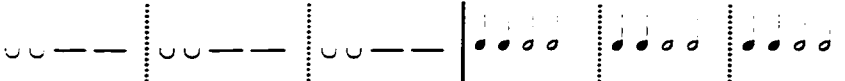
Chant:

1st verse:  17 unities

Two choriamb, one bacchius. This is a *catalectic choriambic trimeter*.

2d verse:  12 unities

Ionic minor dimeter. Two ionic minors. The first ionic minor is changed into a diamb by the anaclassis.

3d verse:  18 unities

Ionic minor trimeter. three ionic minors

Rechant:

Unique verse:  17 unities

Trochaic pentapody. Dactyl substitute for the first foot, spondee substitute for the fifth and last foot. Chant with 17 unities, like the first verse of the Chant.

*35th chorus: "D'une coline m'y proumenant"*⁶⁵

Chant for three voices, Rechant for three voices, Reprise of Rechant for five voices.

One of Claude Le Jeune's most beautiful inspirations. The poem speaks of an

⁶³"I alone..."

⁶⁴"These Lovers Have Nothing But Sorrow And Torment"

⁶⁵"Walking From A Hill"

extraordinary rose: "Bright red rose / From which all flowerets of the beautiful rose / Keep their distance." But the marvelous flower is inaccessible: "I see you from afar, / And I love you well, / I want to pluck you / I stretch out my hand / But, alas, it is in vain." Le Jeune has expressed this symbol of effort with an impossible happiness and light in a superb march of modulating harmonies with a crescendo in each phrase building to a fortissimo on the words: "I stretch out my hand"...the whole followed by a reiteration of the pianissimo in minor: "But, alas, it is in vain." This effect makes up the entire *Rechant*. First for three voices, with counterpoint in eighth notes. It is repeated for five voices, without the eighth notes, in thick harmonies, and, after an effort which seems greater than the previous one and places this already heightened superhuman and incomprehensible joy even higher when someone approaches, it collapses with more sadness still on the pianissimo in major.

Citation from the second *Rechant* for five voices:

REPRISE à 5

The musical score is for a five-voice setting titled "REPRISE à 5". The voices are labeled on the left: *Dessus* (Soprano), *Cinquième* (Fifth voice), *Haute-Contre* (Alto), *Taille* (Tenor), and *Basse-Contre* (Bass). Each voice part has a staff with a treble clef and a key signature of one sharp (F#). The lyrics "ie la voy de loin," are written below each voice staff. The piano accompaniment is shown at the bottom with two staves (treble and bass clefs). The music consists of a series of chords, with the piano part providing a harmonic foundation for the voices.



etc.

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Chant:

1st verse: ◡ ◡ ◡ ◡ ◡ | ◡ ◡ ◡ — | ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ | 10 unities

Two Peon IVs, of which the first is resolved to five shorts

2d verse: — ◡ ◡ | — ◡ ◡ | — ◡ | — — | ◡ ◡ ◡ | ◡ ◡ ◡ | ◡ ◡ ◡ | ◡ ◡ | 15 unities



















Alchaic decasyllable: two dactyls, trochee, spondee

3d verse: — ◡ ◡ | — ◡ ◡ | — — | ◡ ◡ ◡ | ◡ ◡ ◡ | ◡ ◡ | 12 unities

Dactylic tripod: with spondee substitute for the third foot

2d verse:  21 unities

Charu:

1st verse:                  

2d verse: like the preceeding.

3d verse: \cup | $- \cup$ | $- \cup$ | $- -$ | \bullet | $\bullet \bullet$ | $\bullet \bullet$ | $\bullet \bullet$ | 11 unities

*37th chorus: "Doucète, surcrine, toute de miél"*⁶⁸



Chant for three voices. Rechant for three voices, of which the beginning is a variation of the Chant. The Haute-Contre voice is added to this rhythm:  Reprise of the Rechant for five voices, new variation: the Taille voice is added to this rhythm:



Chart:

1st verse: — 00 : — 00 : — 00 : — 00 : — 0 : — — | 23 unities



[illegible]

261

Two dactyls and one long, and again two dactyls and one long. In the 1st colon, the second dactyl is replaced by a spondee. This is what metricists have improperly named dactylic pentameter, by dividing it as follows: two dactyls, a spondee, two anapests.

(◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡). In fact, it is a

Dicatalectum, composed of two *catalectic dactylic tripodies*:

◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ||

Rechant:

1st verse: — ◡ ◡ — ◡ ◡ — ◡ ◡ — ◡ ◡ — ◡ ◡ — — | 24 unities

◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ |

Hexameter or dactylic hexapody: spondee substitute for the sixth foot

2d verse — ◡ ◡ — ◡ ◡ — ◡ ◡ — — | ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ | 16 unities

Dactylic tetrapody: spondee substitute for the fourth foot

3d verse: ◡ ◡ — — ◡ ◡ — — | ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ | 12 unities

Two ionic minors

38th chorus: "La béle gloire, le bél honeur doner"⁶⁹

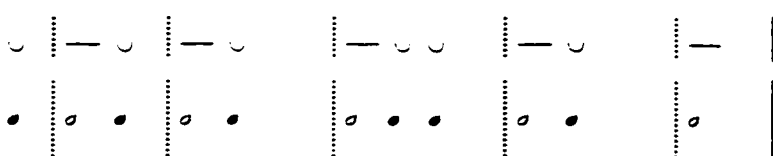
Rechant for four voices. Chant for four voices. Reprise of Rechant for six voices with a few harmonic variations and the principal melody in the second soprano (Dessus).

Rechant:

1st verse: ◡ ◡ ◡ — ◡ ◡ ◡ ◡ — ◡ — | ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ ◡ | 14 unities

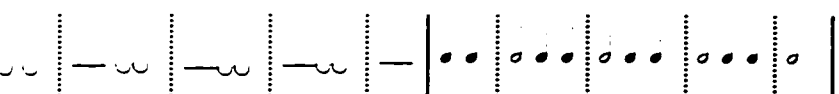
⁶⁹"Beautiful Honor Gives Beautiful Glory"

Catalectic trochaic pentapody, with substitution of a tribrach for the first and the third feet:

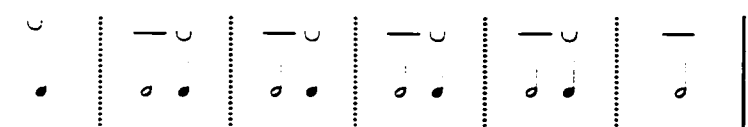
2d verse:  16 unities

Alcaic hendecasyllable: anacrusis, short, two trochees, one dactyl, two trochees of which the second is catalectic

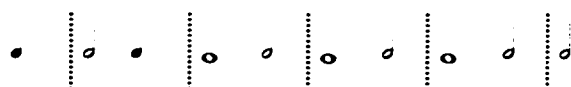
Chant:

1st verse:  16 unities

Dactylic tetrameter: base of two shorts, three dactyls, catalexis

2d verse:  15 unities

Short anacrusis. Catalectic trochaic pentapody. Claude Le Jeune has changed the tempo of these verses derived from the second foot, and altering the trochees by augmentation: it changes to the first tempo on the last syllable, which links to the reprise of the *Rechant*.



39th and last chorus: "Amour, quand, fus-tu né?"⁷⁰ (isochronal)

For seven voices. One medium low, the other higher, two half-choruses alternate between questions and answers, then reunite for the conclusion.

⁷⁰"Love, When Were You Born?"

D) GREEK RHYTHMS USED AND TRANSFORMED IN A FEW OF MY WORKS


D) GREEK RHYTHMS USED AND TRANSFORMED IN A FEW OF MY WORKS

Turangalila-Symphonie, Final:

glyconic: — ◡ | — ◡ ◡ | — ◡ | —

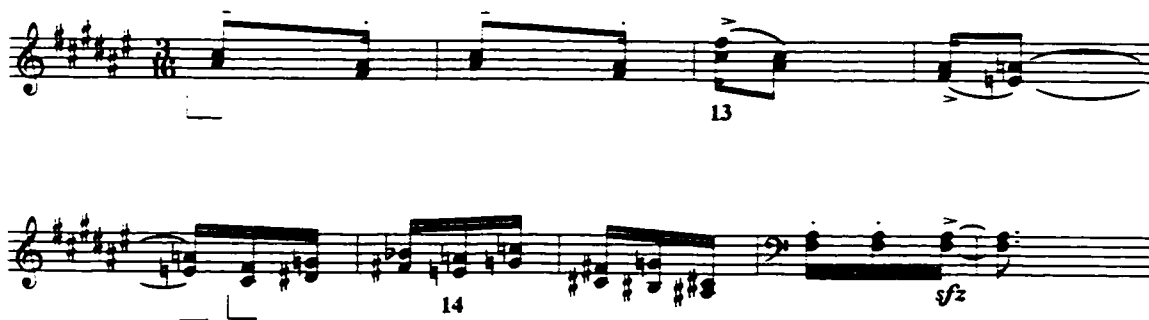
For instance: trochaic base, dactyl, trochee, catalexis

The accentuation is not that of a glyconic:

 the second and the third measures are rather accented

like a choriamb — ◡ ◡ —

The statement of the antecedent in the first period gives a succession of 13 + 14 (sixteenth-notes):



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(See the complete analysis of the work in Volume II.)

Numerous Greek rhythms can be found in my works, transformed as follows:

1) In the *Sept Haïkai*, second excerpt

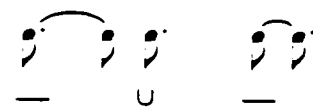
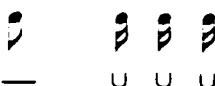



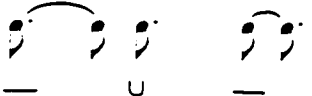
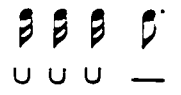



"Le parc de Nara et les lanternes de pierre"⁷¹

In the bass clarinet: transformation of three cretic tetrameters (number 1 in the orchestral score):

In the fourth measure of number 3, the phalecean is transformed.

At number 4, the pherecratean is transformed. At number 5, adonic, etc.

From no. 6, "les oiseaux de Karuizawa,"⁷² through number 9, the first couplet is based on a cretic strophe which occurs in the percussion and begins at the third measure of rehearsal number 9 :

 long cretic (values of 5, 3, 5 ♩)	 Peon I (transformation)	 Peon I (1st value dotted)
 ditrochee (substitution)	 cretic	 long cretic (values of 5, 3, 5 ♩)
 Peon IV (transformation)	 cretic	 ionic major (substitution)
	 cretic	

etc.

(The analysis of *Sept Haïkai* is an integral part of Volume V.)

⁷¹"The Park of Nara and the Lanterns of Stone"

⁷²"The Birds of Karuizawa"

2) *Couleurs de la Cité Céleste*⁷³

Outside of Hindu rhythms and inversions, it is important to notice (beginning with rehearsal number 42) the cretic and aristophanean rhythms; and from rehearsal number 62 through rehearsal number 67, the cretic, phalacean and aristophanean rhythms.

So as not to lengthen this chapter on Greek rhythms transformed in my works, (I must also mention Greek rhythms in birdsong: notably the Marsh Warbler, the Quail, the Great Sedge Warbler and Turdoid, the Sedge Warbler, the Red-legged Partridge, the Grey Partridge, etc. in my *Catalogue d'Oiseaux* for piano). I cite, in closing, one single example: the first movement of the *Messe de la Pentecôte* (for organ): (a work that will be completely analyzed in Volume VI.)

3) *Messe de la Pentecôte* (for organ)

The first movement: "Les langues de feu" uses *Greek rhythms* exclusively. But they are submitted to such tortures! Instead of employing these Greek verses, which are delicate organisms – especially the simple logaedics such as adonic, aristophanean, pherecratean, glyconic, sapphic minor; and compound logaedics, such as sapphic major, the alcaic decasyllable and the two asclepiadeans – instead of searching for strophic combinations such as the sapphic strophe, I prefer to align the different types of feet (they are all or almost all there: the pyrrhic and the molossus are the only ones missing from the list!) in the most fantastic fashion there is: by repeating certain feet several times (the iamb and the spondee come back five times each, not to mention the compound feet where we again find choriamb, diiamb, dispondee, dochmius, and anapest). This alignment of Greek rhythms presents a risk: once the order and balance of the verses and the strophes is eliminated, the only thing left is the alternation of shorts and longs, which creates a chain of frightful

⁷³"Colors of the Celestial City"

monotony... To prevent this inconvenience, I have passed my Greek rhythms to the bed of Procrustes, elongating and diminishing the durations (where necessary). In other words, my feet are not all in the same tempo. In one, the short will be a sixteenth-note, in another it will be a quarter-note. Shorts and longs can also be dotted values. Finally, to avoid normal values, I have made use of irrational ones. By using the transformation already practiced by the Greeks under the name of dissolution, I have divided the smallest durations of longs and even shorts, and also have elided or eliminated the attack at the beginning of a rhythm (its first value being linked to the last value of the preceding rhythm). The Greek rhythms then become so varied that they are not easily recognized.

A word of excuse on the subject of irrational values. I have not avoided prime numbers. If there is a rhythm of five (peon, amphimacer), or of seven (epitrite), it occurs within a single irrational group. My irrational values have nothing to do with this research of isochronality which I have fought against! They are fantasy and experience... perhaps again the unhealthy pleasure of playing games with the enemy... In any case, they do nothing to change the spirit of the Greek rhythms. A single, valid reproach: the piece is difficult to execute. Only a very conscientious player could play it with the necessary precision! Hereafter, the complete table of rhythms used in "les langues de feu," in other words, the rhythmic scheme of the entire piece. Above the exact durations, I have inscribed the name of the Greek rhythm which engendered it, with its conventional notation in longs (—) and shorts (◡). Analysis of the table:

Iamb in irrational values, trochee in normal values (the short is an eighth-note). Spondee in irrational values (the long is a half note of quarter-note triplets). Another quarter-note triplet, in which an amphimacer is inserted (a small quintuplet in the larger triplet) and an anapest. The two anapests do not have the same tempo: one uses the sixteenth-note of a quarter-note triplet for the short (a little less than a sixteenth-note), the other uses a dotted-eighth note for the short (a little more than an eighth-note). Irrational tribrach. The first value of the dactyl is not re-attacked, last value of the dactyl elongated.

Proceleusmatic in a quintuplet. The first values of the amphibrach and the amphimacer, not re-attacked. Bacchius and antibacchius in irrational values (the short is the sixteenth-note of a quintuplet). Diiamb: first iamb, irrational values; second iamb, normal values. Ditrochee: first trochee – the short is the quarter-note of a triplet; second trochee – the short is a dotted eighth-note. Irrational ionic major. Peon III: a sixteenth-note quintuplet in a quarter-note triplet. Ionic minor: exaggerated by whimsy past the boundaries of amusement: the first short is of a ridiculous length: the half note of a quarter-note triplet tied to an eighth-note – second short: eighth-note – the two longs: two dotted-eighth notes. (The upper voices begin a transformation.) Choriamb: the short is a quarter-note – trochee in normal values, irrational iamb. In a quarter-note triplet: anapest in two eighth-note triplets, Peon I in a sixteenth-note quintuplet. Epitrite I: almost entirely transformed into sixteenth-notes (the short is an eighth-note). Irrational iamb (short = one eighth-note of a triplet). Irrational amphimacer (short = one sixteenth-note of a quintuplet): the first value of the amphimacer is not re-attacked. Epitrite II: the first long is a dotted-quarter note, not re-attacked, and transformed. What follows is the return of a sixteenth-note quintuplet: short, not re-attacked, two transformed longs. Again Epitrite II, without transformation, and irrational. Irrational iamb (the short is one eighth-note of a triplet). Irrational amphimacer (the short is one sixteenth-note of a quintuplet). Dactyl (short = normal sixteenth-note). Dochmius: first value not re-attacked, comprises two half notes each belonging to a different quarter-note triplet (transformations in the upper voices). Epitrite III in irrational values (the short is one thirty-second note of a septuplet). Trochee in irrational values (the short is one eighth-note of a triplet). Iamb (short = normal eighth-note). Epitrite IV: first long: quarter-note, the other two longs: dotted-eighth notes, short: sixteenth-note. Irrational Peon II and III (for II: a quintuplet of sixteenth-notes, for III: an eighth-note quintuplet). Peon IV: shorts: three eighth-notes (the first is not re-attacked), long: dotted-eighth. Peon I: long: a value of seven sixteenth-notes (transformed in the upper voices), shorts: three dotted-eighth notes, transformed into sixteenth-notes. Spondee: first long: half note in quarter-note triplets,

second long: quarter-note (of a quarter-note triplet) tied to a normal quarter-note (written as an eighth and a half rest). Epitrite III (the short is one thirty-second note of a septuplet). Peon III, Peon IV (The short is one thirty-second note of a dixtolet – it is then faster than the preceding short.) Spondee: first long: normal quarter-note tied to the quarter-note of a triplet, second long: half note in quarter-note triplets. Iamb (The short is a dotted quarter-note.) Spondee: two half notes, the second with fermata.

The image displays musical notation for various poetic feet, organized into four rows. Each foot is represented by a sequence of notes (half notes, quarter notes, eighth notes, sixteenth notes) and rests (half rests, quarter rests, eighth rests, sixteenth rests) on a four-line staff. Above the notation, a bracket indicates the number of notes against a standard unit (e.g., '3 (against 2)').

Row 1:

- Iamb: 3 (against 2)
- Trochee: 3 (against 2)
- Spondee: 3 (against 2)
- Amphimacra: 3 (against 2)
- Anapest: 3 (against 2)
- Anapest: 3 (against 2)

Row 2:

- Tribrach: 3 (against 2)
- Dactyl: 3 (against 2)
- Proceleusmatic: 5 (against 4)
- Amphibrach: 5 (against 4)
- Amphimacer: 5 (against 4)
- Bacchius: 5 (against 4)
- Antibacchius: 5 (against 4)

Row 3:

- Diiamb: 3 (against 2)
- Ditrochee: 3 (against 2)
- Peon III: 3 (against 2)

Row 4:

- Peon III: 3 (against 2)
- Ionic minor: 3 (against 2)
- Choriamb: 3 (against 2)

antipast Peon I Epitrite I

iamb amphimacre Epitrite II Epitrite II iamb amphimacre dactyl

iochmius dispondeo spondee

Epitrite III trochee iamb Epitrite IV

Peon II Peon III Peon IV Peon I

3 (against 2 ♩)

spondee

7 (against 8 ♩)

Epitrite III

10 (against 8 ♩)

Peon III Peon IV spondee

3 (against 2 ♩)

iamb

spondee

MESSE DE LA PENTECÔTE

POUR ORGUE

OLIVIER MESSIAEN

I. ENTREE (Les langues de feu)

"Des langues de feu se posèrent sur chacun d'eux" (Actes des Apôtres)

R: bourdon 16 et cymbale | Pos: quintaton 16 et 3^{re} | G: montre 8 et 5^{re} | Péd: clavier 4 seul |

Moderato (rythmes grecs traités en valeurs irrationnelles)

Pos.

MAN. *dr. mf legato*

PED. *f legato*

legato più f

Pos.

MAN. *dr.*

PED.

Pos.

MAN. *dr.*

PED. *legato sempre*

mf non legato

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CHAPTER IV

HINDU RHYTHMS

A) Introduction to Hindu rhythms

- 1) General overview –
- 2) Rhythmic notation –
- 3) The Gânas –
- 4) The Deçi-Tâlas –
- 5) Table of 120 Deçi-Tâlas, + 4 appendices –
- 6) Karnâtic theory, table of 7 tâlas and of their 5 jatis –
- 7) Tagore

B) Analysis of several Hindu rhythms as used by Olivier Messiaen:

- Quatuor pour la fin du Temps* (first movement) –
- Four measures of the "Noël" (from *Vingt Regards*) –
- Cinq Rechants* (first and fifth Rechants) –
- Sept Haïkai* (first part: "Introduction") –
- Turangalîla-Symphonie* (Wood block rhythms from the 4th part) –
- Messe de la Pentecôte* (second part) –
- Livre d'Orgue* (examples from numbers 1, 2, 5)

HINDU RHYTHMS

A) Introduction

The beginnings of Indian music date back quite far. According to the ancient chronicles (Purânas), they go back more than 6000 years before our era. Legend has it that the God Shiva himself, who taught music and dance to man, did so close to our time. The "Gandharva Veda" (Veda of celestial musicians) recognizes four musical systems in India. These four systems are attributed to Shiva, Soma, Hanamant, and Bharata.

1) In Shiva's system:

Here are the 10 pentaphonic modes in Shiva's system:

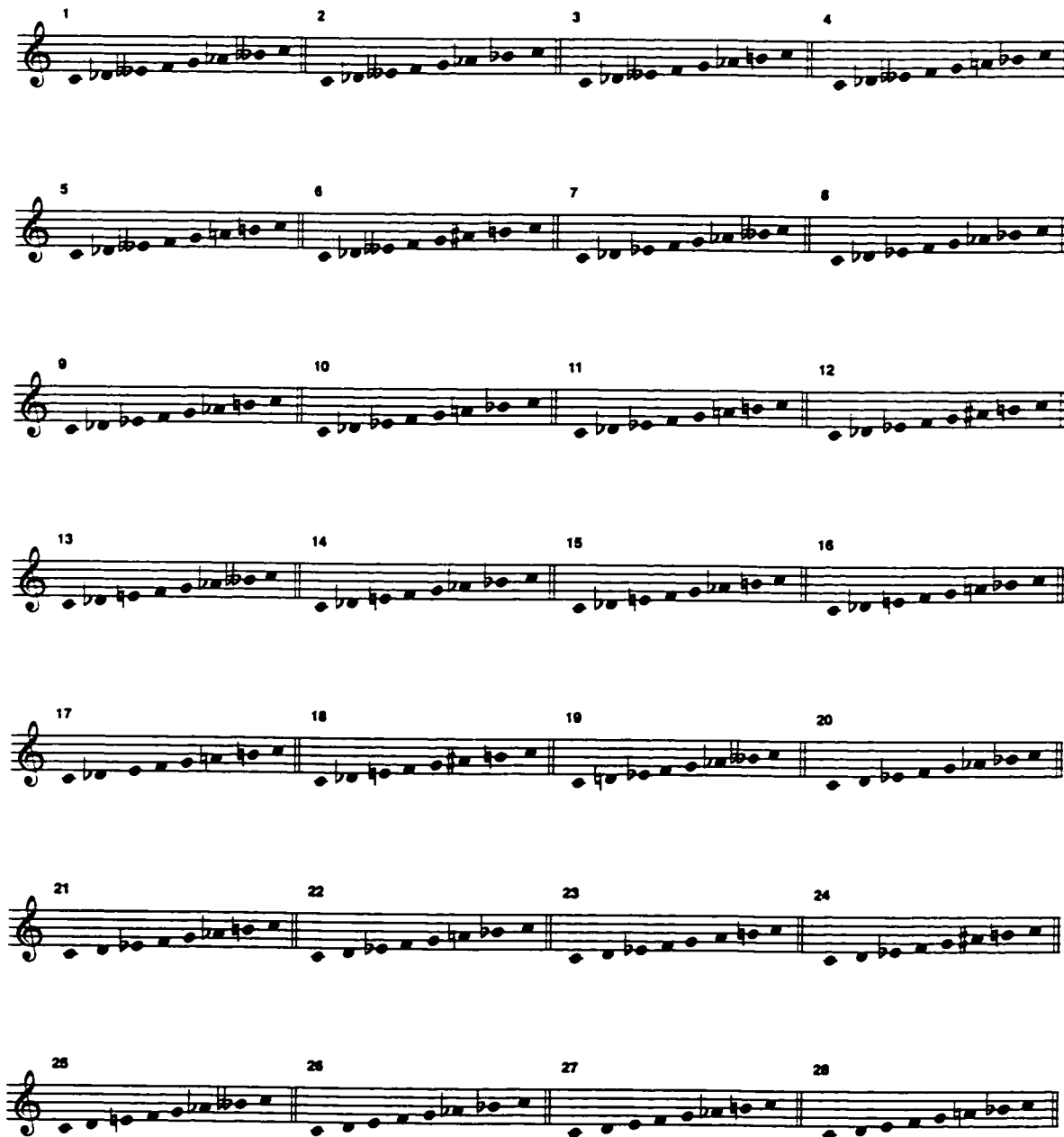


We find the seventh mode, "Bjûpâla," in Balinese music. The ninth mode uses two perfect and augmented fourths: f and f sharp.

2) The musical system of southern India (Karnâtic system) is attributed to Soma. The 72 modes of the Karnâtic system all contain seven sounds. They leave intact what we call tonic, subdominant, and dominant, and apply all the possible accidentals to the four intercalary notes. This creates 36 modes. By altering the perfect fourth which becomes

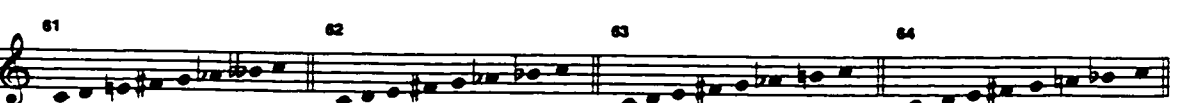
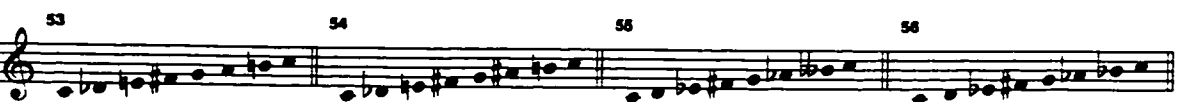
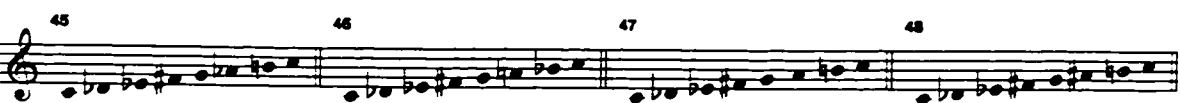
augmented, we obtain 36 different modes. The total of 72 modes then divide into two classes: the Çaddha-Madhyama class (36 modes on the perfect fourth), and the Prati-Madhyama class (36 modes on the augmented fourth). Here is the list of the 72 Karnâtic modes (according to Joanny Grosset):

I. – (*çaddha-madhyama class – perfect fourth*)





II. – (*prati-madhyama class – augmented fourth*)





3) The traditional music of northeastern India claims to be derived from the Hanumant theory.

4) The classical Indian system is the Bharata system.

The "Gîtâlamkara" of Bharata is the first known treatise on the music of India. It was written in approximately the fifth century BC. Bharata is the author of the "Nâtya-Çâstra," the most important of ancient treatises. The "Nâtya-Çâstra" is a compilation of early works. The extant version was recreated two centuries before our era and acquired its definitive form only around the fourth century AD. The "Gîtâlamkara" and the "Nâtya-Çâstra" have been rewritten in Sanskrit. The *Samgîta-Ratnâkara* (Ocean of Music, or Diamond Mine of Music) is the best and most complete of all the treatises of India. It has also been rewritten in Sanskrit. It is divided into seven books, and it is in the fifth book, dedicated to rhythm (tâla), that the table of 120 Deçî-Tâlas (the most extraordinary catalogue of rhythms in the entire history of music) is found. The treatise of Çarṅgadeva was written in the first half of the eighth century. All works on the music and rhythm of India after Çarṅgadeva are more or less inspired by the *Samgîta-Ratnâkara*. After the 15th century, these works were written in Persian, then in Hindi, Bengali, and Mahrati for northern India, and in Tamil, Telagu, Kannada, and Malayalam for southern India. According to Alain Daniélou (*l'Inde du Nord*, first chapter),¹ outside of the three great living musical traditions – Dravidian in the South, Shivaism, and Arian-Vedic in the North – several different popular musical systems still exist in India: those of the primitive tribes (Santals and Gonds in the North, Todas in the mountains of the South), those of popular castes like the Ahirs (dairy farmers from the

¹North India

North), and finally the Nepal and the provinces of the Northwest take part in the Tibetan musical family.

Here are five rhythms (tâlas), cited in the Bharata's "Nâtya-Çastra."

1) *Caccatputa* S S | S[^] ♪ ♪ ♪ ♪. (8 mâtârs)²
(or *Chanchatputa*)

♪ ♪ ♪ | ♪ in other words, 8 ♪ by 5 + 3. This is the opposite of the Greek dochmiach: ♪ — — ♪ — ♪ ♪ | ♪ ♪ ♪ iamb + cretic, in other words 8 ♪, by 3 + 5.

2) *Câcaputa* S | S | ♪ ♪ ♪ ♪ (6 mâtârs)
(or *Châchaputa*)

in other words, 6 ♪ divided into 2 x 3 ♪. This is the Greek ditrochee:

— ♪ — ♪ ♪ ♪ | ♪ ♪

We can add this variant to Câcaputa:

S | | S ♪ | ♪ ♪ | ♪ (6 mâtârs)

in other words, six eighth-notes, divided into 3 x 2 eighth-notes. This is the Greek choriamb:

— ♪ ♪ — ♪ ♪ ♪ ♪
(what the Greeks considered trochee + iamb: ♪ ♪ | ♪ ♪)

In any case, the alignment of several Câcaputa, with the variant, quite neatly creates the sensation of six divided into two and three (a rhythm that is found in Orpheus' aria and ritornello from Act II of Monteverdi's *Orfeo*, before the arrival of the Messenger, and also in the "Iberia" for piano by Albeniz, Almeria, Rodeña).

S | S | | S | S | | S | | S | S | | S | S | |
♪ ♪ ♪ ♪ | ♪ ♪ ♪ ♪ | ♪ ♪ ♪ ♪ | ♪ ♪ ♪ ♪ | ♪ ♪ ♪ ♪ |
(in 2) (in 2) (in 3) (in 2) (in 2)

² The term mâtâra refers to one short duration. This term is defined later in Messiaen's discussion of Hindu rhythmic notation on page 289.

2) *Shatpitâpura*

$S^{\sim} | S S | S^{\sim}$ $\text{♩. ♩ ♩} \quad \text{♩. ♩ ♩}$ (12 mâtṛās)

This is a non-retrogradable rhythm.

First analysis: two cretics $— \cup — \quad \text{♩. ♩ ♩}$

the first cretic beginning with a dotted value: ♩. ♩ ♩

the second cretic ending with a dotted value: ♩ ♩ ♩.

second analysis: Greek iamb and trochee, surrounded by two dotted values:

$\text{♩.} \quad \text{♩ ♩} \quad \text{♩ ♩} \quad \text{♩.}$
dotted value iamb trochee dotted value

4) *Pancapâni*

(or *Panchapâni*): $S | S S | S \text{ ♩. ♩ ♩} \quad \text{♩. ♩ ♩}$ (10 mâtṛās)

This is a non-retrogradable rhythm containing two cretics:

$— \cup — \quad \text{♩. ♩ ♩} \quad | \text{ these are non-retrogradable } (— \cup —)$

Its variant: $S^{\sim} | S S | \text{ ♩. ♩ ♩} \quad \text{♩. ♩ ♩}$ (9 mâtṛās)

can again be analyzed as two cretics:

$— \cup — \quad \text{♩. ♩ ♩} \quad | \text{ the first cretic with a dot added to the first value: } \text{♩. ♩ ♩} \quad |$

the second cretic interrupted (or catalectic): ♩ ♩ The dot added to the first cretic and the amputation of the second cretic gives a total of nine eighth-notes to the variant. Linking

the normal rhythm to its variant gives a relationship of $10 + 9$, and the opposite, $9 + 10$:

each time a total of 19 (prime number).

$S | S S | S \quad \text{♩. ♩ ♩} \quad \text{♩. ♩ ♩} \quad | \text{ } S^{\sim} | S S | \quad \text{♩. ♩ ♩} \quad \text{♩. ♩ ♩}$
 $\text{♩ ♩ ♩} \quad \text{♩ ♩ ♩} \quad | \text{ } \text{♩. ♩ ♩} \quad \text{♩ ♩} \quad | \text{ } \text{♩ ♩ ♩ ♩} \quad \text{♩ ♩} \quad \text{♩ ♩}$
(10 ♩) (9 ♩) (10 ♩)

5) *Sampakkeshtâka*

$S^{\sim} S S S \quad S^{\sim} \text{ ♩. ♩ ♩} \quad \text{♩. ♩ ♩}$ (12 mâtṛās)

This is a non-retrogradable rhythm.

If we compare it to the 51st Decî-Tâla of the system of Çârngadeva:

Vijaya (victory): S[^] S S[^] ♩. ♩. ♩. (8 mât-râs)

(which is also non-retrogradable)

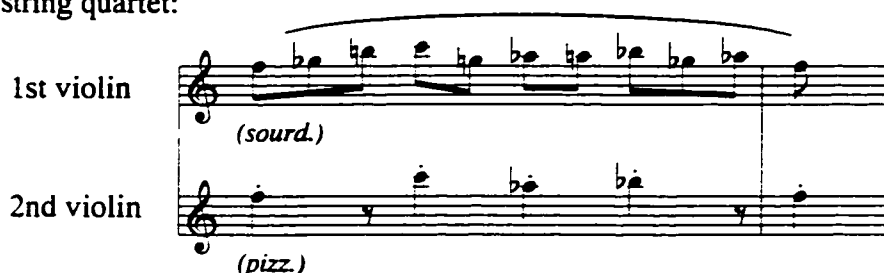
and if we double, then triple the central value of Vijaya:

S[^] S S S[^] : S[^] S S S S[^] | we obtain the Sampakkeshtâka rhythm,
 ♩. ♩. ♩. ♩. | ♩. ♩. ♩. ♩. | and we certify that it is issued by
 Vijaya.

In the sixth volume of *Mikrokosmos* for piano, Béla Bartók has written his fourth

"Dance in Bulgarian Rhythm" in measures of $\overbrace{3+2+3}^8$ ♩. ♩. ♩. This is the Vijaya,
 original form.

The second form: ♩. ♩. ♩. ♩. has also been used by Bartók in the scherzo trio of
 his fifth string quartet:



The second and the third forms have been used by Stravinsky in the *Sacre du Printemps* (opening of the second part: "Nuit" – two muted trumpets):



The first trumpet plays the rhythm: ♩. ♩. ♩. ♩. | ♩. ♩. ♩. ♩. |

By using the third form, Stravinsky again uses the Sampakkeshtâka tâla:

S[^] S S S S[^] ♩. ♩. ♩. ♩. ♩.

Above I have cited the 72 Karnâtic modes (used in South India). Here are the 10 modes of the Hindustani system (used in North India).

Bhairava



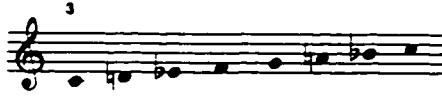
(with two augmented seconds
—as found in Arabian music)

Bhairavî



(Greek Dorian)

Kâfi



(D mode from plain-chant)

Todî



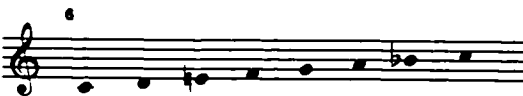
(like Shrî, with the minor
third)

Shrî



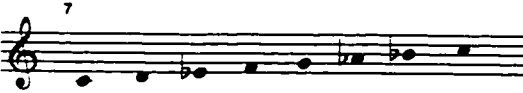
(the same as Bhairava with an
F sharp, augmented fourth)

Khammâja



(G mode from plain-chant)

Asâvarî



(our descending melodic
minor key)

Bilâval



(resembles our major scale)

Kalyâna



(F mode from plain-chant)

Pûravî



(like Shrî, with an A flat)

According to Alain Daniélou, the modes, used for the melodic improvisation of the râgas, are tied to a particular spiritual state, which corresponds to a determined hour of the day or night, or even to a season or a natural phenomenon (fire, rain). Here are a few

examples, borrowed from the works of Alain Daniélou on *l'Inde du Nord* (p. 57 and following):

Lalitâ (in the first hours of day):



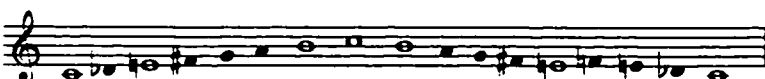
(contains two augmented seconds and two fourths – augmented fourth and perfect fourth)

Bhairavî (in the morning)



("Bhairavî with big eyes is seated at the summit of sacred mount Kailasa, on a throne with inlaid crystal. Cymbals in hand, she venerates God with leaves and lotus flowers.")

Pûravî (at the end of the day):



Vasantî (in the Spring):



Megha Mallâr (during the rainy season)



("Megha Mallâr shines like the blue lotus. The exquisite smile on his moon-like face is sweeter than ambrosia. Adorned in yellow in the middle of heavy clouds, he shines among heroes. Thirsty, the châtakas birds who like only rain water, ask for a drink when they see him.")

The names of notes in French are like the first syllables of each verse of the hymn of Saint Jean Baptiste in plain-chant: Ut (Do) – Re – Mi – Fa – Sol – La – Ti: Ut queant laxis, Resonare fibris, Mira gestorum, Famuli tuorum, Solve polluti, Labii reatum, Sancte

Joannes. Similarly, the names of notes in India are the first syllable of symbolic words: Sa – Ri – Ga – Ma – Pa – Dha – Ni – Sa (Shadjâ, father of the six others); Ri (Rishabha, the bull – this note is borrowed from the bulls bellowing); Ga (Gandhâra, perfumed – the third, and certainly the major third, gives its perfume, its strong color to the mode); Ma (Madhyama, median – the fourth, certainly the augmented fourth, found in the middle of the octave – this note would have been borrowed from the jackal's howl and from the crane's cry); Pa (Pancama, the fifth – this note would have been taken from the song of the kokila, the Indian coucou); Dha (Dhaivata, subtle – the sixth, does not have the strong color of the third, but also colors the mode); Ni (Nishâda, seated, resting, because the seven notes finish with this one. It is borrowed from the elephant's braying).

The tâlas, or rhythms of India are actually executed on several types of drums (Mridanga, Chakhâvaj, Tablâ). In order to immediately memorize the rhythm and the numerous attacks that transform it, the player is served by "bols," mnemotechnic syllables. Unfortunately, this system of "bols" and of transformations leads to an almost complete destruction of the rhythm, which, despite numerous accents, is found drowned under a raft of very rapid, equal values. However, certain tâlas are varied in ways other than transformation, and I must cite a few processes of rhythmic variation that are particularly interesting.

a) The *contretemps*. This places the attack midway between the two durations:

Rupaka tâla: ♩ . ♩ ♩ (7 shorts)

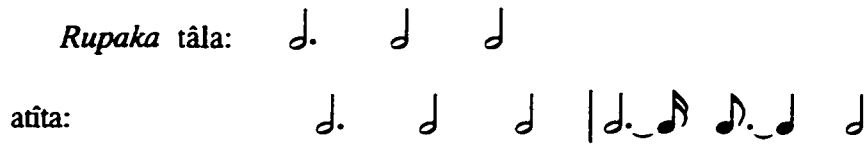
contretemps: ♩. ♩ ♩ | ♩. ♩ ♩ |

b) *avanaddha*. The attack occurs a fraction of a second before the short duration:

tâla *Rupaka*: ♩ . ♩ ♩


avanaddha: ♩. ♩ ♩ | ♩- ♩. ♩- ♩ ♩ |

c) *atīta*. The attack occurs a fraction of a second after the short duration:

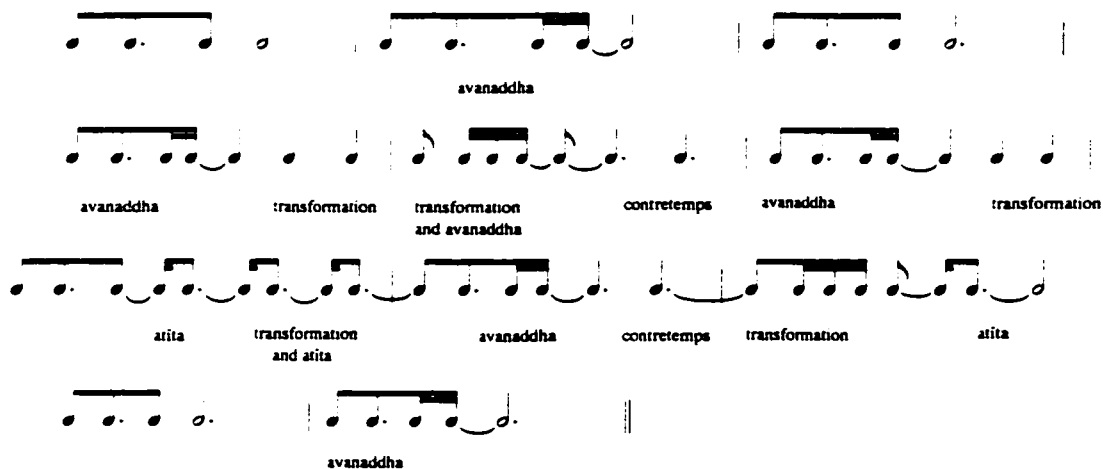


d) by combining: *transformation*, *contretemps*, *avanaddha*, *atīta*:



To facilitate the lecture, I will double the values: 

A combination of different rhythmic variants:



Hindu music utilizes three tempi: fast (*druta*), moderate (*madhya*), and slow (*vilambita*). The word "yati" indicates fluctuations of tempo. There are three "yatis" – equal (*sama*), accelerated or slowed (*srotogata*), variable, "the cat's tail" (*gopuccha*), and a mixture of accelerated and slowed.

In Hindu music singing is always improvised. It generally begins with a long prelude: *Âlâp* (exposed), in an extremely free rhythm. This prelude establishes the chosen melodic mode, as well as the relationships between the different notes and with the finale.

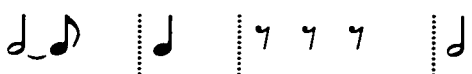
Here are a few song forms:

The *Dhrupad* begins with an *Alâp* sung on nonsense syllables. Then comes what is

called the sung poem, which is served exclusively by the notes of the chosen mode, and is accompanied by a rhythm that is also chosen, scanned by the drum (*Pakhâvaj*), and sustained by the *Tânpûrâ* (stringed instrument with a very long neck, resembling the Sitar, that hums a tonic-dominant pedal). The sung poem is divided into four parts: *Sthâyî* (which utilizes the bass and the first tetrachord of the mode), *Antara* (which utilizes the treble and the second tetrachord of the mode), *Samehari* (spread over three octaves), and *Abhoga* (which serves as the final part).

The *Dhamâr* is a *Dhrupad* sung on the *Dhamâr tâla*: rhythm at 14 mâtras, divides into 5 + 2 + 3 + 4:



attacks  (the attacks create a division of 5 + 5 + 4)

bols 
Kadh ghé ta dhi ta dha - gat ti ta ti ta ta

The *Tarânâ* (Northern India) or *Tellanâ* (Southern India) is related to the *Dhrupad*. It is a lively and light rhythmic song in which the poem is replaced by mnemonic syllables from the drum (*bols*) player.

The *Khyâl* is sung in ornamented style, with vocalises. Its divisions are the same as the first two parts of the *Dhrupad*: *Sthâyî*, *Antara*. It utilizes a great variety of rhythms.

The *tâlas* or rhythms can be played on several kinds of drums. The classic drum of India is the *Mridanga*. It is held horizontally on the knees, and played by striking each hand on the two skins, right and left. The *Pakhâvaj* is a big *Mridanga* from Bengal or Northern India. The *Tablâ* is a *Mridanga* divided into two instruments: a small straight drum on one side (or *Tablâ*, as it is properly called) – played by the right hand of the player – and a small kettledrum, played with the left hand, called a *Bâyâ* (which means left). The *Bâyâ* is lower and gives the exact *tâla*. The *Tablâ* is higher and expresses the rhythmic transformation and variations. It allows for a large variety of attacks – with the palm, with the wrist, with one or two straight fingers on the edge, on the skin, or in the center.

The *Damaru* is a small drum in the shape of an hourglass. It evokes the "tsutsumi" of the Japanese Noh. It is found in representations of the God Shiva creating the world through his cosmic dance. It can be found again in Tibet in its original form: two superimposed human skulls. Cymbals are used to accompany the dance. The cymbals used to mark the *tâlas* are the *Jhâlra* (medium size), the *Jhâng* (larger), the *Tâli* (all small, sharper, and with a crystalline sound).

1) General Overview

Hindu music has certainly gone the farthest in the rhythmic domain, especially where the quantitative order (combinations of long and short durations) is concerned. Hindu rhythms contain a refinement and an unequaled subtlety that leave our poor Western rhythms far behind with their isochronal measures and their perpetual divisions and multiplications by two (sometimes by three). The "*râga*" is a melody improvised on groupings of pre-established notes to which carefully catalogued modes and rhythms are applied, with all the possible ornamentations (*alamkâras*), and with all the possible rhythmic variants (substitutions, lengthening, shortening, transformations, permuted durations). The *râga* provides quite a concise idea of Hindu melodic and rhythmic technique. Except for a few instrumental pieces, it is generally sung with accompaniment from a percussion instrument. The singer and the player must both know the types of modes and rhythms perfectly. If the singer quickly changes the rhythm, the player must follow the change. If he does not, through lack of technique or knowledge, he commits a grave error, and all his assistance vanishes; it is destroyed. The rhythm is marked by his beating hands, by the cymbals he plays (*Kara-tâla*, *jhanjâ*, *jâlra*, *mandirâ*), and by the drum (*mridanga*, *mardala*, *khol*, *tablâ*).

Tâla This is the rhythm. Ancient India has known thousands of *tâlas*, all carefully defined, classed, and passed down by the oral tradition. Unfortunately, the majority of these rhythms have been lost: those who were taught have died, their descendants have forgotten... In a book entitled *Mridanga-Pravesika* (treatise on *Mridanga*, written by

Prosanna Kumar Saha Vanik), the author gives the list of 495 classic Hindu rhythms, to execute on the Mridanga (a long drum that is played with two hands, with the aid of the fingertips and the wrist, the right hand beating the smaller membrane, the left the larger). Alas! there are only the Sanskrit names or symbols of these 495 rhythms. The rhythmic notation is lost... and no one knows which combination of durations represents each one!...

By contrast, the tradition of gânas, metric formulas obtained by diverse combinations of short or long syllables, which began in the fifth century BC, has been admirably conserved. A large enough number of treatises on the music and rhythm of India is available to us, from the Nâtya-çâstra, of Bharata, (ca. fifth century BC) (last revision) (ca. fourth century AD) – to the Râga-Vibodha, written in 1608 by Soma-nâtha, – and includes the most important of all: the *Samgîta-Ratnâkara*, written by Çârngadeva, a poet-musician-rhythmicist-theorist from the eighth century AD. We find in the *Samgîta-Ratnâkara* the complete list of the 120 Deçî-Tâlas, or popular rhythms of India. These admirable rhythms, which I presume to be very old (they came about perhaps with the beginning of humanity) sufficed to nourish the rhythmic minds of all rhythmicists, past, present, and future! For the Hindus, music and rhythm are practiced in the paradise of Indra by geniuses (Gandharvas) and nymphs (Apsaras). Then the ascetics delivered this artistic treasure to ordinary men. No doubt the 120 Deçî-Tâlas are a part of the marvelous gift!... By adding the modern Karnâtic theory of seven tâlas (rhythms) and their five types (jâtis), to the gânas, and to the 120 Deçî-Tâlas, we will have a complete enough idea of the Hindu rhythmic system.




2) Rhythmic Notation of the Hindus

Tâla means *rhythm*. Tâla designates the cymbals that mark the rhythm. Tâla also designates the beats of the measure. When the measure is beat without noise, simply by hand and finger movements, the silent beat is called nihçabda. On the contrary, the rhythms can be marked by beating the hands, or by playing the cymbals or the drum. In the present


chapter, for the word *tâla*, I will always preserve its first and principal meaning – rhythm.

The unified value is called *Mâtrâ*. It sometimes represents the durations, and sometimes the average common value of all the rhythms. Following the slowness or rapidity of tempo (*laya*), and following any *accelerando* or *rallentando* affecting the established tempo (speed of execution or *yatis*), the *mâtrâ* is basically short or long. It can correspond to the blink of an eye (*nimesha*), to a pulsation, to the articulation of a short syllable; or to five blinks of the eye, to five pulsations, to the articulation of five short syllables; or even to the durations of four or six blinks of the eye, etc. In the 120 *Deçî-Tâlas*, (popular rhythms of India enumerated by *Çârṅgadeva*), the *mâtrâ* designates the unified value and always equals *one eighth-note* (or short duration).



Here are the different signs of duration used by the Hindus:




<i>laghu:</i>		equal to one eighth-note:	
<i>guru:</i>	S	equal to one quarter-note:	
<i>pluta:</i>	S [^]	equal to one dotted-quarter note:	


In addition to these classic symbols, the popular rhythms (*Deçî-Tâlas*) employ the *druta* (rapid) equaling half of one *laghu*.

<i>druta:</i>	O	equal to one sixteenth-note:	
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I must also add the sign of the *virâma*, an accent in the form of a crescent moon, which is placed above the other signs, and prolongs each duration for half of its value, exactly like our dot. Consequently:

<i>laghu</i> using the <i>virâma</i> :	^c	equal to one dotted-eighth note:	
<i>druta</i> using the <i>virâma</i> :	O ^c	equal to one dotted-sixteenth note:	

The *guru* is not used with *virâma*. Its dotted form already exists under the name *pluta* (S[^] = .) The *pluta* with *virâma* would be the equivalent of  plus 1/2, in other words, a value of nine sixteenth-notes:  It is not used.

The sign  in the form of pincers represents the number four and replaces | | | | = four laghu.

The sign  replaces | | = two laghu.



These two abbreviations are only used in the case of nihçabda, silent beat indicated by X.

The durations are then only sung, without percussion from the hands, cymbals, or drum.





















I translate  X using  | and  X using 

3) The Gânas

Here is what Joanny Grosset says, in her "histoire de la musique de l'Inde":³



"In the fashion of metricists, Hindu musicians are served by use of abbreviation, for the necessity of defining the eight syllables *ma, ya, ra, sa, ta, ja, bha, na*, that express eight groups of three durations each, and present all the possible combinations of these durations." The durations in question are the long and the short of the Greeks, indicated here by guru (S = ) and laghu (| = 

Here is the table for each rhythm, followed by the name of the equivalent Greek rhythm.

<i>ma</i>	S S S	  	Three longs – Greek molossus
<i>ya</i>	S S	  	One short, two longs – Greek bacchius
<i>ra</i>	S S	  	Long, short, long – Hindu Denkhî, Greek cretic or amphimacer – non-retrogradable
<i>sa</i>	S	 	Two shorts, one long – Greek anapest
<i>ta</i>	S S	  	Two longs, one short – Greek antibacchius
<i>ja</i>	S	  	Short, long, short – Greek amphibrach Non-retrogradable
<i>gha</i>	S	 	One long, two shorts – Greek dactyl
<i>na</i>			Three shorts – Greek tribrach

³History of the Music of India

















According to another tradition – a tradition that I learned of from my friend, the Hindu musician, Tarun Kumar Ghosal – these rhythms were found in India, in the fifth century BC, while assembling 10 syllables in all sorts of ways, short or long, called *gânas* (known as "numerales").

Here is the list of these *gânas*. I have indicated the corresponding duration under each syllable by means of a guru (S = ) or by a laghu (l = )













ia	ma	ta	ra	ja	bhâ	na	sa	la	ga
	S	S	S		S				S

All permutations are possible. Where applicable, the corresponding Greek rhythms are indicated.

1) By reading the syllables in groups of two or three, and by suppressing the intermediary syllable:

ia	ta	ma	ra	ta	ja	ra	bhâ	ja	na	bhâ	sa	na	la	sa	ga
	S	S	S	S		S	S			S					S
															
(iamb)		(spondee)		(trochee)		(spondee)		(pyrrhic)		(trochee)		(pyrrhic)		(iamb)	

2) By reading the syllables in groups of three, the eight formulas from the tradition cited by Grosset (see above) are retrieved:

ia	ma	ta	ma	ta	ra	ta	ra	ja	ra	ja	bhâ
	S	S	S	S	S	S	S		S		S
											
(bacchius)			(molossus)			(antibacchius)			(Hindu Denkhi, Greek amphimacer. Non-retrogradable)		

ja bhâ na S	bhâ na sa S S S	na sa la 	sa la ga S S
(Greek amphibrach. Non-retrogradable)	(dactyl)	(tribrach)	(anapest)

3) By reading the syllables in groups of four:

ia ma ta ra S S S	ma ta ra ja S S S	ta ra ja bhâ S S S	ra ja bhâ na S S	ja bhâ na sa S	bhâ na sa la S	na sa la ga S
(Epitrite I)	(Epitrite IV)	(Epitrite III)	(ditrochee)	(Peon II)	(Peon I)	(Peon IV)

4) Two groups of five syllables:

(Three longs surrounded by two shorts) ia ma ta ra ja S S S	(Three shorts surrounded by two longs: opposite of the preceding) bhâ na sa la ga S S
(rhythm of 8, non-retrogradable)	(rhythm of 7, non-retrogradable)

All these permutations were suggested to me by Tarun Kumar Ghosal. Here are some others, entirely of my own invention, but completely in the Hindu spirit:

5) In groups of six, going from extreme values to central values, and always returning to the central departure point:




ia ga ma la ja bhâ S S S	ma la ta sa ja bhâ S S S	ta sa ra na ja bhâ S S S
(rhythm of 9)	(rhythm of 9)	(identical to the preceding)

In his article "Sur la nature et la valeur des accents védiques,"⁴ professor Haug gives a

⁴"On the Nature and Value of Vedic Accents"



musical translation of the first verses of the "Atharva-Veda" (a collection of Vedic hymns, some dating from 2000 years before our era). He notates the poetic accents (spoken, rhythmic, and sung accents together) by dotting the long and short accented values. This creates an exact reproduction of the fashion in which professional cantors recite hymns.

This notation uses four durations:



- a) the long (guru: S or ) b) the short (laghu: | or )
- c) the dotted long (pluta: S[^]) d) the dotted short (laghu with virâma: |^c or )

By using these four durations, I obtain this last permutation:

- 6) Two groups of seven syllables, one forward, the other retrograde. By dotting the values of every other one, starting with the first value:

ia ma ta ra ja bhâ na		ga la sa na bhâ ja ra
^c S S [^] S ^c S ^c		S [^] ^c S [^] S [^]
		

The same thing but starting with the second value, every other one is dotted:

ia ma ta ra ja bhâ na		ga la sa na bhâ ja ra
S [^] S S [^] S [^]		S ^c ^c S ^c S
		

4) The Deçî-Tâlas

Çârngnadeva (Çrî-niççanka), son of Sothala and grandson of Bhâskara, descended from a noble family originally from Kashmir. His grandfather decided to search for fortune on the coast of Midi and emigrated to the province of Dékhan. It is there, at the court of King Singhana in Devagiri-nagara, that our author wrote *the Samgîta-Ratnâkara*. Now, the prince (Singhana) occupied the throne between 1210 and 1247 AD. Thus it is between these dates that the composition of Çârngnadeva's works occurred. (Joanny Grosset)

The *Samgîta-Ratnâkara* (translation: "Ocean of Music" or "Diamond Mine of Music")

includes seven books (adhyāyas). The fifth book entitled *Tāla* (rhythm) is entirely dedicated to rhythm. The table of 120 Deçī-Tālas, that I have reproduced herein, and discuss at length, is taken from this fifth book of the *Samgīta-Ratnākara*. My table of the 120 Deçī-Tālas according to the system of Çarṅgadeva is arranged as follows:

For each tāla: 1) its order number, 2) its Sanskrit name, 3) the English⁵ translation of the Sanskrit name, 4) an explanation of the poetic and religious symbols contained in this name, 5) the tāla itself in Hindu rhythmic notation, 6) a transcription in European notation, 7) the number of mātṛās that can theoretically divide the tāla, and 8) a musical and rhythmic analysis – when the beauty, importance, or refinement of the rhythm requires it – the announcement of a law, of a fundamental rhythmic principal, or of a rhythmic process founded by the Hindus.

The French translation of each Sanskrit name is by my friend *Tarun Kumar Ghosal*. Tarun Kumar Ghosal is a Hindu musician and theorist, an excellent tablā player (the tablās are two small drums or kettledrums, strapped to the player's waist and played with the hands), and an excellent improviser of rāgas. He is also a benefactor of the blind in Bengal.

The explanation of the poetic and religious symbols is entirely my own. To find it, I have read the works of Alain Daniélou and Jean Herbert on polytheism, mythology and Hindu spirituality, and certainly the commentaries of Shri Aurobindo on the "Upanishads" and the "Bhagavad-Gītā."⁶ These lectures have only influenced and guided me in the choice of this or that commentary. My vision of the hidden truths under the symbol remains then, in part, European, with no doubt, the few errors that it brings with it...



The tālas conform exactly to those of Çarṅgadeva. The transcription in European notation follow the durational correspondances between Hindu signs and European signs which I have given in the above list. It is then similar to that of Joanny Grosset in her

⁵I have amended Messiaen's original text only by substituting English for his French translation.

⁶According to *The American Heritage Dictionary*, both of these terms refer to sacred Hindu texts. Upanishad signifies "secret and sacred knowledge," and Bhagavad Gita signifies "The Song of the Blessed One." *The American Heritage Dictionary of the English Language*, ed. William Morris. Boston: Houghton Mifflin Co., 1981, s.v. Bhagavad Gita, Upanishad.

of Hindu rhythms without knowing it. But to retrieve these principles – as old as the world, unknown by Europeans, and sometimes forgotten by the Hindus themselves – I have had to study and practice the Deçî-Tâlas for a very long time. Excepting a few cases permitting several solutions or definitions, I hope to have penetrated the essence of each tâla, and I have made certain always to give a rational analysis, in relation to the detail and spirit of the rhythm. Here are the most important rhythmic principles that come from the study of the 120 Deçî-Tâlas, in order of entry – going from the first tâla to the 120th:

1) *The principle of adding a dot* All simple rhythms can be augmented by the addition of half to one of its values.

 A dot added to the final value:  (This is tâla no. 3: Tritîya).



 A dot added to the final value:  (This is tâla no. 18: Gajalîla).

2) *The principle of subtracting a dot* All rhythms with dotted values can be diminished by subtracting the dot or dots.

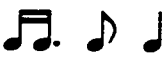

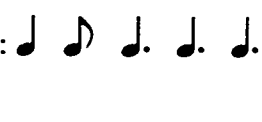
  subtraction of dots:  

3) *The principal of added values* All simple rhythms can be complicated by the addition of a short duration, or added value.

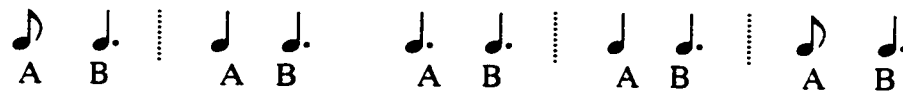
  Plus the added value:  (This is tâla 55^a: Manthikâ 1).

If we were to place the two parts of the preceding example end to end:  and add to it a short value:  we would have tâla no. 6, Nihçankalîla, which mixes the two principles: subtraction of the dot and added value. This last rhythm (Nihçankalîla) is also a rhythm of 11 eighth-notes, or a prime number rhythm.

4) *The principle of prime numbers* We know that prime numbers are whole numbers that can only be divided by themselves and by one, such as 3, 5, 7, 11, 17, 19, 23, etc. This confers on them a sort of power that is very effective in the domain of rhythm. Among the Hindus, there are rhythms based on the number five (the number of fingers on each hand), the number seven, the number 11, all prime numbers. We can also find the number 17, tâla

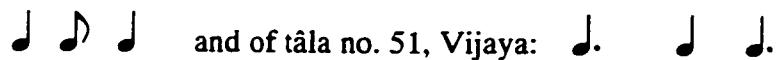
88 (Lakṣmīṇa):  equal to 17 thirty-second notes, prime number – the number 19, tāla no. 93 (Rāgavardhana):  equal to 19 thirty-second notes, a prime number. We can even find the number 37: tāla no. 106 (Laya):  which equals 37 sixteenth-notes.

5) *The principle of augmenting and diminishing a value over two notes.* ("expansion" and "contraction") This is tāla no. 27, Simhavikrīḍita:

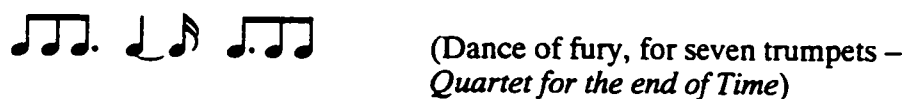


The values of A and B are perpetually alternating, but A increases and decreases in a perfect crescendo-decrescendo of durations, while B never changes. This principle is the principle of "the increasing and decreasing of a group of values over two notes," used by Stravinsky in the Sacred Dance from *Sacre du Printemps*. He also anticipates the "rhythmic character" of my *Turangalila-Symphonie*.

6) *The principle of non-retrogradable rhythms* Whether read from right to left or from left to right the values are the same. This is true for simple non-retrogradable rhythms at three values with identical extreme values and a free central value. This is the case of tāla no. 58, Denkhī:



For complex non-retrogradable rhythms (those with more than three values) it increases. Thus all rhythms which are divisible into two groups and which are retrogrades of each other and have a common central value, are non-retrogradable. I have frequently used complex non-retrogradable rhythms in my works. For example:

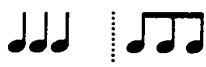



The Hindus hold to simple non-retrogradable rhythms.

The principle of non-retrogradation is of considerable importance. I cite first the old magic Papyrus from the "British Museum" where sorcerer's spells – Ablanatanalba-

Cramacamarç – can be read. Despite their slightly grotesque strangeness, they are nonetheless non-retrogradable words. Second, the mania of human architecture where we so often find non-retrogradable rhythms: and first all those cornices: broken, cut down, coiled so that they always present two inversely symmetric figures around a free central figure. Then those Assyrian capitals where two bull heads surround the column; and all those entirely non-retrogradable gothic cathedral facades. Third, the extraordinary construction of the human body that goes through an uninterrupted succession of non-retrogradable rhythms: the two ears on either side of the two eyes, which surround the nose, a free central value; the two hands (of which the fingers are in exact inverse symmetry) and the two arms that encircle the two breasts, or the two shoulders; not to mention the tree of the central nervous system with all its symmetrical branches to the right and left. Finally, the largest of all symbols, what we call God, where man extends his arms to the Crucifix. The sign of the Cross is a non-retrogradable rhythm. I will add to this one that is equally awesome – the moment I see, the thought that travels through me, the movement I make, the rhythm I execute – there is eternity before and eternity after: this is a non-retrogradable rhythm.

7) *The principle of rhythms immediately followed by their augmentation or diminution*

 The three eighth-notes are the diminution of the three quarter-notes. Or contrarily:


 The three quarter-notes are the augmentation of three eighth-notes: this is tâla no. 73: Vasanta.

8) *The principle of inexact augmentation or diminution* This principle consists of rhythms immediately followed by their augmentation or diminution, as in the preceding principle, but these are a little too long or a little too short, which creates a delicious asymmetry, a charming limp.

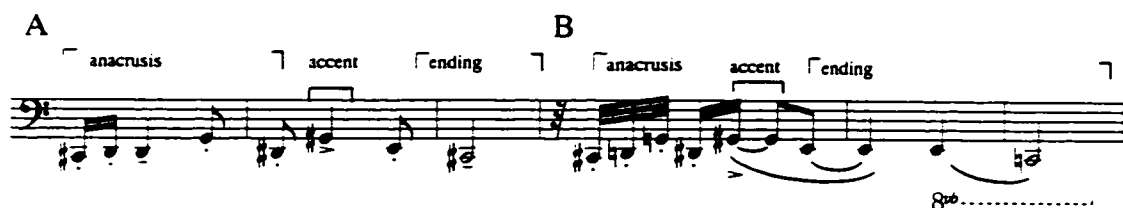
Tâla no. 88: Lakskmîça: OO^c | S



offers us a particularly savory example. B is the augmentation of A.


Normally, B would have to be: . Its last value is then too long for an eighth-note.

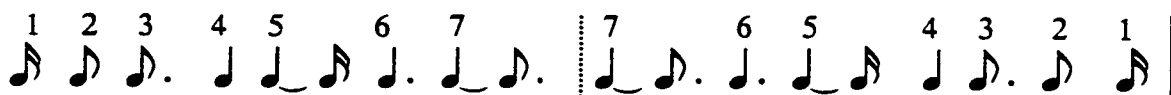
Comparing this to the extraordinary effect of "Brouillards" by Debussy (*Préludes pour piano*, 2d book):



In A, the theme. In B, the theme by inexact diminution, then by inexact augmentation. Diminution: quick anacrusis in very short values; accent with retreat of the 1/4. The quarter-note becomes a dotted-eighth note. Augmentation: the penultimate is changed from an eighth-note to a dotted-quarter note. It is repeated:






 (a total of five eighth-notes); the last one is identical.

9) *The principle of chromatic durations* In the face of "total chromaticism," established in the music of sounds by Schoenberg and his dodecaphonic serial works, chromaticism in the music of durations is addressed and is its indispensable complement. I am in large part responsible for the chromaticism of durations. But it existed already in an embryonic state. This is true in Hindu rhythms. Proof: *tâla* no. 118, *Râjamârtanda*:  which is a decrescendo of values. By taking the sixteenth-note as the unifying value, we come up with a more complete example of the chromatic range of ascending and descending durations:



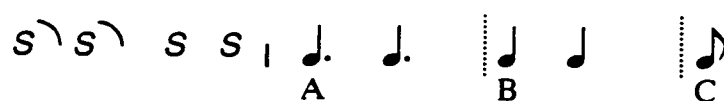
(The numbers for each duration indicate its possible division into sixteenth-notes.)

10) *The principle of disassociation and coagulation* Here again, we think of Schoenberg, Berg and Webern, but especially of Berg, who creates the different sections of a series simultaneously (with chords) or successively (with superimposed melodic lines). This

the alchemists adopted these two great words as a basis for their scientific experiences: to disassociate and to coagulate. Well before the alchemists, the Hindus could have predicted it. Tâla no.93: Râgavardhana:  is divided into two parts: A)  diminution of B)  However, the diminution of A is a little too long, by the addition of a dot:  According to B, it is *coagulated*, the three eighth-notes being united in a single duration:  |

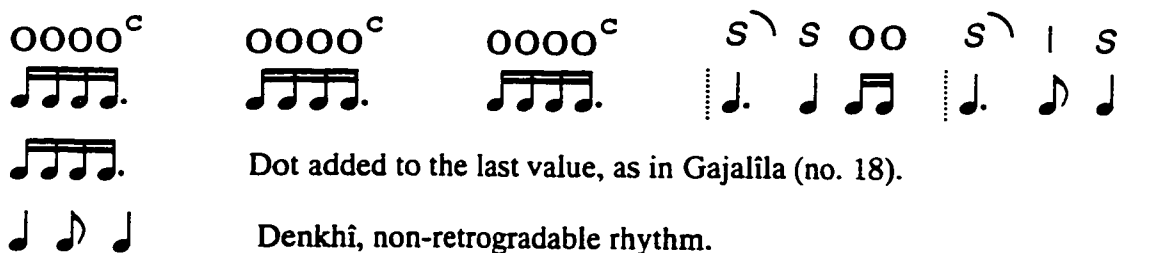
Disassociation or dissolution is the inverse process: a long duration is replaced by several short durations, having the same total value as the long. This is what I also call "transformation."

11) *Mixture of all the preceding precedents* Several tâlas offer us mixtures of the different aforementioned principles. Examples: tâla no.6, Nihçankalîla:

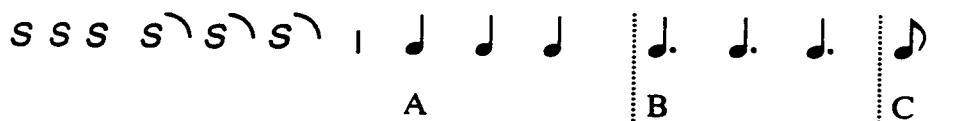


In B, removal of dot. In C, added value. Combined rhythm: chromaticism of durations, in accelerando, and a prime number (11 eighth-notes).

Tâla no. 26, Mirça varna:



Tâla no. 105, Candrakalâ:



Augmentation of A by adding a dot. C: added value.

Tâla no. 93, Râgavardhana:



This is one of the richest ones, because it uses five principles: a) diminution and augmentation placed end to end, b) disassociation and coagulation, c) inexact augmentation or diminution, d) addition of a dot, added value, added silence, and e) non-retrogradable rhythms. I will demonstrate further how all this exists by the power of Râgavardhana.

Before linking this to the table of 120 Deçî-Tâlas, a few hints for pronunciation of the Sanskrit name for each rhythm – valid indications for all the Sanskrit words contained in chapter 4. I have always written these words phonetically in accordance with the following conventions:

u = ou | Caturthaka is pronounced Tchatourthaka.

au = aou | Gaurî is pronounced Gaouri—

The circumflex (^) indicates a prolonged and accented vowel:

Lîlâ is pronounced Li—la—

c = tch | Candrakalâ is pronounced Tchanedrakala—

j = dj | Râjamârtanda is pronounced Ra—djama—rtaneda.

s = z | Sârasa is pronounced zâ—raza.

sh = French ch or English sh | Shattâla is pronounced Shattâ—leu.

In certain mutes, the a becomes an intermediary sound between e and a:

tâla is pronounced tâ—leu. [talø]⁸

gâna is pronounced gâ—neu. [ganø]

Finally: am = âme; an = âne; in = îne; om = ôme; un = oune.

In other words, vowel combinations with m and n are not nasalized but are pronounced as they are regularly. Consequently: Hamsalîla, Gajajhampa, Manthikâ, Turangalîla, Denkhî, Kuvindaka, Dombulî, Mukunda, are pronounced: Hame zalî—lâ—, Gadajjahamepa, Mane thikâ—, Touranegheulî—lâ—, Dhêneki—, Dômeboulî—, Moukouneda.

⁸Here Messiaen uses French vowels and vowel combinations to illustrate pronunciation. Since most of these vowels correspond to the International Phonetic Alphabet, I have provided IPA spellings only where discrepancies occur.

**TABLE OF 120 DEÇÎ-TÂLAS
(SYSTEM OF CÂRNGADEVA)**

TABLE OF THE 120 DEÇÎ-TÂLAS (SYSTEM OF ÇÂRNGÂDEVA)

5) Table Of The 120 Deçî-Tâlas According To The System Of Çârngadeva

1) *Aditâla* – translation: the root of the tâlas. In other words the first, the beginning, the initial rhythm, that engenders all the others. This is the unified value or mâtâra.

|  (one mâtâra: )

Aditâla is not a rhythm but a beginning. Our European rhythmic notation comes from the whole note which subdivides into the half note, quarter-note, eighth-note, sixteenth-note, etc. Hindu rhythmic notation comes from one short (ordinarily short): the laghu (which is confused here with the mâtâra or unified value). The word *Aditâla* means "root of tâlas." And this duration of the laghu is mentioned first, before all rhythms. The reason for this placement is certainly religious. A single event in the universe immediately creates a before and an after: time is born, but rhythm is not. If we add a second event to the first event, rhythm is born. And, in fact, all the tâlas that follow *Aditâla* are comprised of several events and will be tâlas, or rhythms. *Aditâla*, the unique laghu, the root of rhythm, is found "at the beginning." The Hindus are polytheists and pantheists. They do, however, recognize a pure, unique Being – a universal consciousness: the Self – a Brahman (or immensity), "any conceivable Thought of the mind, by which the thought is thought" (Kena Upanishad) – the sum *God*, what the Bhagavad Gîtâ calls *The Ultimate*. The Hindus even use the word Tri-mûrti to designate three principal gods: Brahmâ, Vishnu, Shiva. But they have not received the marvelous revelation from the Great Mystery of Christianity: the unique God in Nature and Three Persons, the Mystery of a single god: the Father, Son, and Holy Ghost. Their conception of the world's creation remains equally confused. However, in the *Aditâla*, the laghu, the unique root of all tâlas, one can see a



magnificent symbol of the causality of the First Principle, of God the Creator of all things. Creator of all things, including Time (we have seen that a unique event engenders Time). By taking notice of the fact that all rhythms are divisions of the time that exists before them, and that there is not really a before and after Time, since without Time, the before and the after would not exist, but that Eternity is totally separate from Time and the Created, God alone is eternal.


2) *Dvitiyai* – translation: the second.

○ ○ |  (2 mātrās: )

This is the Greek anapest.


3) *Tritiya* – translation: the third.

○ ○ ○^c  (one and 3/4 mātrā: )

The principle of adding a dot. Three druta, the third with virāma, or three semi-brevis, the last being dotted. This can also be thought of as a prime-number rhythm: seven quarters of a short duration ().

4) *Caturthaka* – translation: the fourth.

| | ○  (2 1/2 mātrās: )

Two laghu, one druta. Prime-number rhythm: five semi-brevis  . This is the Greek antibacchius.

5) *Pañcama* – translation: the fifth.

○ ○  (one mātrā: )

6) *Nihçankalīla*– translation: audacious, fearless game. The Sanskrit word *līla*, that we often find in the nomenclature of the Deçî-Tâlas, literally means the game: but the game in the sense of divine action in the cosmos, creation, life, movement, rhythm. Fearless, because it seems to gather its forces for an outburst...

S[`] S[`] S S |  (11 mātrās: 11 eighth-notes)

Two pluta, two guru, one laghu. Prime-number rhythm (11 short durations).

The principle of subtracting a dot: ♪. ♪. then ♪ ♪ plus an added value: the final eighth-note. The combined rhythm is an accelerando of durations.

7) *Darpana* – translation: the mirror.

○ ○ S ♪ ♪ (3 mâtṛās: ♪ ♪ ♪)

8) *Simhavikrama* – translation: the strength of the lion.

S S S | S ♪ S ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ (15 mâtṛās:
15 eighth-notes)

Combination of the fourth Greek Epitrite: ♪ ♪ ♪ ♪ and the Hindu Vijaya:
♪. ♪. ♪.

In other words, it is a rhythm of seven shorts, followed by a rhythm of eight shorts; the latter being heavily non-retrogradable, with its two dotted values surrounding the same value without the dot, like two pillars, symbols of strength.

9) *Ratilīla* – translation: the game of Rati. Rati is the wife of Kandarpa, god of Love.

| | S S ♪ ♪ ♪ (6 mâtṛās: 6 eighth-notes)

This is the Greek ionic minor.

10) *Simhalīla* – translation: game of the lion.

○ ○ ○ ♪ ♪ (1 1/2 mâtṛās: ♪ ♪)

11) *Kandarpa* – Kandarpa is the god of Love, as I have said. His other name is Kâma-deva: the god of desire.

○ ○ | S S ♪ ♪ ♪ (6 mâtṛās: 6 eighth-notes)

This rhythm is one variant of the preceding Ratalīla.

12) *Vīravikrama* – translation: the hero's strength. Warrior rhythm.

| ○ ○ S ♪ ♪ ♪ ♪ (4 mâtṛās: ♪ ♪ ♪ ♪)










13) *Ranga* – translation: the color, the game.

O O O O S  (4 mât-râs: )


14) *Çrîranga* – Çrîranga (Lord of color) is one of the names of Vishnu (or Vichnou, according to another phonetic orthography). We know that in Hindu mythology, one's personal God emanates from the divine Brahman, the ineffable One, and from his shakti or maternal power of manifestation: Ishvara. "Ishvara is subdivided according to specialization into three parts that form the great Hindu Trinity (trimûrti) of creation (Brahmâ), of conservation (Vishnu), and of destruction (Shiva – or Çiva)." (Herbert) From the trimûrti comes man, nature, and all the other gods.

| | S | S  (8 mât-râs: 8 eighth-notes)



This rhythm can be analyzed in four ways:

- a) one binary duration and two ternary durations: 
- b) an anapest () and an iamb with a long final duration ()
- c) the Greek Peon III () and a final dotted duration (), or 5 + 3 mât-râs, or
- d) arsis of two mât-râs (), thesis of two mât-râs (), then diminished arsis () and augmented thesis (), which seems to me to be the best explanation.

15) *Caccarî* – the caccarî is a percussion instrument from South India.

O O^c O O^c O O^c O O^c O O^c O O^c O O^c O O^c O O^c

 (10 mât-râs: 10 eighth-notes)

Druta and druta with virâma eight times in a row. This rhythm is slightly reminiscent of the Greek iambic tetrameter (eight iambs). Just as the iamb is a heart rhythm, this one seems to be of a physiological origin and is based – as are all the rhythms divisible by five – on the five fingers of the hand:

 =  This is also the principle of adding a dot: a

succession of 16 values with a dot added to all paired values.

16) *Pratyanga* – translation: body parts.

S S S | | ♪ ♪ ♪ ♪ (8 mât-râs: 8 eighth-notes)

(The 4 parts – 4 quarter-notes)

17) *Yatilagna* – translation: the right moment for stopping. Perhaps a rhythm-signal in an improvisation with two or more people, indicating the end of the improvisation?

O | (1 1/2 mât-râs: ♪♪)

Hindu Rati (♪ ♪) by diminution. Greek iamb.

18) *Gajalîla* – translation: the game of the elephant. The God Indra (the "enlightened mind") is represented seated on an elephant. We have already seen that lîla was the transcendent game, the action, the rhythm. Gajalîla with its last value being too long reproduces the heavy gait of the elephant? This last augmented value symbolizes the prolongation given to the mind through illumination?...

| | | |^c ♪♪♪. (4 1/2 mât-râs: ♪ ♪ ♪ ♪ ♪)

The fourth laghu is placed on top of the virâma: four equal values, the last being too long by one half: principal of adding a dot. In the sixth volume of *Mikrokosmos* by Béla Bartók, the fifth dance in Bulgarian rhythm is written in a measure of:

$\frac{2 + 2 + 2 + 3}{8} = \text{♪ ♪ ♪ ♪}$

This is the Gajalîla tâla.

19) *Hamsalîla* – translation: the game of the duck.

|^c |^c ♪. (3 mât-râs: ♪ ♪ ♪)

20) *Varnabhinna* – translation: different colors. Four durations of which three are different:

O O | S ♪♪ ♪ (4 mât-râs: ♪ ♪ ♪ ♪)


21) *Tribhinna* – translation: division into three. Because there are three different durations.

| S S[^] ♪ ♪ ♪. (6 mât-râs: 6 eighth-notes)

Each value equals one eighth-note more than the preceding one: a chromaticism of durations in crescendo (by augmentation).



22) *Râjacûdâmâni* – translation: King of Kings.

O O | | | O O | S  (8 mât-râs: 8 eighth-notes)

Transformation of: .

23) *Rangadyota* – translation: brilliant color.

S S S | S  (10 mât-râs: 10 eighth-notes)

Divisible into two binary metrons and two ternary metrons:  | Or better yet, into 7 + 3:  in other words, Greek Epitrite IV and dotted final duration.

24) *Rangapradîpaka* – translation: luminous color.


S S | S S  (10 mât-râs: 10 eighth-notes)


At 7 + 3 like the preceding, in other words, Greek Epitrite III and dotted final duration:



25) *Râjatâla* – translation: the king's rhythm.

S S  O O S | S  (12 mât-râs: 12 eighth-notes)


Three binary short durations and two ternary short durations ($\frac{3}{4} + \frac{6}{8}$):  or division of six into three and into two.


26) The three Deçî-Tâlas united under the number 26 are also under the sign of color (varna), color here being a temporal element, a division of the Duration. These divisions are chosen among the signs of durational values in Hindu rhythmic notation: laghu |, guru S, pluta S , druta O, plus the virâma ^c.

26^a) *Tryasra varna* – translation: three colors. These three colors are one laghu |, a druta O, and again one laghu |, each duration being repeated twice.



| | O O | |  (5 mâtṛās: 5 eighth-notes)


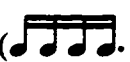

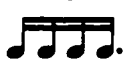
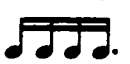
The Tryastra varna is non-retrogradable; it is a Greek amphimacer or a Hindu Denkhî:


 with transformation.

26^b) *Miçra varna* – translation: a mixture of colors. In effect, this rhythm – the most complete and the most complex, the most refined of the Deçî-Tâlas – mixes all the durations of Hindu rhythmic notation except for one. We find: laghu | , guru S , pluta S[^], druta O , and druta with virâma O^c. The only thing lacking is the laghu with virâma: |^c ()

Despite this absence, our Deçî-Tâla utilizes five different durations, with a virtuosity of which its sponsors have been conscious, a more unifying consciousness than our own since they have assimilated these durations of colors by naming it *Miçra varna*: a mixture of colors. This can be translated even more poetically: rainbow of durations.

OOOO^c OOOO^c OOOO^c S[^] S O O S | S total of 71  (prime number)
(17 3/4 mâtṛās: 17 eighth-notes, and 3/4 of an eighth-note or  represented here by the dots that follow each group of sixteenth-notes)

Analysis: 1) Gajalîla three times () by diminution () in other words a total of 27 thirty-second notes.    = 27 thirty-second notes. I have already said that Gajalîla utilizes the principle of adding a dot. Here, the dot is added to the fourth sixteenth-note of each group.

2) a rhythm of 11 eighth-notes by 6 + 5:  | The final fragment of five eighth-notes is non-retrogradable. This is the Greek amphimacer and the Hindu Denkhî.

26^c) *Caturasra varna*– translation: four colors. In other words four durations: guru, laghu, druta, and a new guru. The immediate repetition of the druta O O does not count. By contrast, the reprise of the guru S after the druta is valid, since it brings a change of color in the durations.

S I O O S

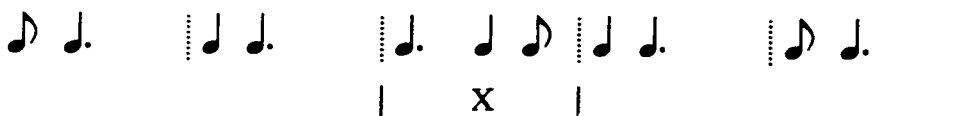


(6 matrâs: 6 eighth-notes)

27) *Simhavikrîdita* – translation: the lion's leap.

| ṣ ṣ ṣ ṣ ṣ | ṣ ṣ | ṣ (24 mǎtrás: 24 eighth-notes)











If we divide the rhythm as follows:



it seems evident that the X fragment has been transformed to avoid a unison duration:

♩. ♩. By re-establishing this unison duration – which is more rhythmically logical and simpler for the analysis – we obtain:




We notice right away that the rhythm is subdivided into two perpetually alternated values, A and B, but that A increases and decreases while B never changes. To augment from  to  then diminish from  to  ( |  |  . |  | ) in a crescendo-decrescendo of perfectly progressive durations. The trajectory described by the lion's leap is thus well expressed. As for value B, which stays unchangeably , it seems to represent a supreme point of altitude that can be attained at the summit of a certain curve and for only an instant. Is it a symbol of Krishna's grandeur?... We know that the lion (simha) has a mane (kesarin), and can reproach the long-haired (keshava) Krishna... (see the analysis of "l'incendie de la forêt"⁹ in the Mahābhārata, by Herbert). In any case, the rhythmic principle is clear: it consists of *the augmentation and diminution of one value over two notes*. Stravinsky has enlarged this principle in the sacred Dance from *Sacre du Printemps*, by transforming it into *augmentation and diminution of a group of values over two notes*. I have consciously used the same process, and have made it conform to the laws of theater under the name "*rhythmic characters*." The group in which the durations

9 "The Forest Fire"

increase is a character who acts, who moves another character. The group in which the durations decrease is a character who has acted, who is moved by the preceding. A third group of durations that is repeated verbatim is an immobile character, who observes the conflict and debates it with the other two without intervening. We can find a very striking example of the action of these rhythmic characters in "Joie du sang des étoiles,"¹⁰ the fifth movement of *Turangalila-Symphonie*.*

28) *Jaya* – translation: victory.

| S | | O O S  (9 mâtrias: 9 eighth-notes)

29) *Vanamâlî* – translation: "he who wears a garland of wild flowers." Vanamâlî is one of the names of Vishnu (Vichnou, god of conservation in the great Hindu Trinity or trimûrti: "he who assures the protection, the conservation, and the continuity of the cosmos, of the multiplicitous universe." (Herbert)

OOOO | OO S  (6 mâttrâs: 6 eighth-notes)


30) *Hamsanâda* – translation: the voice of the duck.

| S OO S  (8 mâttrâs: 8 eighth-notes)

31) *Simhanâda* – translation: the voice of the lion.

| S S | S  dochmiach rhythm
(8 mâttrâs: 8 eighth-notes)

Can be divided into 3 + 5:  (Rati and Denkhî for the Hindus,

iamb and amphimacer for the Greeks); or 5 + 3:  |

(bacchius and iamb for the Greeks, Kankâla vishama followed by Rati for the Hindus)

We can see there again two ternary metrons and one binary metron:  |

32) *Kudukka* – the kudukka is a percussion instrument from southern India.



O O | |  (3 mâttrâs: )

¹⁰"The Joy of the Blood of the Stars"


*See the analysis in Volume II.

33) *Turangalîla* – this word signifies perhaps the force of life and the creative power symbolized by the galoping horse, and is manifested in the game (lîla), in other words, by movement and rhythm? This would be creative rhythm?... I myself am not served by the Deçî-Tâla that it represents, and I have never thought that it was (although it has been said to be) the name of a woman or of a young lady. I have chosen it as the title for my work (*Turangalîla-Symphonie*) only because of its phonetic qualities. Properly pronounced (it must be: Tourânegheulî—lâ—), it is agreeable enough to the ear.

O^c O^c O O  (2 1/2 mâtrâs: )

Two dotted values () , followed by the same undotted values () . The principle of diminution by subtracting a dot. One can also see the opposition of three and two by which certain rhythmicists believe they can explain any quantitative combination.






( = values divisible by three  = values divisible by two)



Finally, this rhythm contains a total of 10 semi-brevis (10 )): a number equal to the fingers of both hands.

It is necessary to compare the *Turangalîla* tâla to the *Sama* tâla (no. 53), and the *Jhampâ* tâla (no. 76). Here is *Sama*:

| | O^c O^c 

Here is *Turangalîla*: O^c O^c O O  *Turangalîla* is *Sama* by diminution:




this diminution being the subtraction of one fourth for the first two values ( becomes ) , and subtraction of one third (or subtraction of the dot) for the last two values ( becomes ). Here is *Jhampâ*: O^c O^c |  |

Jhampâ is *Turangalîla* with coagulation of the last two values into one single value ( becomes )

I do not believe in the Zodiac and its influences. It has been said that being born on the 10th of December, I belong to the sign of Sagittarius, and that I have had the honor of taking part in this membership with Hector Berlioz and Rainer-Maria Rilke (my favorite

34) *Carabhalila* – translation: the passionate game, the swiftness of the game.

35) *Simhanandana* – translation: the lion's son. (30 mâtṛās: 30 eighth-notes)

The sign  in the form of pincers represents the number four; it is an abbreviation of  = four laghu. The sign X that follows it indicates the nihçabda, or soundless beating. The durations can be struck lightly on the cymbals, they can also be sung only, and accompanied with silent movements of the hand. This is the second case that has been signaled by  X.













iamb dotted iamb iamb transformed bacchius iamb dotted iamb dactyl final long



(7) (8) (7) (8)

313

also give us $6 \times 5 = 30$. The 35th tâla could then be called Shivanandana (the son of Shiva).

36) *Tribhângi* – translation: cut in three.

| S | S  (6 mâtrâs: 6 eighth-notes)

Divided into two iambs:  it contains two ternary groups, or 2×3 mâtrâs, which explain its name: "cut in three."

37) *Rangâbharana* – translation: to fill with colored water.

S S | | S  (9 mâtrâs: 9 eighth-notes)

One can see here a $\frac{3}{4}$ and a $\frac{3}{8}$  in other words, the reversal of

the Hindu Vasanta:  Another analysis: a measure of $\frac{4}{4}$ in which the

last time is too long by half, the principal of the final duration elongated by a dot? Third analysis: 4 mâtrâs + 5 mâtrâs:



38) Four Deçî-Tâlas fall under the name of mantha (churning of butter). The churning evokes, in particular, solemn memories. "The Ocean is the image of infinite and eternal existence." (Shrî Aurobindo) "From the original ocean of milk, from the Non-differentiated, the duality of the gods and demons emerges, churning all that can be objects of sensual or intellectual desire for man." (Herbert) With the lotus that gushes from Vishnu's (Vichnou) navel, the churning of the milky ocean is one of the most celebrated Hindu myths of Creation, or rather of the projection of the multiplicitous universe outside the Undifferentiated.

38a) *Mantha 1*–

S | | S  (8 mâtrâs: 8 eighth-notes)

38^b) *Mantha 2* –

S | | S ʌ X  (8 mâtṛās: 8 eighth-notes)

ʌ = new sign of abbreviation replacing two laghu. With nihçabda X, in other words silent beating.

38^c) *Mantha 3* –

S | | ʏ X  (8 mâtṛās: 8 eighth-notes)

38^d) *Mantha 4* –

| | | | S | |  (8 mâtṛās: 8 eighth-notes)

39) *Kokilâpriya* – translation: dear to the Indian coucou.

The Cuculines are very abundant in India. The kokila, or Indian coucou, is a black bird well-known to the Hindus. For them, its song has given birth to *pa* (sol), the fifth note of the scale.

S | S[˘]  (6 mâtṛās: 6 eighth-notes)

40) *Nihaârûka* – translation: the cloud, the fog.

| ^c | ^c  (3 mâtṛās: )

Identical to the Hamsalîla, no. 19.

41) *Râjavidyâdhara* – translation: the knowing king.


| S O O  (4 mâtṛās: 4 eighth-notes)

42) *Jayamangala* – translation: the benediction of victory.

| | S | | S  (4 mâtṛās: 8 eighth-notes)

These are two Greek anapests (anapestic dipody). The anapest – which seems so trivial now – was a powerful warrior rhythm for the Greeks. We can see right away the analogy between the ideas of combat and force, and the idea of victory, whether this victory is material or spiritual!...

43) *Mallikâmoda* – translation: jasmine scent. (The white jasmine is Vishnou's favorite flower.)

| | O O O O  (4 mâtrâs: 4 eighth-notes)


44) *Vijayânanda* – translation: the pleasure of victory (or the joy of victory).

| | S S S  (8 mâtrâs: 8 eighth-notes)

Greek anapest and spondee:  | As in Jauamangala, the idea of victory involves the use of the anapestic rhythm.


45) *Candarihsâruka* – translation: camphor scent.

O^c O^c  (1 1/2 mâtrâs : )

Nihaâruka (fog, cloud) and Hamsalîla (the game of the duck) contain two laghu with virâma: | ^c | ^c () Candanihsâruka, with its two druta provided by the virâma, is the exact diminution of it.

46) *Jayaçrî* – Jayaçrî is one of the names of Lakshmî. Lakshmî is the goddess of opulence, beauty, and harmony. Lakshmî is Vishnou's shakti (or power of manifestation). Jayaçrî means: "the beauty of victory."

S | S | S  (8 mâtrâs: 8 eighth-notes)


Diverse analyses: two Greek trochees and one final duration: 

One long anacrusis and two iambs:  | A kind of Greek dochmius, 3 + 5:  | or the opposite, 5 + 3:  |


47) *Makaranda* – translation: pollen.

O O | | |  (4 mâtrâs: 4 eighth-notes)

This is Vijayânanda by diminution. It can be divided differently and thought of as two

semi-brevis forming an anacrusis, and three shorts: 

48) *Kîrti* – is translated as reputation.

| S[~] S | S[~]  ternary dochmiach
(10 mâtrâs: 10 eighth-notes)

arsis:  | thesis:  | lengthened arsis:   | thesis:  |

Another analysis: two binary metrons:   | two ternary metrons:    |



49) *Çrikîrti* – means: marvelous reputation.

| | S S    (6 mâtrâs: 6 eighth-notes)

Greek ionic minor. The two guru are the augmentation of the two laghu. (The same as Ratilîla, no. 9)

50) *Pratilâla* – translation: the echo of rhythm.




| O O   (2 mâtrâs:  )




To respond to its name, this tâla must perhaps be executed with a decrescendo of intensities?  

f p pp

51) *Vijaua* – translation: victory.

S  S S    (8 mâtrâs: 8 eighth-notes)

Two pluta surround a guru, or two dotted values surround the same undotted value. This is a *non-retrogradable rhythm*. A simple non-retrogradable like the Hindu Denkhî (S | S   ), with two similar values to the right and left, and one central free value. Under this heading, it makes me think of the anjali: "a movement of respectful salutation that is made by lifting two cupped hands." (Herbert) In this movement, the fingers of both hands, which are presented inversely, are the two extreme values. The palms, drawn closely together through (around) the back, are the central value. In the sixth volume of *Mikrokosmos* for piano by Béla Bartók, the fourth "Dance in Bulgarian Rhythm" is written in a measure of:

$\frac{3 + 2 + 3}{8} =$    | This is Vijaya, original form. Non-

retrogradable rhythms can develop in one of two ways: by enlarging or diminishing the extreme values or groups of extreme values symmetrically from right to left, or by

enlarging or diminishing the central value or the group of central values. We find in Igor Stravinsky's *Sacre du Printemps* (muted trumpets at the beginning of the second part: "Nuit"), the Vijaya rhythm with augmentation of the central value:



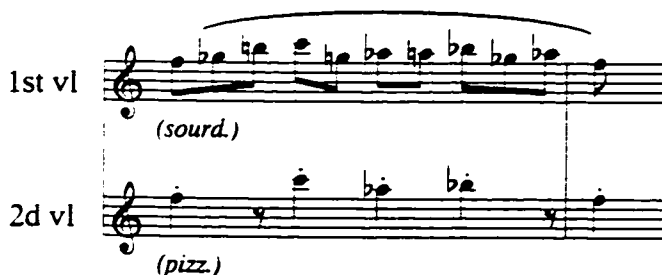
If the second trumpet makes the Russian melodic cadence heard, transformed and "Debussy-ized," the first trumpet executes a chromaticism which has returned from an inexpressible nostalgia, on the Vijaya rhythm, first with two quarter-notes in the center:



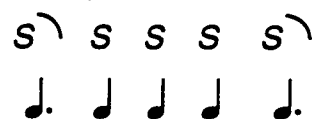
By putting the original and the two augmentations used by Stravinsky end to end, we obtain three forms, all non-retrogradable:



The second form has been utilized by Bartók in the scherzo trio of his fifth string quartet:



The third form is a very well-known classical Hindu rhythm, that goes by the name of Sampakkeshâtâka:

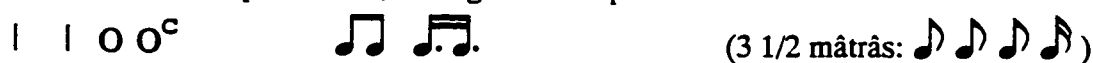


52) Bindumâlî –








(6 mâtrâs: 6 eighth-notes)

53) *Sama* – translation: equality. Why equality? Could it be because these durations are repeated twice? Two equal values, and again two equal values?...









(3 1/2 mâtrâs:)

Two laghu, two druta with virâma, divided as follows: a) two eighth-notes

b)  diminution of two eighth-notes. The eighth-notes equals four , minus a quarter (1 ) it remains . (3 ). Thus it consists of a diminution through subtracting a quarter of its value.

First principle: rhythm immediately followed by its diminution. Second principle: diminution by subtracting one quarter of the value. If we repeat this Deçî-Tâla several times successively, we have:

a)  b)  diminution of  by subtracting 1/4 of the value.
a)  augmentation of  by addition of 1/3 the value. b)  diminution, etc.

54) *Nandana* – translation: the infant, he who gives joy. "The infant is, for the Hindu woman, the crowning of her life...The first Hindu sacrament exists to sanctify conception in advance." (Herbert)

| O O S    (5 mâtrâs: )










This tâla is based on the number five, the number of fingers on each hand. His hand is the infant's first toy, and it is on his hand that he later learns numbers...

55) Two Deçî-Tâlas unite under the name of Manthikâ. Manthikâ means: he who churns butter. The churning of the ocean of primitive milk, symbol of Creation, represents for the Hindus "the projection of the multiplicitous universe outside the Undifferentiated."

(Herbert) This is the passage of the One to the many, of the Absolute (Brahman) to his manifestation.

55a) *Manthikâ 1* –

S O S    (5 1/2 mâtrâs: )

Guru, druta, pluta. Tâla of 5 1/2 mâtrâs, in other words, of 11 semi-brevis (11 ). We can see here an arsis () , with anticipation of the thesis () , and a long thesis (). Or a rhythm of five (in 2  + 3 ), with the  = an added value, or a rhythm of 11 (5  + 6 ).

left, the apparatus between the two. Similarly, here the laghu is placed between the two guru. Our tâla perhaps also reproduces the movement of the apparatus caused by the two women during the shelling.

S | S  (5 mâtrâs: 5 eighth-notes)

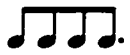
This rhythm is *non-retrogradable*: whether it is read from left to right or from right to left, the order of its values remains the same. We find it among the Greeks under the name of amphimacer (or cretic):

— u — 

It is doubtlessly very old, like all the rhythms based on the number five, the number of fingers on the hand. The Denkhî (I repeat with conviction) is the oldest, the simplest and the most natural of the non-retrogradable rhythms.

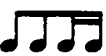

59) *Vishama* – this means what is not equal, what is not sama.

OOOOC OOOOC  (4 1/2 mâtrâs: )

The addition of the dot to the final durations of each group of sixteenth-notes, does not allow this tâla to have equal values. This is the Gajalîla rhythm: | | | |^c  by diminution, and repeated twice.

60) *Varnamanthikâ* – translation: analysis of color.

| | OO | OO  (5 mâtrâs: 5 eighth-notes)



Abridged repetition: a)  b)  repetition of a) minus one eighth-note. This process of decreasing repetition brings to mind Stravinsky and rhythmic characters.

61) *Abhinanda* – means: congratulations.

| | OO S  (5 mâtrâ: 5 eighth-notes)



62) *Ananga* – this is the god of Love.

| S[^] | | S  (8 mâtrâs: 8 eighth-notes)

Elongated iamb:  and Greek anapest: 





63) *Nândî* – translation: guardian of Shiva's door. (Shiva is the god of destruction, who destroys the multiplicitous world to return us to the Absolute, to Unity. He is the third named in the trimûrti, the great Hindu Trinity. It is in the same sense of unification that the divine Krishna speaks of in the Bhagavad-Gîtâ, saying: "I am the Spirit of Time, destroyer of the world." This means, comments Shri Aurobindo, "I have to destroy the old structures and build a new, powerful and splendid kingdom." He who guards Shiva's door is then very close to destruction, to the One, to the light...)

| OO | | S S  (8 mâtrâs: 8 eighth-notes)

This is the same chromaticism of durations (each duration being repeated twice) as in *Dîpaka* (he who lights the fire):  with an added laghu (). Does this added laghu represent the door? In any case, there is an evident rapport between Shiva and Agni (fire): fire consumes, fire illuminates, and we go toward increasingly longer durations, and toward an increasingly larger light...

64) *Mallatâla* – translation: difficult rhythm. *Tâla*: signifies rhythm; *Malla*: signifies struggle. Contrary to its name, this rhythm, which is perhaps difficult for Westerners, is not for the Hindus.

| | | | OO^c  (5 1/4 mâtrâs: )

A rhythm of five eighth-notes, with the addition of a quarter of the last eighth-note: 
This final duration of 5 , transformed into 2 + 3: . The total rhythm equals 21 

65) Four *Deçî-Tâlas* unite under the name of *Kankâla*. *Kankâla* means skeleton.

Figuratively, it is also the God Shiva.

The four *Deçî-Tâlas* have five mâtrâs because five is the number of Shiva. It is necessary to take *Kankâla* here in the sense of: resignation.


65a) *Kankâla pûrna* – translation: complete resignation.

O O S |  (5 mâtrâs: 5 eighth-notes)

65^b) *Kankâla khanda* – translation: partial resignation.

OO S S  (5 mâtrâs: 5 eighth-notes)

65^c) *Kankâla sama* – translation: equal resignation.

S S |  (5 mâtrâs: 5 eighth-notes)

Greek antibacchius.

65^d) *Kankâla vishama* – translation: unequal resignation.

| S S  (5 mâtrâs : 5 eighth-notes)

Retrograde of the preceding. Greek bacchius.

It consists, no doubt, of the acceptance of destruction (skeleton, Shiva). Kankâlas a and c, equal or complete acceptance, rejoin the unity by ending with a laghu = one mâtrâ or unified value. Kankâlas b and d, unequal or partial acceptance, end with a guru.

66) *Kanduka* – translation: inconstancy, change – like a ball that is thrown in all directions.

| | | | S  (6 mâtrâs: 6 eighth-notes)

Does not respond at all to its symbol. Perhaps it must be used with numerous variants?...

67) *Ekatâli* – translation: one duration. This is the (rapid) druta that equals one half of the unified value or mâtrâ.

O  (1/2 mâtrâ: )

68) *Kumuda* – "The white flower that blooms in ponds, in the moonlight" (the water lily).

68^a) *Kumuda 1* –


| OO | | S  (6 mâtrâs: 6 eighth-notes)

68^b) *Kumuda 2* –

| OOOO S  (5 mâtrâs: 5 eighth-notes)

69) *Castustâla* – translation: tâla of four durations. There are certainly four: one guru and three druta.

S OOO  (3 1/2 mâtârs: )

Rhythm of 7 , divided into 4 + 3.

70) *Dombulî* – ambiguous translation. Perhaps it consists of the dumbaru or damaru: percussion instrument shaken by Shiva's hand when he danced the dance of creation? It is exactly the same tâla (two laghu with virâma) as Nihoâruka (cloud, fog).

|^c |^c  (3 mâtârs: )

71) *Abhanga* –

| S[^]  (4 mâtârs: )






A long iamb, lengthened by a dot.



72) *Râyavankola* –


S | S OO  (6 mâtârs: 6 eighth-notes)

73) *Vasanta* – translation: Springtime.


| | | S S S  (9 mâtârs: 9 eighth-notes)

Principle: a rhythm immediately followed by its augmentation. If we repeat this rhythm several times: a)  | b)  | c)  | d)  | we have: in a), three eighth-notes ; in b), three quarter-notes, augmentation of the three eighth-notes; in c), three eighth-notes, diminution of the three quarter-notes, and so on. In J. S. Bach there are canons where augmentation and diminution are superimposed; here, they are placed end to end. This rhythm – of infantile simplicity for a rhythmicist – presents a certain difficulty for European players that usually presents itself as the following error: lengthening of the three long durations, as in a $\frac{12}{8}$ , or irrationalization of the three short durations, as in a $\frac{4}{4}$ with an eighth-note triplet:

 which returns to the same.


Here is a passage of *L'Histoire du soldat* by Stravinsky ("petit concert," rehearsal number 20) in which the clarinet plays a reversed "Vasanta." 

Unfortunately, the effect of the "Vasanta" is destroyed, in part by the transformation of this rhythm, in part by the isochronal rhythms that accompany it.



Stravinsky, *L'Histoire du soldat*

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74) *Laghuçekhara* – translation: light crown.





 (1 1/2 mâtârs: )

75) *Pratâpaçekhara* – translation: the force which emanates from the brain, intellectual power. "Indra," says Shri Aurobindo, "is Mental power."






 (4 1/2 mâtârs: )







Pluta, two druta, the second druta with virâma – in other words a dotted long duration, two semi-brevis, with added dot to the second half. Or, as the division of mâtârs indicates, measure of four metrons with one quarter of a duration added. Does this added quarter represent the illumination of mental capacity, this prolongation of intelligence that takes

consciousness to the yogi of the divine Self? "As the light of a lamp in a windless spot, thus is mastered consciousness," says Bhagavad Gîtâ. Pratâpaçekhara is a rhythm with a total of 8  and 1 , then a prime number (a total of 17 ).

76) *Jhampâ* – translation: the jump.

O^c O^c | . . (2 1/2 mâtrâs:     )

The eighth-note represents an added third in relation to the preceding duration.


( = 3  | . +  = ). Jhampa equals a total of 10 , by 3 + 3 + 4.








77) *Gajajhampa* – translation: jump of the elephant.

The image of an elephant that jumps is also comical for a Westerner. For the Hindus, it is a very clear symbol. The elephant is a figure of the manifestation of physical strength.

In a Hindu myth, the world is represented as being sustained by four elephants, who are resting on four tortoises, who are posed on who knows what. This is a clear symbol that the world is maintained by apparent physical strength (the elephants), by secret strength (the tortoise who retires into its shell), and by the ineffable, the Brahman. (Herbert)

The jump of the elephant reminds me of the terrible episode from Rudyard Kipling's *Second Jungle Book* where the elephant Hathi, followed by her three sons, trampled an entire village.

S OOO^c  . (3 3/4 mâtrâs:      )





This is Catustâla:   with the addition of a dot to the last sixteenth-note. Because of the added dot, this rhythm is the exact mid-point between 7  and 8  | Its total is 7 semi-brevis () and one quarter of a short duration () , in other words, 15  .

78) *Caturmukha* – translation: having four faces (like Brahmâ).

There are, in fact, four durations: laghu, guru, laghu, pluta.

| S | S[˘]    . (7 mâtrâs: 7 eighth-notes)

Rhythm of seven eighth-notes (prime number) divides unequally into two iambs:

  |  . | the long of the second iamb being lengthened by the addition of a dot.

79) *Madana* – god of Love.

OO S  (3 mât-râs: 3 eighth-notes)


80) *Pratimanthaka* – translation: to churn again.

I I S S I I  (8 mât-râs: 8 eighth-notes)




Non-retrogradable (The middle is the augmentation of the extremes.)

81) *Pârvatilocana* – same rhythm as Simhavikrama (taken in the same sense as Shiva) with transformation – translation: the eyes of Pârvatî. The white Pârvatî, goddess and daughter of Himâlâya, is the Shiva's shakti (his power of manifestation).

S S S I S S OO  (15 mât-râs: 15 eighth-notes)





Tâla of 15 mât-râs, or rhythm of 15 eighth-notes, by 2 x 7 eighth-notes + 2 semi-brevis (2 ) added on:



The first rhythm of 7  is the Greek Epitrite IV. The second rhythm of 7  is Epitrite II () with fusion of the long and short durations into one dotted value at the beginning.

82) *Rati* – translation: love. (We have already seen the tâla Ratilîla, that Rati is the wife of Kandarpa or Kâma-deva, god of Love.)


I S  (3 mât-râs: )




This is the Greek iamb:  The iambic rhythm imitates the human heartbeat, if each beat is divided as follows: contraction =  , sustain. =  , rest =  . Now, the heart is the symbol of love.

83) *Lîlâ* – translation: the divine game. Lîlâ is one of the most important Sanskrit words in the cosmic and musical dictionary of India. Lîlâ is action, movement, rhythm. The game of the Mother, of the fundamental shakti, is Lîlâ: "it is the expression of complete dynamic

abundance." (Shrî Aurobindo) Lîlâ is the synthesis of calm and dance. It is the great Rhythm, with a capital R. It is the most beautiful definition of music.

O | S  (4 1/2 mâtrâs: )


This can be divided into three semi-brevis, or three shorts: 

(Same principle as Vasanta:  Or iamb:  (the beating of the heart, love, life) and dotted long duration or ternary:  (rest, perfection).


84) *Karanayati* – translation: the silent tâla. In classical Indian rhythms, the measure is indicated by hand movements and by clapping. In popular rhythms (Deçî-Tâlas), the durations are marked by the cymbals (kara-tâlas, jâlrâs, etc.). The noiseless beating (hand movements) is called nihçabda. Here, the singer executes four druta; the cymbals stop during one duration of two mâtrâs.

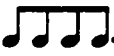
O O O O  (2 mâtrâ: )

85) *Latila* – translation: sweet, refined. (the same as Varnabhinna no. 20)

O O | S  (4 mâtrâs: 4 eighth-notes)

86) *Gârugi* – ambiguous translation. Perhaps it consists of garuda, the bird that carries Vishnou?

O O O O ^c  (2 1/2 mâtrâs: )

As in Vishama and in Miçra varna, this is Gajalîla () by diminution. Principle: addition of a dot to the final value.

87) *Râjanârâyana* – translation: the king of kings.

O O | S | S  (7 mâtrâs: 7 eighth-notes)

Rhythm of seven. Divided as follows: anacrusis:  | two iambs  |

Or even: Dvitîya (Greek anapest by diminution): 

and Denkhî (Greek amphimacer):  |

88) *Lakṣmīṇā* – translation: calm, peaceful, like *the peace* of the goddess Lakshmi, like *the peace which descends* from the goddess Lakshmi. Lakshmi, Vishnou's shakti (his wife and his power of manifestation), "mistress of the delicate harmony and rhythm of the universe, represents opulence and beauty." (Herbert) "Lakshmi teaches rhythm to energy and strength – rhythm that keeps the power of their acts harmonious and measured – and projects charm onto perfection which makes her last forever." (Shri Aurobindo)

O O^c | S ♪. ♪ ♪ (4 1/2 mātrās: ♪ ♪ ♪ ♪ ♪)

Principle of *inexact augmentation*. This rhythm divides into two fragments, A and B.



B is the augmentation of A. Normally, B should be: ♪. | Its last value is then too long for an eighth-note: *inexact augmentation*. A is an anticipated arsis; B a weakened thesis.

The inexact augmentation (too long) of B, gives this rhythm a languorous quality, a particular nonchalance. In A (♪.) we have five quarters of a short duration (♪), in B (♪ ♪) six semi-brevis (♪). This rhythm is the exact mid-point between 8 ♪ and 9 ♪, in other words, 17 ♪ (prime number). Lakṣmīṇā possesses this androgynous, sublime and smiling grace to the highest degree which is one of the charms of the Orient. This is perhaps the most noble, the most elevated of all the Deçî-Tâlas. It is also the most exquisite.

89) *Lalitapriya* – translation: very dear, very loved.

| | S | S[^] ♪ ♪ ♪ (7 mātrās: 7 eighth-notes)

This resembles the third Greek epitrite: ♪ ♪ ♪ ♪ |

90) *Crinandana* – translation: the son of the goddess Lakshmi, the favored child of the goddess of prosperity. (Shri or "beauty" is one of the names of Lakshmi.)

S | | S[^] ♪ ♪ ♪ (7 mātrās: 7 eighth-notes)

A rhythm of three quarter-notes, with a dot added to the third note.

91) *Janaka* – translation: the father.



A rhythm of seven longs (♩). The shorts and the longs are arranged in alternating groups, and in decreasing numbers: four shorts, three longs, two shorts, one long.

92) *Vardhana* – augmentation.



A rhythm of five eighth-notes. Perhaps it is called Vardhana (augmentation) because its durations increase in length? This is a crescendo of values, the last value being much longer than the others.





93) *Râgavardhana* – translation: the rhythm that gives the most life to the rāga. (The rāga, profane melody, has succeeded at the jâti, a religious classical melody. The rāgas are schematic melodic formulas, destined to become points of departure for multiple sung variations. The number of rāgas is considerable. The *Nârada-Samvâda* and the *Samgîta-Nârâyana* tell us that "the gopīs or shepherds of Mathurâ, charmed by the melodious sounds of Krishna's flute, followed him in quantities of 16,000, and that thus 16,000 melody-types were born, each corresponding to a particular rāga, to try to capture the heart of a divine shepherd with its song." (Grosset) As for possible variations of the rāga, by process of ornamentation (alamkāra), they are practically infinite. One can easily see the importance of a rhythm, which is said more than any other, to give life to the rāga.)




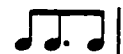
Three druta, the second with virâma, and one pluta. Three sixteenth-notes: and three eighth-notes which are the augmentation of the three sixteenth-notes:




principle of diminution and augmentation placed end to end, as in Vasanta ()



But the three eighth-notes are coagulated, united in one dotted-quarter note: *Principle of coagulation* or union, by opposition to *disassociation* or dissolution which is the inverse





process: one long duration being replaced by several shorts that have the same total value (disassociate and coagulate were two important words from the Alchemists). In addition, the initial diminution (it is diminution in relation to the supposed augmentation that will follow it):  contains one dotted-sixteenth note. It is then an inexact diminution: *principle of inexact diminution*, and *principle of adding a dot*. Finally:  is exactly the opposite of Vijaya (): two simple values surrounding the same dotted value. And:  is a *non-retrogradable rhythm*, whether it is read from left to right or from right to left, the order of its values remains the same: *principle of non-retrogradable rhythms*. To summarize, we have in Râgavardhana – and this demonstrates the importance of this rhythm – five rhythmic principles: a) principle of diminution and augmentation placed end to end; b) principle of coagulation or union, and disassociation or dissolution; c) principle of inexact diminution (or of augmentation); d) principle of adding a dot (also the added value and even the added silence); and e) principle of non-retrogradation or of non-retrogradable rhythms. All this, though not clearly stated, exists in the power of Râgavardhana, and makes of this tâla a mine rich with rhythms to exploit. I have often used the Râgavardhana in augmented, inverse and changed form:


 | augmented:   | inverse:   |



by transforming the dotted-half note into three quarter-notes:   |

This form is simple to execute and makes the rhythmic principles more sensible. It remains a little cowardly when faced with the original form which is at once more refined and more powerful according to this hermaphroditic, androgynous character so typical of oriental art. Other analyses of the original form can also be found, for instance: 19  by 7  + 12  : or even two small iambs – the first with one diminished long by subtraction of a fourth:

short =  | long =  |


  |  .

000000  (3 mãtrâs: 3 eighth-notes)

ooo^c  (1 3/4 mǎtrâs: )



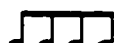
1 1^c (2 1/2 mátrás:)

| s[~] ♪ ♪. (4 mât-râs: 4 eighth-notes)

S **oo** **s**  (6 mǎtrâs: 6 eighth-notes)

| | | | (4 matrâs: 4 eighth-notes)

The elephant is the manifestation of physical strength. Its four heavy feet and its heavy and powerful gait are represented by four durations. This is the case in all the Deçî-Tâlas where the elephant is in question:

Gajalîla (), Gajajhampa (), Gaja ().

100) *Varnayati* – translation: cessation of melody.





| |    (3 mâtrâs: 3 eighth-notes)

101) *Simha* – translation: the lion.

|  | | |  (4 1/2 mâtrâs: )

Rhythm of 9  This can be thought of as Vasanta by diminution:

Vasanta:  Simha =  |

And this would then be diminution () and augmentation () placed end to end. A better analysis: four laghu () with one added value (the druta or ).

The principle of the added value Just as with the Greek epitrites, the added value can be displaced for up to a total of five formulas:

a)  b)  c)  d) 
e) 

102) *Karuna* – translation: pathetic.

S  (2 mâtrâs: )

103) *Sârasa* – translation: stork.


|   | |  (4 1/2 mâtrâs: )

At nine sixteenth-notes. It contains augmentation () and diminution (),



but the three sixteenth-notes are interpolated:  |

Another possible interpolation:  |

104) *Candatâla* – translation: the rhythm of the moon.

OOO | |  (3 1/2 mâtrâs: )




For the Hindus, Chandra (the moon) personifies sweetness. Here, it is a question of its rhythm.

Candatâla is a rhythm of 7 , divided into 3 + 4:  but it contains two groups of different values: one group of three druta, one group of two laghu. This division into two perhaps symbolizes the two revolutions of the moon: "its sidereal revolution (time that elapses between two successive conjunctions of the moon with the same star)... and its synodic revolution (time that elapses between two consecutive conjunctions of the moon and of the sun or the interval that separates two new moons)." (Théo Varlet)

105) *Candrakalâ* – translation: the beauty of the moon.

S S S S[^] S[^] S[^] |  (16 mâtrâs: 16 eighth-notes)

Again three different groups of values: consists of the three phases of the moon?

First quarter (, full moon (, last quarter () ?... Or does it consist of the trio: earth, sun, moon (in this order)? We know that earth-moon forms "a couple on which the sun acts, that constitutes the famous problem of the three bodies." (Théo Varlet)... In any case, these astronomical explanations give us the correct division of Candrakalâ:



The three dotted-quarter notes are the augmentation of the three quarter-notes: augmentation by addition of a dot. The final eighth-note is an added value. Two principles: *the principle of augmentation by addition of a dot; and the principle of the added value.*

106) *Laya* – Laya is quick or slow movement. This term corresponds to the Italian word: tempo. In Hindu rhythm and music, there are three types of layas or three tempi: 1) fast

(druta), not to be confused with the sign of duration by the same name; 2) medium (madhya); and 3) slow (vilambita). These three tempi correspond approximately to our allegro, moderato, and lento. For each of them there are three nuances of speed: just as our fast movement can be allegro, presto, or prestissimo – just as our moderate movement can be andante, moderato, or allegretto – and just as our slow movement can be largo, lento, or adagio. To this must be added three alterations of movement, corresponding to our accelerando and rallentando, which are called yatis. The three yatis are: 1) samâ (equal) – the rate does not change; 2) srotoratâ (at the speed of a torrent) – continuous stringendo, evolving from slow to moderate, then to fast; and 3) gopucchâ (cow's tail) – progressive ritenuto, going from fast to moderate, then to slow.



It is curious enough to see a rhythm called laya (tempo). The tempo is a certain general speed, which changes nothing in relation to the difference between durations. The word laya here must precisely refer to the difference between durations. We have, in effect, in this tâla, four different durations:

guru (), laghu (), pluta (), druta ().

Laya can be divided as follows:



B is the contraction of A: it takes only its first value () and its last value (). This is a very rapid passage leading to the repetition of the tâla. Another analysis:



107) *Skanda* – Skanda makes a part of the âjânadevas (gods who have been so since the beginning). Skanda, "the call to material forces and confidence in personal effort" (Herbert), is the god of war. He is depicted with sword in hand. "His character appears the most often in sacred literature as a general in the army of the gods fighting against demons." (Herbert)

S | S OO S S ♪ ♪ ♪ ♪ ♪ ♪ (10 mâtâs: 10 eighth-notes)

Greek amphimacer (or Hindu Denkhî): ♪ ♪ ♪ two semi-brevis added on: ♪♪ |
 ♪♪ | and Greek spondee: ♪ ♪ | Divides then into 10 eighth-notes, by 5 + 1 + 4:
 ♪ ♪ ♪ ♪♪ ♪ ♪ |

108) *Tripura* – translation: folded in three. (It is also called Addatâlî)

O | | ♪♪ (2 1/2 mâtâs: ♪ ♪ ♪)

Rhythm of five ♪ – Folded in three, because it has three assigned durations: one druta and two laghu. This is the Greek bacchius.

109) *Dhattâ*–

| | OO | S ♪♪♪ | ♪ ♪ (6 mâtâs: 6 eighth-notes)

110) *Dvandva* – translation: dispute, combination of two elements.

| | S S S | S ♪ ♪ ♪ ♪ ♪ ♪ (12 mâtâs: 12 eighth-notes)

Based on the division of six into three and two. Six divided into three ♪♪ | ♪♪ |
 = six eighth-notes.

Six divided into two: ♪ ♪ | ♪ ♪ | = six eighth-notes. A dispute between the opposing binary and ternary metrons – but also a combination since they are placed end to end.

111) *Mukunda* – Mukunda is one of the names of Vishnou.

| OOOO S ♪ ♪♪♪ | (5 mâtâs: 5 eighth-notes)

112) *Kuvindaka* –


| OO S S[^]  (7 mâtârs: 7 eighth-notes)

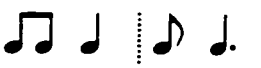

A rhythm of three quarter-notes, with transformation of the first quarter-note, and addition of a dot to the third quarter-note. A total of seven eighth-notes.

113) *Kaladhvani* – translation: very sweet sonority.

| | S | S[^]  (8 mâtârs: 8 eighth-notes)

Three analyses: a) anacrusis of two shorts, and Greek amphimacer in which the last value is dotted:

 | b) Greek anapest and iamb, the long duration of the iamb is dotted:

 | c) Greek Peon III and dotted final duration:  |

114) *Gaurî* – Gaurî is one of the names of the Shiva's shakti (his power of manifestation).

Under the name of Kâlî (power of time), Shiva's shakti is a frightening goddess who wears a collar of human heads (symbolizing the energy which destroys the imperfections of man). Under the name of Gaurî (the white one), she is a young and beautiful wife who gives abundantly to all (material goods, intellectual powers, spiritual graces). The group composed of Shiva (under the name of Shankara) and of his shakti (under the name of Gaurî) is called: Gaurî-Shankar: "this is the origin of the name given to one of the highest summits of Himâlaya." (Herbert)

| | | | |  (5 mâtârs: 5 eighth-notes)

In Hindu sculpture, Shiva is often represented dancing the "cosmic dance" with one pair of legs and two pairs of arms. With the two upper hands, he holds the damaru (a percussion instrument) and the fire of spiritual cognizance (agni). With the two lower hands, he makes gestures from the ritual dance (hasta). When Shiva and his shakti, both enclosed in the circle of the Tândava (the cosmic dance) dance together, the two pairs of Shiva's arms added to his shakti's unique pair of arms and to their two respective pairs of



legs, equal five pairs. This is perhaps the reason that determined the choice of five laghu (five eighth-notes) for the Gaurî Deçî-Tâla. In every way five is Shiva's number, and consequently, the number of his shakti.

115) *Sarasvatîkanthâbharana* – translation: Sarasvatî's collar. Sarasvatî is the goddess of science and the arts. Brahmâ's spouse and shakti, or power of manifestation, Sarasvatî represents the "penetrating capacity of intimate knowledge." (Shrî Aurobindo)

S S | | OO  (7 mâtrâs: 7 eighth-notes)

A rhythm of seven eighth-notes (prime number). It represents a decrescendo of values (durations that become shorter and shorter), each value being repeated twice.

116) *Bhagna* – translation: cracked in two, broken, burst.

OOOO | | |^c  (5 1/2 mâtrâs: )


At five eighth-notes, with *addition of a dot* to the last eighth-note. Total: 11 sixteenth-notes (11, prime number). Is the virâma added to the last laghu (addition of the dot) that "breaks" the regularity of the five mâtrâs and "bursts" the isochronality?




117) *Râjamrigânka* – translation: the king who is handsome like the moon.



OO | S  (4 mâtrâs: 4 eighth-notes)

The same as Varnabhinna (no. 20) – and Lalit (no. 85).

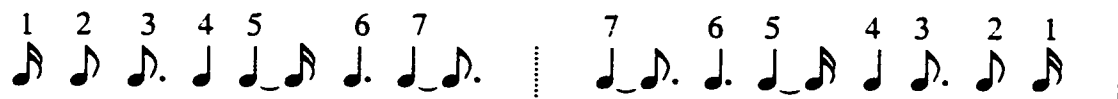
118) *Râjanârtanda* – translation: the Sun-king.

S | O  (3 1/2 mâtrâs: )

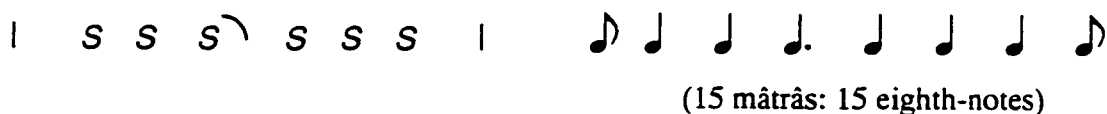
Trochaic rhythm (), with an added value (). Total: 7  |

Notice the order of values for Râjamrigânka and Râjamârtanda: the first is made up of increasing values; the second of decreasing durations. These tâlas are played at the beginning of the night, at sunset, preceding the moon's rising?... Râjamârtanda is then a decrescendo of durations, or the principle of *chromatic durations*. Taking the sixteenth-note as a unified value, here is a chromatic scale of durations of 1  to 7  (ascending order),

and of 7 ♪ to 1 ♪ (descending order). The numbers indicate the possible division into sixteenth-notes:



119) *Niṣṣanka* – translation: fearless.



Rhythm of 15 eighth-notes, divisible into 3 x 5: ♪ ♪ ♪ | ♪. ♪ | ♪ ♪ ♪ |

Another division: iamb – non-retrogradable, which is the opposite of Vijaya – Greek antibacchius:



It can also be divided into arsis and thesis (I indicate the arsis by A, the thesis by T):



120) *Çârṅgadeva* – *Çârṅgadeva* (Çrî-niṣṣanka) is the name of the author of *the Samgita-Ratnākara* (Ocean, or Diamond Mine, of Music), discussed in seven books, where the table of 120 Deçî-Tâlas is found. The two last tâlas of the table, *Niṣṣanka* and *Çârṅgadeva*, are its signature.



Anacrusis of two semi-brevis: ♪♪, and two rhythms of five: ♪ ♪. | ♪ ♪ ♪ |

The second rhythm at five metrons transforms the first. This is the Greek antibacchius.

Total: 11 eighth-notes, prime number.

APPENDIX A

APPENDIX A

On Tâla no. 105:

Candrakalâ (*the beauty of the moon*) –

S S S S\ S\ S\ S\ | ♪ ♪ ♪ ♪. ♪. ♪. ♪
(16 mâtrâs: 16 eighth-notes)

We divide this rhythm into three parts:

♪ ♪ ♪ | ♪. ♪. ♪. | ♪ |

and make it into the symbol of the trio: earth, sun, moon (in this order). For the Hindus:

The cosmic Being is manifest on three planes: the celestial or angelic plane, the individual or subtle plane, and the plane of elements, or sensory plane. Each one of these planes is divided into five spheres. On the celestial plane, the five spheres are: 1) the Auto-engendered, 2) the supreme Sovereignty, 3) the Sun, 4) the Moon, and 5) the Earth. The cosmic spheres come from the nature of Agni (fire, devouring), or of the nature of Soma (the victim, the devoured) – or the devourers and the devoured. The Auto-engendered is ignited, the supreme Sovereignty is consumed, the Sun is ignited, the Moon is consumed, the Earth is ignited. (according to Daniélou)

The devouring, ignited Earth is symbolized by the three guru: S S S (♪ ♪ ♪).

The sun, even more ignited, and devouring even more, is symbolized by three pluta:

S\ S\ S\ (♪. ♪. ♪.).

The moon, a consumed, devoured victim, is symbolized by the unique laghu, reduced, short: | (♪)

Let us now consider the "*Candrakalâ Tâla*" under the aspect of the number seven. We have already found the number seven in the "*Candratâla*" (rhythm of the moon):

OOO | | ♪♪ ♪ of which the total durations give seven druta (7 ♪). In

"*Candrakalâ Tâla*," which is the number of executed durations, the number of attacks? It is the number seven:

♪ ♪ ♪ ♪. ♪. ♪. ♪
1 2 3 4 5 6 7

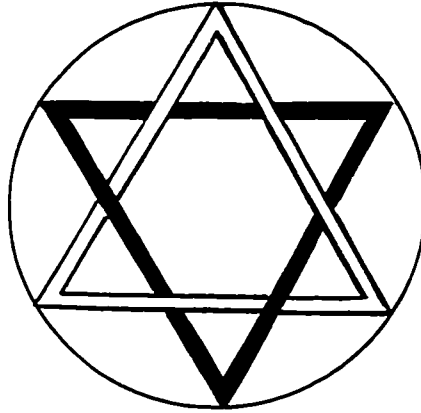
We have come to see that the earth (♪ ♪ ♪) and the sun (♪. ♪. ♪.) were both ignited and devouring. The consumed, devoured moon is the seventh duration, the final laghu: | (♪). The passage from fire to ashes, from the two devourers to the devoured, is the passage from six to seven (earth + sun + six durations + moon + seven durations). "In Egyptian antiquity, the passage from life to death was considered the same as from 6 to 7." (Bindel)

Otherwise, in Hindu mythology, the moon contains seven chalices of the liqueur of immortality. Each day, the gods empty the chalices; when they have drunk it all (last quarter), the chalices are magically refilled (new moon).

The Hindus give several names to the Moon, of which a few are very poetic: "Crown of Shiva" (Shiva-shekhara) – "Lord of the lotus" (Kumuda-pati) – "Maker of Night" (Nishâkara). The most used is "Candra," which means "the Luminous one" (pronounced Tchanedra).

The Moon is mental-cosmic. "It is assimilated in the primordial waters, from which the waves give birth to every appearance of the tangible world." (Daniélou) "Because the Sun is the principle of life and the primordial waters are the Moon. These waters are the source of everything, of the visible and the invisible. The waters are the image of everything." (Prashna Upanishad)

The Moon is then a god of the liquid element, and governs the tides or oscillatory movements of the sea. In fact, the tides are produced by lunar and solar attractions, combined with the rotation of the Earth – the most considerable effects being those produced by the moon. Here again we find our trio: earth, sun, moon. We can also see a masculine symbol in the mounting flux or tide, a feminine symbol in the descending reflux or tide. If I may be permitted, the reproduction of a very ancient, highly symbolic drawing on this subject:



For the Chinese, the Yang and the Yin express the masculine and feminine forces of the universe. An equilateral triangle pointing upward, symbolizes the male element, fire and Yang. An equilateral triangle pointing downward symbolizes the female element, water and Yin. These two interlaced figures create a hexagram based on the number six.

By adding the circle, and inscribing the two triangles within it, we obtain $6 + 1 = 7$, and once again, the relation of six to seven. The drawing above was known to the Egyptians. It was named "Salomon's seal." It was respected in Hebrew culture as much as the "star of David..." This is also one of the most used symbolic diagrams or "Yantra" of India. The ascending triangle is masculine, it represents Shiva the Procreator, and the Cosmic Person (Purusha): its numeric symbol is the number 3. The descending triangle is feminine, it represents the Shakti or feminine energy, and Cosmic Nature (Prakriti): its numeric symbol is the number 2. The circle surrounding the star figure represents Time.

In the *Candrakalâ Tâla*:

We have three guru: S S S (♪ ♪ ♪) or three binary divisions. This is the feminine triangle. Then three pluta: S` S` S` (♪. ♪. ♪.) or three ternary divisions. This is the masculine triangle. Then the unique laghu: | (♪) : this is the indivisible instant, the symbol of Time, symbolized by the circle.

Last interpretation of *Candrakalâ*: we can elevate ourselves even higher and see in this rhythm 16 mâtrâs divided into $6 + 9 + 1$.

♪ ♪ ♫ = 6 ♪

six is the number of conception. Then

♪. ♪. ♪. = 9 ♪

nine is the number of birth. Behind these

two numbers, the laghu = 1 ♪ |

one is the number of the Divinity.

Presiding over conception as over birth: the infinitely one, the infinitely simple, the Unknowable, "The Ultimate!" – which disappears, as it is said in the "Kena Upanishad," since it approaches Mental Power... Behind Life, there is God...

APPENDIX B

APPENDIX B

On Tâla nos. 101, 31, 8, 27.

no. 101) *Simha* (the lion): | O | | |  (4 1/2 mâtrâs)











no. 31) *Simhanâda* (the lion's voice):

| S S | S      (8 mâtrâs)

no. 8) *Simhavikrama* (the lion's strength):

S S S | S[^] S S[^]        (15 mâtrâs)

no. 27) *Simhavikrîdita* (the lion's leap):

| S[^] S S[^] S[^] S[^] S S[^] | S[^]
          (24 mâtrâs)

These four Tâlas come together under the sign of the lion. The lion rarely appears in Hindu symbolism. The male lion is, however, the fourth of Vishnou's ten incarnations. I cannot speak of the lion without thinking of the prodigious sculpture, situated between the temples of Kadraya Mahaveda and of Brahat, which represents a woman kneeling before a lion. Is the woman in love with the lion? is the lion getting ready to devour her? We know not... The lion has something of the divine, and the woman's attitude is a unique mixture of supplication, adoration, praise, terror, and eroticism. The ensemble is sheltered by a pavilion full of stairs, columns, floors, and balconies. The cruelty of light and shadow augments the mystery...

According to another tradition, the four Tâlas nos. 101, 31, 8, and 27, would be dedicated not to Simha, the lion – but to Shiva, the God of destruction. In truth, all Tâlas, all rhythms could be dedicated to Shiva Nataraja, King of the Dance. Shiva Nataraja is represented dancing the cosmic dance. The harmonious disposition of his arms and legs,

one foot on the ground, one foot lifted, two arms lowered, four arms raised, expresses the alternation of creation and destruction. The contrast between the movement of the six arms and legs, and the smiling immobility of his face, expresses the opposition as well as the union of Time and Eternity. "Shiva is omnipresent. His five dances are temporal and eternal. They are his five activities: ("Tirukuttu Darshan," vision of the sacred dance). Shiva's five dances or activities are: "1) Shristy: creation and evolution, 2) Sthity: conservation and preservation, 3) Samhara: destruction and rebirth, 4) Tirobhava: incarnation of souls, and 5) Anugraha: deliverance of the cycle of Karma." (according to Srimati Usha)

Otherwise, "Shiva is the Regent of the 5 directions of space, of the 5 elements, of the 5 senses, of the 5 human races, and of all that is submitted to the number 5." (Daniélou) Shiva is also the God with five faces. One of the faces looks at the zenith, the others at the four cardinal points: the two faces that look east and west are soft like the moon; "the face that looks to the north enjoys the company of Night's Peace (Unâ); the face which contemplates the south is terrible, it destroys everything." (Daniélou)

In ancient Egypt, the world of the dead is designated by the number five: as Destroyer. Shiva is also the God of death. For the ancient Greeks, 2 was the symbol of the woman, 3 the symbol of the man: $2 + 3 = 5$: Shiva is also the "Half-woman God" or androgynous Shiva, representing the union between the God and his Shakti, and the double nature of the universe.

Of all these symbols, the number five is the number of Shiva. Now we find the number five in Tâla nos. 101, 31, 8, and 27.

In Tâla no. 101: | O | | |  there are five durations, five attacks.

In Tâla no. 31: | S S | S  there are five durations, five attacks.

Tâla no. 31 is identical to the dochmiach meter, or Greek dochmius: eight metrons, divisible into 3 + 5 (iamb plus cretic): $\cup - \vdots - \cup - |$

The second division of the rhythm again contains the number five. The number three could signify Shiva's three eyes. The total eight could represent the eight forms of Rudra-Shiva: 1) Sharva (the archer), 2) Bhava (the existing), 3) Pashupati (the master of grazing animals), 4) Ishana (the sovereign), 5) Bhima (the formidable), 6) Rudra (the lord of tears), 7) Maha-Deva (the great God), and 8) Ugra (the Terrible). The Egyptian God Thoth was called "lord of the number 8... in him was seen the abundance of wisdom." (Bindel) Now Shiva, under the great God's (Maheshvara's) watchful eye is the "Lord of learning." "In him the three energies that form the nature of learning – the powers of understanding, of desire, and of action – are coordinated..." (Daniélou)

Tâla no. 8:

S S S | S[^] S S[^] ♪ ♪ ♪ ♪ ♪ ♪ ♪

contains 15 mâtrâs. $3 \times 5 = 15$. It always comes back to the number five.

The first part of the rhythm contains seven ♪ (this is Greek Epitrite IV — — —)

The second part of the rhythm: ♪ ♪ ♪ is the Hindu Vijaya: S[^] S S[^]

(Vijaya means victory.)

From the point of view of an individual being, destruction is always present in two successive stages, the first is physical death, the second is the dissolution of subtle individuality. The first is the end of apparent existence, the second is liberation from its subtle bonds. There are then two aspects of Shiva, one frightening, the other desirable, one immediate, the other transcendent. In his ultimate action, Shiva represents the death of death, in other words, eternal life. (Daniélou)

From the beginning of time, seven has been considered a sacred, celestial number. The coupling of seven and Vijaya (victory) could signify victory over death.

Tâla no. 27:







| S[^] S S[^] S[^] S[^] S S[^] | S[^]
 ♪ ♪ :| ♪ ♪ :| ♪ ♪ :| ♪ ♪ :| ♪ ♪ |

is extremely important for me. With this Tâla, I have discovered *the increasing and decreasing of a value over two*. I see the prophecy of the *increasing and decreasing of a*

group of values over two used by Stravinsky in the sacred Dance from *Le Sacre du Printemps*. It is the foundation of my theory of *rhythmic characters*.

Tâla no. 27 divides into five phases:

A B A B A B A B A B

1 2 3 4 5

and we again find, as always, the number five.

Value A of each phrase observes a perfect curve: increase – climax – decrease:

It can represent relative or cyclic time, which is the effect of the circular movement of the planets.

Value B remains perfectly immobile. Always equal to itself, always pluta: S or ♫. |

it knows no change. It could represent Absolute Time (Mahâ-Kâla) "which is an ever present eternity, indivisible and without measure." (Daniélou)

The union of Time and Eternity is one of the principal symbols of Shiva Natajara.


APPENDIX C

APPENDIX C

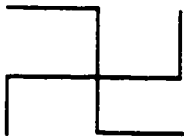
On Tâla nos. 99, 18, 77

no. 99) *Gaja* (the elephant): | | | |  (4 mâtrâs)

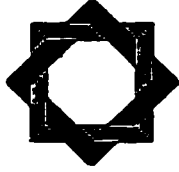
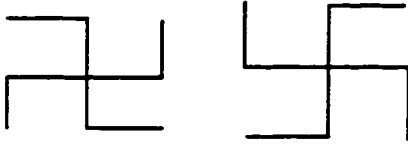
no. 18) *Gajalîla* (the game of the elephant): | | | |^c  (4 1/2 mâtrâs)

no. 77) *Gajajhampa* (jump of the elephant): S OOO^c  (3 3/4 mâtrâs)

These three Tâlas fall under the sign of the elephant. And also under the sign of the number four, since all three contain four durations, four attacks. I have already spoken of the elephant, the manifestation of physical strength – from the elephant, Indra's mounting ("illuminated mental power"). Let us now consider the human God with the elephant's head, Ganesha (or Ganapati), the Lord of categories, the Principle of the number, who is also called Gajâdhipa (king of the elephants). The number of Ganesha is four. "He has four arms. It is by him that the four principles of the elements move. It is he who has created the four kinds of beings. It is also he who establishes the four castes and reveals the four paths of knowledge, the four Vedas." (Daniélou) Ganesha's two yantras (symbolic diagrams) are the swastika and two entwined squares. The swastika is a cross (symbol of 4) in which



each branch is bent because "the exterior forms of the Universe



never lead us toward their fundamental unity, the path that leads to the principle being *twisted*. "

(Daniélou) Ganesha is otherwise represented with a twisted elephant's trunk. Ganesha's trunk is curved a little to the right, a little to the left, just as the

branches of the swastika can be curved in either direction. The knowledge of the divine can only be indirectly attained, by the paths which turn to the right or the left. The two entwined squares (2 x 4) indicate the identity of the macrocosm and the microcosm. Inside the infinitely small, as inside the infinitely large, relations can be expressed numerically. This is why Ganesha, "Principle of the number," has a human body (microcosm), and an elephant's head (macrocosm). Despite the superiority accorded to the numbers three and seven in this domain, the number four has played an important role in religious subject matter. The ancient Greeks had a true cult for the number four – "Greek mathematics contain many relations to the square" (Bindel) Among the Hebrews, in the four sacred letters: Jod, He, Waw, He – was found the mysterious name, the divine name, Jeweh – that no one dared speak.

For a catholic, it has been said that the image of a man with an elephant's head is something hideous: a monstrous and ridiculous idol! We must see only what the Hindus see: a symbol. The word Gaja (elephant) is itself symbolic: "ga" is the end – "ja" is the principle – "gaja" represents the principle and the end.

Tâla no. 99: *Gaja* (the elephant) is the simplest:



Four laghu, four eighth-notes, express the number four (Ganesha's number), as well as the elephant's magnificent, crushing strength and its calm demeanor in one beat.

Hathi and his three sons pushed next to each other; the enclosed wall fell, crumbled, caved in. And the villagers, mute with horror, saw the ferocious, clay-striped heads of the four elephant destroyers appear from the ruins. Then they fled through the debris, painless, toward the low valley, while their village, hacked, crushed, and trampled, vanished behind them. One month later, a wavy mound, that recovered a green coat tender with young plants, marked the place; and, at the end of the Rains, the full thunder of the vibrant Jungle ground on this earth, for which the charcoal burners had painfully labored six months previously. (Rudyard Kipling, *The Second Jungle Book*, "Letting in the Jungle")¹¹

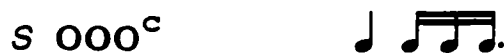
Tâla no. 18: *Gajalîla* (the game of the elephant) brings to us the supplement for 1/2 of a unified value, the addition of a dot:













The white Airavata elephant is held at the entrance to heaven and helps Indra mount. If Indra is "illuminated mental capacity," the virâma added to the fourth laghu could perhaps represent mental capacity prolonged through illumination. Plunged into the Immensity, into the Brahman, into "the Open, behind the Appearance" (as Rilke says), it grows and surpasses mental capacity...

Indra mounts an elephant. The mounter of Ganesha is a mouse. The mouse – miniscule in comparison to the elephant-man – symbolizes the Self, the omnipresent, hidden in the heart of all beings under an inscrutable illusion. The virâma added to the fourth laghu represents it quite well.

Tâla no. 77: *Gajajhampa* (jump of the elephant) again groups four durations, but with more research:



One guru, two druta, one druta with virâma. This is a mixture of Catustâla (no. 69):  and of Tritîya (no. 3): . Seven is the number of perfection, eight is the number of glory. Gajajhampa equals 3 3/4 mâtrâs, in other words, three  and one , or better, seven  of which the last is dotted = 15 . It is held then, between seven  (14 ) and eight  (16 ) , in this invisible space which is illusory, and must lead us

¹¹"Letting In the Jungle"

from seven to eight, that is to say, from perfection to glory. The invisibility is again achieved by adding a dot – silent, but present because it lengthens the last sixteenth-note.

One last symbol – more terrible than the miniscule mouse who aids in Ganesha's mounting – is the myth of the world sustained by four elephants, who stand on four tortoises, who stand on Nothing. The elephants apparently represent physical strength – the tortoises represent the secret strength – the Nothingness, the Indefinable. This is the Brahman, limitless Immensity. This Nothingness, this "who knows what," is perfectly represented by the added dot – the virâma – silent, but present, which prolongs the last sixteenth-note and makes seven lean toward eight...

APPENDIX D

APPENDIX D

On Tâla nos. 81, 88, and 115 – (the 3 shakti)

no. 81) *Pârvatilocana* –

S S S | S[^] S S OO ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪
(15 mât-râs: 15 eighth-notes)

Pârvatilocana – translation: the eyes of Pârvatî.

Pârvatî is Shiva's shakti. The notion of the shakti is of extreme importance in Hindu mythology and theology. The shakti is the near wife of the divine. Each god is accompanied by his spouse, or more exactly by his feminine counterpart, by his power of manifestation, by his shakti, by his Energy in one word. The Goddess, creative Energy, is inseparable from the divinity: only Shiva himself can create and destroy with his Energy, with his shakti. Shiva's power of creation and destruction is Pârvatî. "Like Shiva himself, his power falls under three principle categories: an immanent, active, creative aspect called energy (shakti) – a permanent, peaceful, immanent, spatial aspect called Pârvatî, the daughter of the mountain, in other words, personified ether – a destructive, immanent time-aspect, which is called the power of time (Kâlî)." (Daniélou)

Tâla no. 81: *Pârvatilocana* strangely resembles Tâla no. 8: *Simhavikrama*.

Simhavikrama: ♪ ♪ ♪ ♪ ♪ ♪ ♪

Pârvatilocana: ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪

These are exactly the same durations, similar to the last value of *Simhavikrama*, however, ♪ is transformed into ♪ ♪ in *Pârvatilocana*. If we reattach Tâla no. 8 not to Simha the lion, but to Shiva the God of destruction, it seems completely natural that Tâla no. 81 would be similar, since Pârvatî is Shiva's shakti. The transformation of ♪ into ♪ ♪ hinders the analysis a bit with Greek Epitrite IV: ♪ ♪ ♪ ♪ (— — — ∪)

combined with the Hindu Vijaya:

♩. ♩ ♩. (S˘ S S˘)

This analysis could be preferable: Epitrite IV: ♩ ♩ ♩ ♩ (— — — ∪)

plus Epitrite II: ♩ ♩ ♩ ♩ (— ∪ — —) with fusion of the short and the first long into ♩. | and addition of two semi-brevis: ♩♩ | The important thing is still the number of mât-râs: 15. This number is the same in Tâla no. 8 and in Tâla no. 81. Now $3 \times 5 = 15$, and five is the number of Shiva. As well as of his shakti: Pârvatî, Shiva's love, and the daughter of the mountain, engenders the five principles of the elements, the five tattvas.
no. 88) *Lakshmîça*—

O O^c | S ♩. ♩ ♩ (4 1/4 mât-râs: ♩ ♩ ♩ ♩)

Lakshmîça means peaceful like the peace that descends from Lakshmî. Lakshmî is Vishnu's shakti. She is also the goddess of Fortune. (Lakshmî literally means "from hundreds of thousands.") She is also the goddess of beauty. She accompanies Vishnu like a faithful spouse, in all his incarnations or avatars: she was Sîta when he was Râma.¹² Lakshmî is represented with four arms. Vishnu is also represented with four arms. In each of his four hands he holds one of the four attributes. "In his lower right hand, he holds the conch, the symbol of the elements. In his upper right hand, he holds the brilliant disk, the symbol of mental power. In his upper left hand, he carries the lotus, the image of the mobile universe. In his lower left hand is found a club, the symbol of primordial Knowledge." (Gopâla – Uttara – Tâpinî – Upanishad) Again everywhere among Vishnu and Lakshmî, his shakti and his spouse the number four is found. This explains the choice of four durations, four attacks, for the Lakshmîça Tâla.

no. 115) *Sarasvatîkânthâbharana* – translation: Sarasvatî's necklace.

S S | | OO ♩ ♩ ♩♩ ♩♩ (7 mât-râs)

Sarasvatî is Brahmâ's shakti, his wife, goddess of speech, of science, of the arts, and

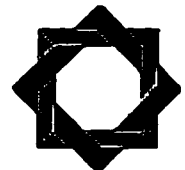
¹²Lord Rama is one of the most commonly worshipped gods of Hinduism. Sita is his wife.

especially of music. She is represented as a very beautiful, gracious, and supple woman, seated on a lotus, with a crescent moon on her forehead. "Saras" means fluid. The name of Sarasvatî then at once expresses the adaptation of water to all her forms and the eloquent melodic flowing of rhythms. "You arise: the water unfolds – You lie down: the water blooms..." (Paul Éluard, "Facile")¹³ These two verses from Paul Éluard can be perfectly applied to the liquid charm of Sarasvatî.

The necklace which is offered here is a progressive acceleration in double time: durations which become shorter and shorter and which are always heard twice. It can be thought of as *accelerando-crescendo*, or *accelerando-diminuendo*.

In opposition to Tâla no. 115: ♩ ♩ ♩ ♩ | Tâla no.33 (Lakskmîṣa):

♩. ♩ ♩ | is a progressive *ralentando* of durations. But much more refined than the preceding acceleration. If we count the value using thirty-second notes for each duration of the Lakskmîṣa Tâla, we get the following numbers: 2, 3, 4, 8. The *ralentando* is perfectly chromatic (2, 3, 4) until the last excluded duration of a single beat. It transports us farther – to the number eight. Symbolically, the 8 expresses the two intertwined squares: which represent paternal-maternal creation, by naturally evoking the God who acts through his shakti. The last lengthened duration can also represent final Peace, this Peace which descends from Lakshmî. Such a *ralentando* toward Peace is very close to the few seconds that precede sleep. An image – borrowed from Maurice de Guérin – completes my thought;



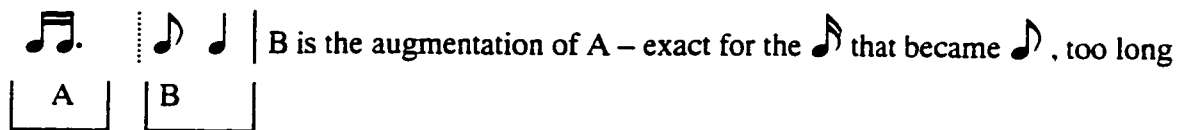
Asleep on the threshold of my repose, flanks hidden in the lair and head under the sky, I was following the spectacle of shadows. So that the foreign life, that had penetrated me during the day, detached itself from me drop by drop, returning to the peaceful breast of Cybele, like after the rain's shower of debris attached to the foliage falls and rejoins the waters. (Maurice de Guérin, "le Centaure")¹⁴






The three Tâlas nos. 81, 88, 115 are each related to the three shaktis of the three gods

¹³"Easy"

¹⁴"The Centaur"

of the Hindu Trimûrti; no. 81 is dedicated to Pârvatî (Shiva's shakti); no. 88 is dedicated to Lakshmî (Vishnu's shakti); and no. 115 is dedicated to Sarasvatî (Brahmâ's shakti). The most beautiful – rhythmically speaking – is certainly the second, Tâla no. 88: *Lakskmîça*. I have already spoken of the four durations, of its chromatic *ralentando*... Let us return to our first analysis, that of *inexact augmentation*:



for the  that became  (instead of ). This lengthened augmentation, exaggeratedly nonchalant and languid, makes me think of those hermaphrodite, androgynous statues of Shiva, half man on one side, half woman on the other – that one can often see in India |  this is the male part, |  this is the female part | The Lakskmîça Tâla can then symbolize the union between the Gods and with their shaktis. "Vishnou is Shiva – Shiva is Brahmâ. Unique is the form, Three are the gods – Vishnou, Shiva, Brahmâ – Generous, Creators of the World, Protectors of the World, Existing for their own sake, They are the Half-woman God." (Harivamsna)

In Tâla no. 27, Simhavikrîdita:



quarter note is like a floor that cannot be cracked. The impaired durations increase and decrease in one magnificent curve, the arc of a perfect circle, that merge on the dotted-quarter note. It ascends to the unison duration, then re-descends: but the dotted quarter remains unchanged. Such Icare, he who comes too near the superior sun sees his wings melt, leaves Eternity and falls back into Time. The dotted-quarter note, the floor, the superior sun: this is the impossible thing, the invisible, the inaudible, the untouchable, "The Ultimate"!... According to the *Kena Upanishad*, neither Agni (fire), nor Vâyû (life), nor even Indra (mental power), can comprehend "The Ultimate"! Alone, the Wife, the Goddess ("Supreme Nature where all cosmic action originates" says Shrî Aurobindo),










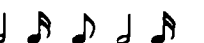

























alone Unâ Haimavatî can name the One, the absolute God, the Brahman. Whether she is considered as the shakti of Shiva, Vishnu, or of Brahmâ, or as the power of their combined form (Ishvara), or as Nature (Prakriti), or as Illusion (Mâyâ), or higher yet, as Brahman's power of manifestation, the original Energy, it is always the Wife, the omnipresent shakti. It is to her, definitively, that the three Tâlas – 81, 88, and 115 – are dedicated. "Ah! to be dead, and to know them all infinitely, the stars!... This is then what I will call the Lover!..." (Rilke, "Seventh Elegy of Duino") The Lover, the Mother, the Wife, the shakti – and with her the Unknowable... "in the place where there is neither night nor day, neither forms nor colors, nor words..." (Rabindranath Tagore, "Gitanjali")

6) The Karnatic Theory

Though it lacks the worth and importance of the 120 Deçî-Tâlas from the Çarṅgadeva system, the Karnâtic theory is only slightly different from the Sanskrit method of representing durations." (Grosset) The denominations and signs closely resemble the ones we already know, but I prefer not to use them in order to avoid confusing the reader: I will then transcribe all these rhythms into European notation. As for the 120 Deçî-Tâlas, I asked my friend Tarun Kumar Ghosal for translations of the names of each rhythm and of each type. I have adopted a more logical presentation than Joanny Grosset's little summary and have followed it with a personal technical commentary. In the following table: a) the names of the Tâlas are inscribed vertically on the left and remain valid for the entire horizontal column; b) the names of the jâtis are inscribed above from right to left, and remain valid for the entire vertical column. The numbers above the notes indicate their possible division into sixteenth-notes.

TABLE OF THE 7 TÂLAS AND OF THEIR 5 JÂTIS IN KARNÂTIC THEORY

Names of the 5 Jâtis

Names of the 7 Tâlas	Tîshra	Chaturîshra	Cûndh	Mîshra	Sankîma
Dhruva	 3 2 3 3	 4 2 4 4	 5 2 5 5	 7 2 7 7	 9 2 9 9
Mâtsya	 3 2 3	 4 2 4	 5 2 5	 7 2 7	 9 2 9
Rûpaka	 3 2	 4 2	 5 2	 7 2	 9 2
Jhampa	 3 1 2	 4 1 2	 5 1 2	 7 1 2	 9 1 2
Tripûta	 3 2 2	 4 2 2	 5 2 2	 7 2 2	 9 2 2
Atatâla	 3 3 2 2	 4 4 2 2	 5 5 2 2	 7 7 2 2	 9 9 2 2
Ekatâla	 3	 4	 5	 7	 9

In the preceding table, if we look at the names of the seven Tâlas (inscribed vertically on the left), with their application (which is valid for the entire horizontal column), by reading the table horizontally we find that:

- 1) Each Dhruva-Tâla is comprised of a base number, then the number two, and the base number is repeated twice. Dhruva means permanent. The frequency of the base number (extended three times over four values) explains the choice of this denomination.
- 2) Each Mâtsya-Tâla includes the number two through repetition of the base number on its

left and on its right. Identical extreme values, free central value: these are *non-retrogradable rhythms*. Mátsya means fish; why this word? Is it because our Mátsya-Tâlas all have three values, and the fish can be divided into three: head, body or spinal column, posterior tail and fins? The fish is very important for the Hindus since it populates the water from its surface to its abysmal depths, and the water, according to Hindu cosmology, "is the first matter from which the earth is made." (Herbert) If we read each Mátsya-Tâla in its five jâtis successively (according to the order of my table), we obtain a non-retrogradable rhythm developed by symmetric augmentation of the extremes at each end:



I have often instinctively used this process in my works, and that of instinct – well before knowing the Karnâtic theory (where it is only implied). In the 21st and last piece of my *Vingt Regards*, "Regard de l'Église d'amour,"¹⁵ on the first page is found:

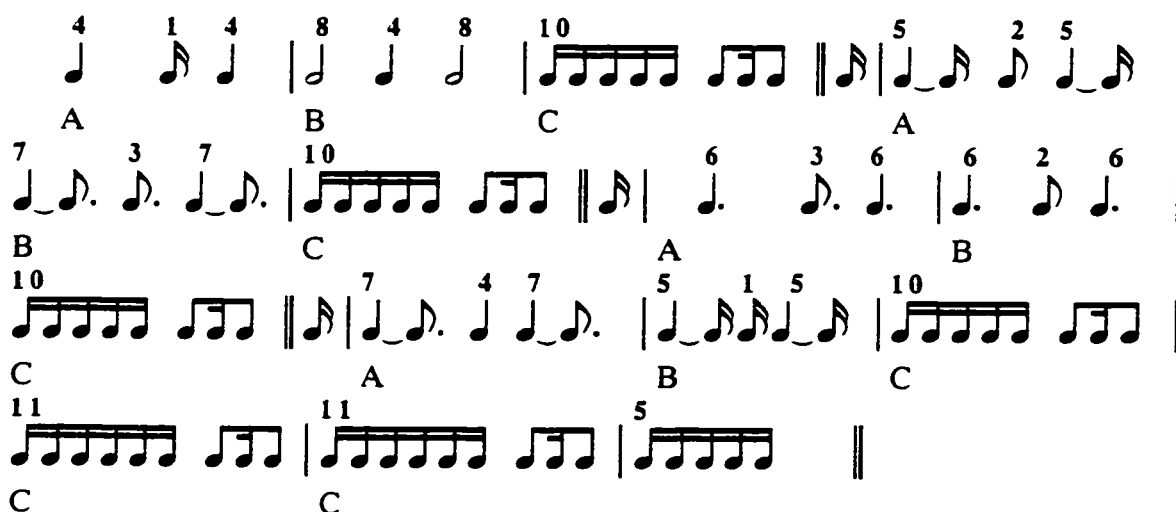


In A, non-retrogradable rhythm (Greek Amphimacer and Hindu Denkhî). In B, the same, amplified by symmetric addition of two eighth-notes, one to each end. In C, new amplification, by interpolation of a dotted-eighth note between the two preceding eighth-notes, again at each end. These amplifications are always symmetrical and at both ends in order to conserve the total rhythm and amplify its non-retrogradable quality.

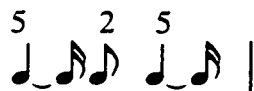
In the fifth movement of my *Turangalila-Symphonie*, "Joie du sang des étoiles," development (orchestral score: beginning at number 14), I have utilized three "rhythmic characters" confined to the trombones and the horns, according to the following principle" character A creates a non-retrogradable rhythm in which the values are numbered 4, 1, 4. Character B creates a non-retrogradable rhythm in which the values give the numbers 8, 4, 8. Character C has 10 sixteenth-notes. Character A increases (all its values gain a sixteenth-note at each repetition). Character B decreases (all its values lose a

¹⁵ *Twenty Looks [at the Infant Jesus]*, "A Look at the Church of Love."

sixteenth-note at each repetition). Character C remains the same at 10 sixteenth-notes, at the end of the example it, in turn, goes to 11, then to five sixteenth-notes. The numbers above the values indicate their possible division into sixteenth-notes:



Although this last example is in a very different rhythmic and technical spirit, all the same it presents a certain relationship with Mátasya-Tâla by the arrangement of the chosen non-retrogradable rhythms (all at three values) – one even retrieves the Jâti-Cúndh of the Mátasya-Tâla:



This shows that, for the Europeans, it is not a matter of copying the Hindus, but of assimilating their rhythms for *another purpose*.

- 3) Each Rúpaka-Tâla is comprised of only two numbers: the base number and the number two. Rúpaka means embellishing, giving beauty. If beauty equals simplicity, the term is well chosen: because this Tâla is reduced to the most simple expression: once each number.
- 4) Each Jhampa-Tâla is comprised of three numbers: the base number, the number two, and, between them, the number one: a short value which serves as a link, a bridge between the other two, and jumps from one to the other like a grasshopper, like a flea because Jhampa means jump. To the five types of Rúpaka-Tâla, the five types of Jhampa-Tâla add this little sixteenth-note through interpolation. This is an *added value*.
- 5) The word Atatâla leaves me perplexed... it means rhythm based on the number eight.

Now, a priori, one does not see a relation between this number and a Tâla that is the sixth of the table, carries five types, and in which the ensemble of sixteenth-notes of each jâti always exceeds the number eight. I see only one possible explanation: I have stated above that I have adopted a more logical presentation than Grosset's, and also that the original presentation (in both, the five jâtis follow each other out of order). Now, in the original presentation, the first type of Atatâla is the Jâti-Chaturúshra, which contains the numbers – 4, 4, 2, 2 – the repetition of the first base number giving a total of eight: $4 + 4 = 8$. In each Atatâla, as in this Jâti, the base number and the number two are heard twice.

7) Ekatâla means rhythm of a single number. It is effectively a summary, simpler and more schematic again than the Rúpaka-Tâla, because it only contains the base number. This unique duration, stripped of all its rhythmic clothing, which the six preceding Tâlas have embellished, make the seventh Tâla into the infinitesimal and naked theme succeeding its own variations.

In the preceding table, if we look at the names of the five jâtis (inscribed horizontally at the top), with their application (which is valid for the entire vertical column), in reading the table vertically we find that:

- a) Each Jâti-Tíshra has the number three as its base. This is precisely what the word Tíshra means.
- b) Each Jâti-Chaturúshra has the number four as its base. This is precisely what the word Chaturúshra means.
- c) Each Jâti-Cúndh has the number five as its base. Cúndh (or Suddha?) means pure?... Pure, because five is the primitive perfect number, the number of fingers on the hand?...
- d) Each Jâti-Míshra has the number seven as its base. Míshra means mixture. Seven is a prime number and a sacred number (one will recall the seven years of the Apocalypse of Saint John); in all times and countries it has been an object of veneration, and one can find traces of the sacred character of this number since the divine rest on the seventh day, in the seven days of the week, in the seven wonders of the world from pagan antiquity, in the

religious systems of China and Japan, up to the seven notes of the scale and the seven colors of the rainbow. Has this astonishing array of diverse acceptance provoked the choice of the word *Míshra*: mix, mixture?

e) Each *Jāti-Sankírna* has the number nine as its base. *Sankírna* means narrow. Narrow because the first *Jāti-Sankírna* in the table, the *Dhruva-Tāla*, offers us the number two, occupying a very small place within the duration, between three enormous number nines?...

Here are the numbers expressing the total amount of sixteenth-notes for each rhythm in the preceding table. (The numbers above the notes indicate their possible division into sixteenth-notes.)

A) *Dhruva-Tālas*

Dhruva-Tíshra:  = 11  (prime number)

Dhruva-Chaturúshra:  = 14 

Dhruva-Cúndh:  = 17  (prime number)

Dhruva-Míshra:  = 23  (prime number)

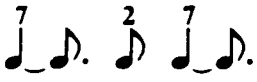

Dhruva-Sankírna:  = 29  (prime number)

B) *Mátsya-Tālas*

Mátsya-Tíshra:  = 8  (Vijaya by diminution)

Mátsya-Chaturúshra:  = 10  (Denkhî)

Mátsya-Cúndh:  = 12 

Mátsya-Míshra:  = 16 

Mátsya-Sankírna:  = 20 

All the Mátsya-Tâlas are *non-retrogradable rhythms*. Their succession creates a non-retrogradable rhythm developed by symmetric augmentation of the values at each end.

C) Rúpaka-Tâlas

Rúpaka-Tíshra:  = 5  (prime number)

Rúpaka-Chaturúshra:  = 6 



Rúpaka-Cúndh:  = 7  (prime number)

Rúpaka-Míshra:  = 9 

Rúpaka-Sankírna:  = 11  (prime number)

D) Jhampa-Tâlas

Jhampa-Tíshra:  = 6 

Jhampa-Chaturúshra:  = 7  (prime number)

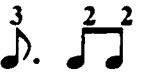

Jhampa-Cúndh:  = 8 

Jhampa-Míshra:  = 10 

Jhampa-Sankírna:  = 12 

All the Jhampa-Tâlas interpolate one sixteenth-note into the corresponding Rúpaka-Tâlas: *added value*.



E) Triputa-Tâlas

Triputa-Tíshra:  = 7  (prime number)

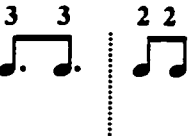

Triputa-Chaturúshra:  = 8 


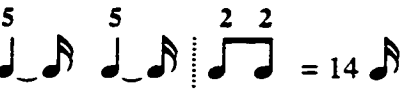
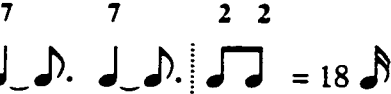

Triputa-Cúndh:  = 9 

Triputa-Míshra:  = 11  (prime number)

Triputa-Sankírna:  = 13  (prime number)

F) Atatâlas (All the Atatâlas are rhythms followed by their diminution)

Atatâla-Tíshra:  = 10  (Turangalîla by augmentation) *Subtracted dot.*

Atatâla-Chaturúshra:		<i>Classic diminution.</i>
Atatâla-Cúndh:		<i>Subtraction of 3/5.</i>
Atatâla-Míshra:		<i>Subtraction of 5/7.</i>
Atatâla-Sankírna:		<i>Subtraction of 7/9.</i>

G) Ekatâlas

The 5 types of Ekatâlas each only contain one value. The possible division of each value into sixteenth-notes results in the following numbers: three (prime number), four, five and seven (prime numbers), and nine.

In the ensemble of seven Tâlas multiplied by their five jâtis, we have found: a) 14 prime numbers; b) five non-retrogradable rhythms, in which the succession offers an example of symmetric augmentation of the extremes (Mátsya-Tâlas); c) the principle of the added value by interpolation (the Jhampa-Tâlas in relation to the Rúpaka-Tâlas; d) Rhythms immediately followed by their diminution, by means of subtracting different quantities (Atatâlas); e) three rhythms which have already figured into the 120 Deçî-Tâlas: Vijaya (through diminution), Denkhî, and Turangalîla (through augmentation); f) the rhythmic variations preceding the base value from which they were created (a succession of seven tâlas, in the same jâti).

7) Tagore

We can not leave India without speaking of Bengal, and of its more genial representative, Rabindranath Tagore. His marvelous poems are universally known through their beautiful translations. Their only fault is forgetting the music to which the original Bengali text is tied. Because Tagore is as great a musician as he is a poet. His song-poems

are divided into two strophes: the "*sthay*" and the "*antar*." The sthay is comprised of: a short refrain A) small couplet B) Refrain A) longer couplet C/Refrain A. The Antar is comprised of one very long couplet D which is more intense and sharper, and a pianissimo Refrain A.

The longer song-poems are divided into four parts: sthay-antar-samchâri-âbhoga. Tagore's music is not truly Hindi. It is the result of three influences: classical Hindu music, European music, and, in large part, popular Bengal music.

In this first song, I have indicated finger snaps or the Tâla, above the melody, which is iambic (quarter-note and half note or six eighth-notes divided into 2 + 4). The melody divides the five eighth-notes into 3 x 2, 2 x 3; and the flat for the penultimate and the final g, into 5 + 1.

Tagore (kar Cokher cawar haway)

un peu vif

The musical score is written on four systems of staves. Each system consists of a treble clef staff and a bass clef staff. The melody is written in the treble staff, and the accompaniment is in the bass staff. The melody is iambic, with a quarter note followed by a half note, or six eighth notes. The melody is divided into two strophes: the sthay and the antar. The sthay is comprised of a short refrain A, a small couplet B, a refrain A, and a longer couplet C. The antar is comprised of one very long couplet D, which is more intense and sharper, and a pianissimo refrain A. The melody is written in a key with one flat (B-flat). The tempo is marked 'un peu vif'. The score ends with a double bar line and the word 'etc.'.

In the second example, the low register, the reduced ambitus, the slow movement and the monotony of the Tâla of seven (3 + 2 + 2), agrees admirably with the solemnity of the words:

Why do you remain silent
outside, before my door?
Why do you remain silent?
My sight lost in the shadows
can no longer see you.
Why do you remain silent?

I know well that the moment is come
when you will pull to you
my light boat
and let it sail on the waves.
Why do you remain silent
outside, before my door?¹⁶

Tagore (nirobe acho kaeno)

lent
pp

etc.

The rhythm of seven is exactly the Tripura Tishra of the "Karnatic" theory. I cite "in extenso" to conclude the "megher pōre megh," one of the most beautiful of Tagore's melodies. The letters on the music indicate the divisions of the sthay and the antar. Sthay: in A, refrain/in B, first couplet / in A, refrain/in C, second couplet, longer, louder and

¹⁶Pourquoi restes-tu silencieux / dehors, devant ma porte? / Pourquoi restes-tu silencieux? / Mes yeux gagnés par l'ombre / ne peuvent plus te voir. / Pourquoi restes-tu silencieux? / Je sais bien que le moment est venu / où tu tireras à toi / ma barque légère / et la laisseras voguer sur les flots. / Pourquoi restes-tu silencieux / dehors, devant ma porte?

higher – its ending formula is identical to the first couplet. In A, refrain, very sweet. Antar:
in D, third couplet longer than the preceding ones. It ends in the bass. Then a second lyric
outburst in the treble and the force varies the second couplet In A, refrain, very sweet.

Tagore – (megher pore megh)

très lié, très lent

The musical score is written for a single melodic line in G major (one sharp) and 4/4 time. It consists of eight staves of music. The first staff is labeled 'A' and begins with a piano (*p*) dynamic. The second staff is labeled 'B'. The third staff is labeled 'A'. The fourth staff is labeled 'C' and begins with a forte (*f*) dynamic. The fifth staff continues the 'C' section with a *più f* marking. The sixth staff is labeled 'A' and begins with a pianissimo (*pp*) dynamic. The seventh staff is labeled 'D' and begins with a forte (*f*) dynamic. The eighth staff continues the 'D' section. The music features various melodic lines with slurs and ties, and some sections have triplets indicated by a '3' over a bracket.

The image displays three staves of musical notation in G major (one sharp). The first staff begins with a forte (*ff*) dynamic and features a series of eighth and sixteenth notes, some beamed together, with a long slur spanning the entire staff. The second staff starts with a forte (*f*) dynamic and includes a crescendo hairpin leading to a fortissimo (*ff*) dynamic. The third staff is marked with a piano (*pp*) dynamic and includes a section labeled 'A' with a slur and a fermata over the final measure.


**B) ANALYSIS OF SEVERAL HINDU RHYTHMS IN THE WORKS OF OLIVIER
MESSIAEN**

B) Analysis Of Several Hindu Rhythms Employed In The Works Of Olivier Messiaen

1) *Quatuor pour la fin du Temps*

for violin, piano, clarinet, and cello – (1940-41)

The piano plays these rhythms in the first movement: "Liturgie de cristal"



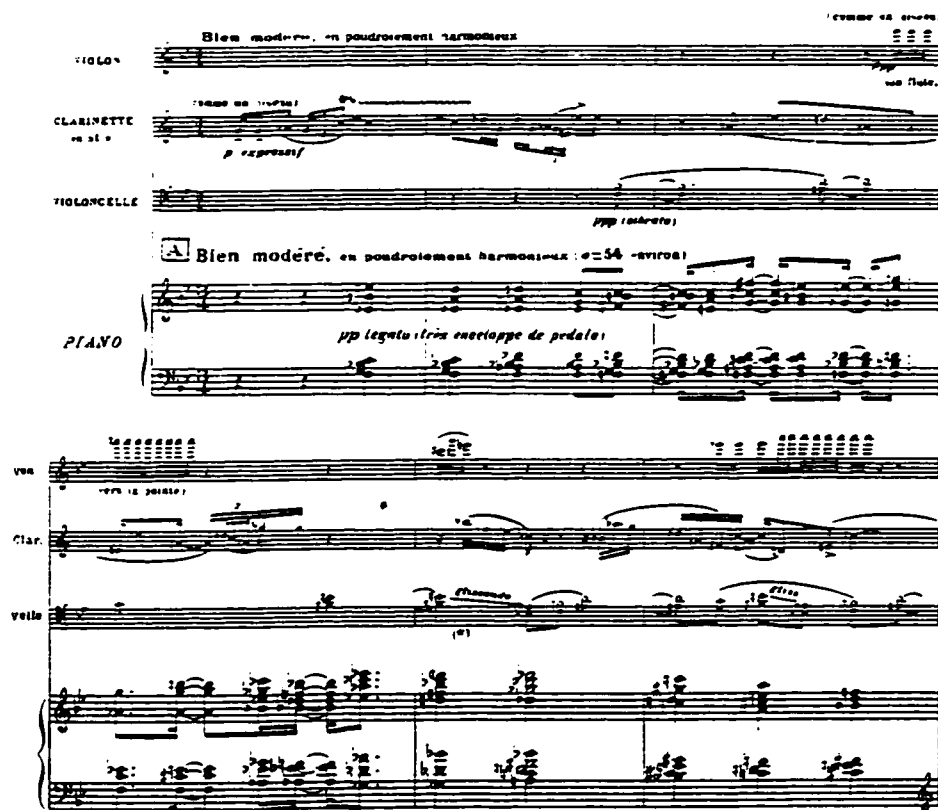
 Râgavardhana Candrakalâ Lakshmîça

QUATUOR POUR LA FIN DU TEMPS

Violon, Clarinette en Si^b, Violoncelle et Piano

OLIVIER MESSIAEN

I. Liturgie de cristal



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vos
 Clar.
 velle

B

von
 Clar.
 velle

von
 Clar.
 velle

C

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von

Clar.

vclle

ritardando

rit

This system shows the first measures of the piece. The voice part has a melodic line with some grace notes. The clarinet part has a descending scale-like figure. The violin part features a series of eighth notes with a 'ritardando' marking. The piano accompaniment consists of chords and moving lines in both hands.

von

Clar.

vclle

rit

D

The second system continues the musical themes. The voice part has a more active line. The clarinet part has a melodic phrase. The violin part has a 'rit' marking. The piano part features a prominent chord marked with a 'D' in a box, indicating a key signature change or a specific harmonic point.

von

Clar.

vclle

rit

rit

The third system shows further development of the musical material. The voice part has a melodic line. The clarinet part has a melodic phrase. The violin part has a 'rit' marking. The piano part features a complex texture with many notes in both hands.

etc.

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2) "Noël" (exerpt from *Vingt Regards sur l'Enfant Jésus*)* – for piano (1944)

This is the Miçra Varna:

("Noël" – 13th piece from *Vingt Regards*):

Modéré, un peu vif

Piano

mf

sf

pp

p

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*See the analysis of *Vingt Regards* in volume II.

3) *Cinq Rechants*¹⁷ (for a capella choir) (1948)

On page five of the first Rechant, the *miçravarna* is sung by the sopranos, then the *simhavikrama* by the three contraltos, the *laya* by the three basses, (and the *parlé-percuté* with variations, for three tenors):

Miçra varna

The musical score for *Miçra varna* consists of two staves. The top staff is for the soprano, marked with a treble clef and a key signature of one flat. It begins with a *mf* dynamic and features a melodic line with various ornaments and a final *pp* (pianissimo) ending. The bottom staff is the piano accompaniment, starting with a *mf* dynamic and featuring a rhythmic pattern with triplets and a final *pp* ending.

Simhavikrama

The musical score for *Simhavikrama* consists of two staves. The top staff is for the contralto, marked with a treble clef and a key signature of one flat. It begins with a *mf* dynamic and features a melodic line with various ornaments and a final *pp* ending. The bottom staff is the piano accompaniment, starting with a *mf* dynamic and featuring a rhythmic pattern with triplets and a final *pp* ending.

Laya

The musical score for *Laya* consists of two staves. The top staff is for the bass, marked with a bass clef and a key signature of one flat. It begins with a *mf* dynamic and features a melodic line with various ornaments and a final *etc.* ending. The bottom staff is the piano accompaniment, starting with a *mf* dynamic and featuring a rhythmic pattern with triplets and a final *etc.* ending.

The musical score for *3 Tén.* (Tenors) consists of two staves. The top staff is for the tenors, marked with a treble clef and a key signature of one flat. It begins with a *mf* dynamic and features a melodic line with various ornaments and a final *etc.* ending. The bottom staff is the piano accompaniment, starting with a *mf* dynamic and featuring a rhythmic pattern with triplets and a final *etc.* ending. The score is divided into four sections: *normal*, *1^{re} variation*, *2^e variation*, and *3^e variation*.

¹⁷*Five Rechants*

Here is this passage, with music: (pages 5-7 of the score).

(parlé, percute)

1^{re} et 2^e Tén. *mf* t k t k t t k t k t

2^e et 3^e *mf* t k t k t t k t k

p *cresc. mollo*

1^{re} Tén. *mf* t k t k t t k t k t

2^e et 3^e *mf* t k t k t t k t k

(furieux)

1^{re} et 2^e Sopr. *mf* ha ha ha ha ha soif

1^{re} Sopr. *mf* ha ha ha ha ha soif

1^{re} Contr. *mf* ha ha ha ha ha soif

1^{re} et 2^e Tén. *mf* ha ha ha ha ha soif

3^e Tén. *mf* ha ha ha ha ha soif

1^{re} Basses *mf* ha ha ha ha ha soif

(souple)

à 3 *f* l'ex-plo-ra-teur Ur-

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Couplet
Modéré (berceur et tendre)

2^e *mf*

3 Sopr. m - roir d'e - toi -

1^{er} *mf*

1 Contr. phé - e trou - ve son cœur dans la mort ha - yo - ma ka - pri -

(parlé, percute)

1 Tén. t k t k t k

3^e *mf*

3 Basses phé - e trou - ve son cœur dans la mort Bar - be Bleure)

R.L. 12.356 a Cl.

2^e

3 Sopr. le châ - teau d'e - toi - le Y - seult d'a - mour se - pa - re

1^{er} *mf*

1 Contr. - ta - ma ha - yo - ma ka - pri - ta - ma ha -

1 Tén. t k t t k t k t k t k

3^e *mf*

3 Basses châ - teau de la septie - me por - te Ha

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1^{re} Sopr. 3^e 2^e *mf* 1^{er} *mf*

bul - le de cris - tai d'e - toi - le mon

1^{er} Contr. 1^{er} 3^e

- yo - ma ka - pri - ta - ma ha - yo - ma ka - pri - ta -

1^{er} Ten. 3^e

t k t k t k t

1^{er} Basses 2^e

ka - pri - ta - ma Bar - be Bleu (e) châ - teau de

1^{er} Sopr. 1^{er} *pp* 2^e *mf*

re - tour mi - roir d'e - toi - le

1^{er} Contr. 3^e 1^{er} 3^e

- ma ha - yo - ma ka - pri - ta - ma ha - yo - ma

1^{er} Ten. 3^e

t k t k t k t k t k t k t k t

1^{er} Basses 3^e 2^e

la sep - tie - me por - te Ha ka - pri - ta - ma Bar - be

1^{er} Sopr. 2^e 3^e

châ - teau d'e - toi - le Y - seult d'a - mour se - pa - re

1^{er} Contr. 3^e 1^{er} 3^e

ka - pri - ta - ma ha - yo - ma ka - pri - ta - ma -

1^{er} Ten. 3^e

k t k t k t k t k t

1^{er} Basses 3^e 2^e

Bleu (e) châ - teau de la sep - tie - me por - te Ha

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1 Sopr. 2^e 2^e 1^{er} 1^{er}
bul - le de cris - tal - d'é - toi - le mon
3 Contr. 1^{er} 3^e 1^{er}
ha - yo - ma ka - pri - ta - ma ha - yo - ma ka - pri -
3 Tén. a 3 t k t k t k t k t
1 Basses 2^e 3^e
ka - pri - ta - ma Bar - be Bleu(e) château
1 Sopr. 1^{er} 1^{er} 2^e 2^e 1^{er} 1^{er}
re - tour mi - roir d'é - toi
3 Contr. 1^{er} 3^e 1^{er}
- ta - ma ha - yo - ma ka - pri - ta - ma
3 Tén. a 3 t k t k t k t k t
1 Basses 3^e 2^e
de la sep - tiè - me por - te Ha ka - pri - ta - ma

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In these same *Cinq Rechants*, in no. 5, we find the rhythms:



From page 39 (second half) through page 41, here is the music:

The musical score is for a piece titled "Cinq Rechants". It features six vocal parts (Soprano, Contralto, Tenor, Basses) and a basso continuo. The lyrics are in French. The score is divided into two systems. The first system is labeled "Rechant" and "Un peu vif (brutal)". The lyrics for the first system are: "l'a - beilLe", "l'al - pha - bet", "ma -", "jeur". The second system has lyrics: "fleur", "du bour - don", "tour - ne", "tour - ne", "mort", "mort", "mort", "mort", "do.ka", "do", "do", "du", "do".

Rechant
Un peu vif (brutal)

1^{re} et 2^e Sopr. l'a - beilLe l'al - pha - bet ma - jeur
3^e Contr. pha - bet ma - jeur
1^{re} et 2^e 3^e Ten. l'a - beilLe l'al - pha
1^{re} et 2^e Basses ha ha ha ha
3^e Basse bet ma - jeur

1^{re} et 2^e Sopr. fleur du bour - don tour - ne tour - ne
3^e Sopr. fleur du bour - don tour - ne tour - ne
1^{re} et 2^e Contr. fleur du bour - don tour - ne tour - ne
3^e Contr. fleur du bour - don tour - ne tour - ne
1^{re} et 2^e Ten. fleur du bour - don mort mort
3^e Ten. fleur du bour - don mort mort
1^{re} Basse fleur du bour - don
2^e et 3^e Basses do.ka do do du do

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1^{re} Sopr. *ff*
tourne à mort la

2^e Sopr. *ff*
tourne à mort le - zards la grot - te

3^e Sopr. *ff*
tourne à mort la

1^{re} Contr. *ff*
qua - tre le - zards la grot - te

2^e Contr. *ff*
tourne à mort qua - tre le - zards la grot - te

3^e Contr. *ff*
tourne à mort qua - tre le - zards la grot - te

1^{re} Ten. *ff*
des le - zards la grot - te

2^e Ten. *ff*
tourne à mort

3^e Ten. *ff*
tourne à mort le - zards la grot - te

1^{re} Basse *ff*
le - zards la grot - te

2^e Basse *ff*
do.ka do du du do.ka do.ka do.ka

3^e Basse *ff*
do.ka do du du do.ka do.ka do.ka

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1^{re} Sopr. pieuvre et la mort

2^e Sopr. pieuvre et la mort

3^e Sopr. pieuvre et la mort

1^{re} Contr. pieuvre et la mort

2^e Contr. pieuvre et la mort

3^e Contr. pieuvre et la mort

1^{re} Tén. *(furioux)* Co.rol.le qui mord deu - xième garde à man-ger d'a.bord Ha

2^e Tén. *(furioux)* Co.rol.le qui mord deu - xième garde à man-ger d'a.bord Ha

3^e Tén. *(furioux)* Co.rol.le qui mord deu - xième garde à man-ger d'a.bord

1^{re} Basse pieuvre et la mort

2^e Basse pieuvre et la mort

3^e Basse pieuvre et la mort

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A short presentation of my *Cinq Rechants* (for 12 mixed voices)

- The *Cinq Rechants* are written for 12 mixed voices: three sopranos, three contraltos, three tenors, three basses – all soloists. The word "Rechant" is an archaic form of Refrain. It has been used by Claude Le Jeune (French musician from the 16th century) in his *Printemps* for a cappella choir.
- The form of each piece is simple: alternation of Refrains and Couplets with an Introduction and a Coda. The melodic material immediately evokes the French troubadour songs from the Middle Ages (especially Jaufré Rudel and Folquet de Marseille), Peruvian folklore and Hindu music.
- The poem, conceived by the musician at the same time as the music, is a love poem. It is written in French, in a surrealist style close to that of Paul Éluard; in an *invented language*, in which each syllable has been chosen for its timbre and for its effect on the musical rhythm. The vocal writing, caressing and sweet or furiously passionate, expresses yet again the union of two lovers.
- The rhythm here is of considerable importance and completely governs the poem and the music. Furthermore, the use of Hindu rhythms – Miçra varna and Simhavikrama in the first Rechant; Gajajhampa, Candrakalâ, and Râgavardhana in the fifth Rechant. I must signal the effect of the "non-retrogradable rhythm" developed by "augmentation of the central values" in the third Rechant, which is certainly the most original passage of the entire work.
- But, I repeat, the *Cinq Rechants* are five songs of *love*, and this single word "*love*" says more than any commentary could.

4) In the *Sept Haïkai*¹⁸ (for piano and chamber orchestra) (1962) (for which a complete analysis appears in Volume V), I will only cite the first movement "Introduction" here: first the choice of rhythms, their vertical placement, then the three first pages of the orchestra score:

The first movement of *Sept Haïkai*:

Strophe Based On The Hindu Deçî-Tâlas

<div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Sama:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Vijaya:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Sama:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Simhavikrama:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Sama:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Gajajhampa:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Vijaya:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Sama:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Gajajhampa:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Sama:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Sama:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Lakskmîça:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Gajajhampa:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Candrakalâ:</div>  </div>	<div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Sama:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Gajajhampa:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Vijaya:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Sama:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Simhavikrama:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Sama:</div>  </div> <div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">[</div> <div style="margin-right: 10px;">Vijaya:</div>  </div>
--	--

Upper voices: retrograde →

Lower voices: original →

¹⁸Seven Haïkaïs

First movement *Sept Haikai*

4
8

BOIS

PIANO

vijaya 2

sama 2

simhavikrama 2

sama d

vijaya d

sama d

simhavikrama d

sama 2

vijaya 2

sama d

gajjehampa 2

sama 2

gajjehampa d

vijaya d

Candrakalā 2

sama d

gajjehampa d

sama d

example from *Sept Haikai* continued

4
8

BOIS

PIANO

sama d

Lakṣmīṇā d

gajajhampa d

Candrakalā d

gajajhampa 2

Lakṣmīṇā 2

sama 2

sama 2

gajajhampa 2

sama 2

vijaya 2

gajajhampa 2

sama d

gajajhampa d

vijaya d

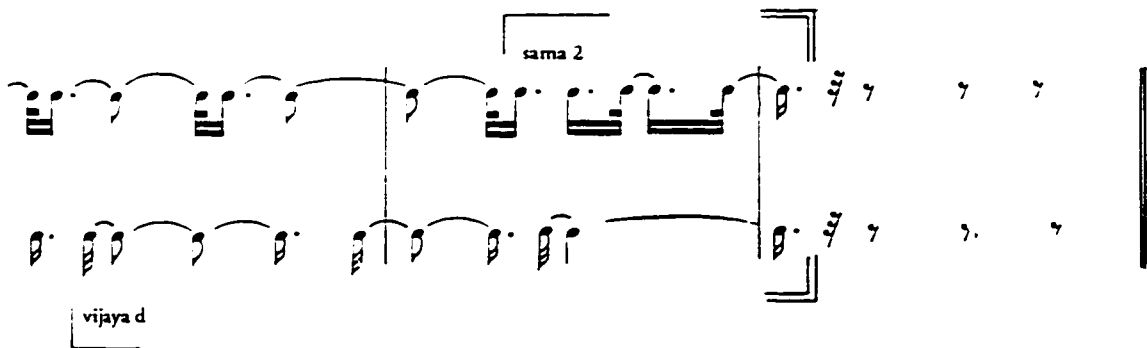
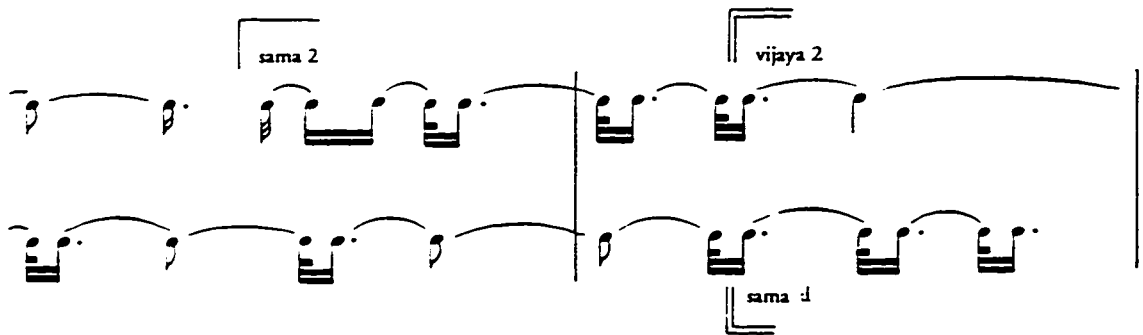
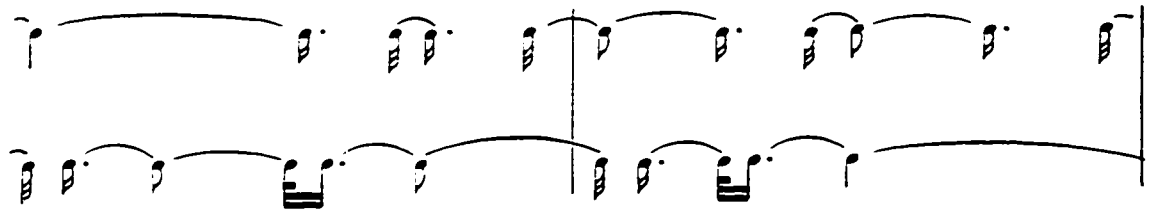
sama 2

simhāvīkrama 2

sama d

simhāvīkrama d

end of example from *Sept Haikai*



Modéré ♩ = 80

P^{te} FLÛTE

1 FLÛTE

2 HAUTBOIS

COR ANGLAIS

P^{te} CLARINETTE

2 CLARINETTES

CLARINETTE BASSE

2 BASSONS

(rythmes des 3 Shakti)

1 TROMPETTE

1 TROMBONE

Modéré ♩ = 50
(1^{re} strophe)

3 VIOLONS
(1 4 8)

CYLOPHONE

MARIMBA

PIANO

4 Modéré ♩ = 40

CENCERROS

CLOCHES

C. G. C. T.

(rythme retrograde)

(rythme retrograde)

(tous les 4)



(miçra varna)


(rythme droit)

(rythmes des 3 Shakti)

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5) We could consult the complete analysis of *Turangalila-Symphonie* (1946-48) in volume II where Hindu rhythms abound. Here I am only citing the rhythms used in the fourth piece, "Chant d'amour 2." In the fifth measure, the wood-block enters to create an ostinato which aligns:

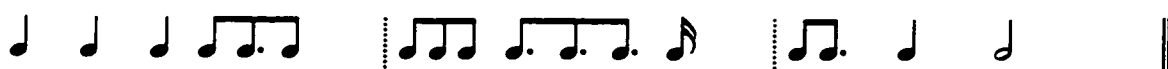
a) Varied Râgavardhana:  | The three eighth notes are the diminution of the three quarter notes; this diminution is inexact, because of the dot added to the second eighth note; additionally:  is non-retrogradable – (Râgavardhana is number 93 of the 120 Deçî-Tâlas).

b) Candrakalâ by diminution:  | The three dotted eighth notes are the augmentation of the three eighth notes, by addition of a dot; the final sixteenth note is an added value. (Candrakalâ is number 105 of the 120 Deçî-Tâlas).

c) Lakskmîça by augmentation  |

The quarter note and the half note are the augmentation of the eighth note and the dotted eighth note; inexact augmentation, because the half note is too long by one eighth note. (Lakskmîça is number 88 of the 120 Deçî-Tâlas).

Placed end to end, Râgavardhana, Candrakalâ, Lakskmîça, give us a complete cycle of our rhythmic pedal:



From the beginning (fifth measure) up to, but not including number 2, the wood-block repeats this ostinato. Total: four cycles. In the fourth cycle, the last Lakskmîça value is shortened (it becomes a quarter note), because of the Bridge which begins here. The wood-block plays mezzo-forte, its woody timbre carries well, and its rhythmic pedal takes on the importance of a theme.

6) The *Messe de la Pentecôte* (for organ) written in 1950, (the complete analysis will appear in Volume IV), contains many commonly used Hindu rhythms.

In the second piece, "Offertoire" – "Les choses visibles et invisibles,"¹⁹ three Hindu rhythms, three Deçî-Tâlas, are found: Tritîya, Caturthaka, Nihçankalîla. They follow each other according to six orders: the six possible inversions or permutations with three unspecified objects. In the third piece, "Consécration" – "The gift of Wisdom," the first measure exposes to the PED (which sounds an 8^{ve} above the notation), the Simhavikrama rhythm.

Then at the sixth measure, always for the PED, the Miçra varna. (Same registration with the bugle four alone for the PED, playing the theme as a solo, an octave above).

Page 14 of the score:

III. CONSÉCRATION (Le don de Sagesse)

"L'Esprit-Saint vous rappellera ce que je vous ai dit" (Evangile selon Saint Jean)

R: bourdon 16, gambe, octavin 2 | Pos: quintaton 16 et 3" | G: bourdons 8 et 16 |
 Péd: clairon 4 seul |

*Moderato (rythme hindou simhavikrama)
 non leg.*

*Un peu plus allant (neumes plain-chantésques)
 Pos: clarinette, nazard, quintaton 16*

¹⁹"Offertory" – "Visible and Invisible Things"

Modéré (rythme hindou micro varna)

MAV. *p* *legato* *pp* *Pos* *Pos* *Pos* *Pos* *R* *pp*

PED. *legato* *piu f* *piu f*

Pos. clarinette, nazard, quintaton 16

etc.

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No. 2 – Pièce en trio

Here is page 5, beginning of the piece. Here, the PED sounds an octave below the written notes:

Livre d'orgue

II. PIECE EN TRIO

"Maintenant, nous voyons dans un miroir, d'une manière obscure..." M. Paul, 1^{re} Epître aux Corinthiens, XIII, 12)
pour le timbre de la Sainte Trinité

R: cymbale 3 rangs 1 Pos: quintaton 16, cor de nuit 9, nazard 2 2^e G: bourdon 16, flûte 4
Péd: soubasse 16, contrebasse 16, tirasse R:

rythmes hindous variés, monnayés, et traités en valeurs traditionnelles

Moderne

Dim 2 2^e umhankrama

MAN. *mf legato*

PED. *mf legato*

MAN. *mf legato*

PED. *mf legato*

MAN. *mf legato*

PED. *mf legato*

MAN. *mf legato*

PED. *mf legato*

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No. 5 – "2^e Pièce en trio"

The lower range (PED) sounds an octave above the notation. This is the principal melody.

The rhythm for the upper range contains three Deçî-Tâlas:

Rangapradîpaka, Caccarî, and Sama. (They are permuted).

The middle range: three other Hindu rhythms; Laya, Bhagna, Niççanka. (They include rhythmic characters, augmentations, diminutions, etc...)

Here is page 19:

V. PIÈCE EN TRIO

"de Lui, par Lui, pour Lui sont toutes choses" St Paul, Epître aux Romains - II, 36
pour le dimanche de la Sainte Trinité

1961. devant les glaciers du Râteau,
de la Meije et du Tabuchet

Portée supérieure: interversions de 3 rythmes hindous (rangapradîpaka, caccari, sama). Rangapradîpaka est augmenté dès le départ de 2 g par valeur, il perd une g par valeur à chaque répétition. Caccari est diminué dès le départ d'une g par valeur, il gagne une g par valeur à chaque répétition. Sama ne change jamais. - Puis on reprend les interversions précédentes en ordre retrograde. Puis on les reprend encore en ordre normal.

Portée médiane: interversions de 3 rythmes hindous (laya, bhagna, niççanka). Laya est augmenté de 7 g par valeur à chaque répétition. Bhagna ne change jamais. Niççanka est augmenté dès le départ de 2 g par valeur, il perd une g par valeur à chaque répétition. Il n'y a pas de reprise.

Partie de pédale: c'est la mélodie principale.

R: bourdon 16, voix humaine 8 (sans trém), nazard 2 $\frac{2}{3}$, octavin 2 |

Pos: quintaton 16, principal 8, nazard 2 $\frac{2}{3}$, tierce 1 $\frac{1}{3}$ |

G: prestant 4, flûte 4, plein jeu | Péd: tirasse G seule (le son principal de la partie de pédale est la 4 pieds)

Bien modéré

MAN. *mf legato*

laya

niççanka

Pos. rangapradîpaka *mf legato*

caccari

laya

mf legato

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Pos. sama rangapradipaka

legato

15 19 9 9 9

piu f leg. (melodie principale)

etc.

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End of Volume I

ACKNOWLEDGEMENTS

We would like to thank the editors who have authorized the reproduction of excerpts from the following works:

- | | |
|---------------------|--|
| Albin Michel: | <i>Vie et Transmutations des Atomes</i> , de Jean Thibaut (1942)
<i>La Mythologie Hindou</i> , by Jean Herbert (1953)
<i>Kena Upanishad</i> , by Shri Aurobindo (1942) |
| Armand Colin: | <i>Précis de Philosophie</i> , by Armand Cullivier (1953) |
| Victor Attinger: | <i>Des Sons et des Couleurs</i> , by Blanc-Gatti |
| Buchet-Chastel: | <i>L'Inde du Nord</i> , by Alain Daniélou (1960) |
| Boivin: | <i>Les Rhythmes comme Introduction physique à l'Esthétique</i> , by Pius Servien |
| E. de Boccard: | <i>Prosodie et Métrique grecque et latine</i> , by Bornecque (1933) |
| Desclée de Brouwer: | <i>À la Gloire de la Terre</i> , by Pierre Termier |
| Desclée: | <i>Nombre musical grégorien</i> , by Dom Mocquereau (1908 and 1927) |
| Flammarion: | <i>Les Jockeys camouflés</i> , by Pierre Reverdy
<i>La Relativité</i> , by Albert

<i>À travers les Espaces célestes</i> , Abbé Moreux (1934)
<i>L'Évolution des Idées en physique</i> , by L. Infeld and A. Einstein (1951) |
| Gallimard: | <i>Le Temps et la Vie</i> , by Lecomte du Noüy (1936)
<i>Essai sur le Rythme</i> , by Matila C. Ghyka (1938)
<i>L'Âme et la Danse</i> , by Paul Valéry
<i>Facile</i> , by Paul Éluard |
| Julliard: | <i>Journal de l'analogiste</i> , by Suzanne Lilar (1954) |
| Larousse: | <i>Astronomie</i> , by Rudaux (1925)
<i>Dictionnaire des racines</i> , by Grandsaignes d'Hauterive (1948)
<i>Les deux infinis</i> , by Marcel Boll (1938 and 1945) |
| Magnard: | <i>Lavarenne</i> (1948) |
| Mercure de France: | <i>Livre 2^e de la jungle</i> , de Rudyard Kipling (1935)
<i>Nature aux cent visages</i> (1943) |

- The Time Machine*, by H. G. Wells (1941)
Le repos du septième jour, by Paul Claudel
- Payot: *Les éléments spirituels des nombres*, by Bindel (1960)
- Picard: *Manuel des études grecques et latines*, by Laurand (1948)
 Plon: *L'homme, cet inconnu*, by Alexis Carrel (1935)
- Presses Universitaires de France: *L'évolution créatrice*, by Henri Bergson (1948)
Dialectique de la durée, by Gaston Bachelard (1950)
Le temps musical, by Gisèle Brelet (1949)
L'espace et le temps, by Émile Borel (1949)
Le rythme musical, by Edgar Willems (1954)
La relativité, by Paul Couderc (1952)
Expansion de l'univers, by Paul Couderc (1950)
- Revue Musicale: "Le rythme concret," taken from *Polyphonie*, by André Souris (1948)
Le giusto syllabique bichrone, by C. Brailoiu (1948)
- Éditions de Seuil: *À la recherche d'une musique concrète*, by Pierre Schaeffer
- Société Française d'Éditions: *Astronomie*, by Théo Varlet
- Styhoff: *Traité de métrique grecque*, by W. J. W. Koster (1962)
- Vega: *La danse hindu*, by Srimati Usha (1951)

ACKNOWLEDGEMENTS

I would like to thank the editors who have authorized the reproduction of excerpts from the following works:

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SELECTED BIBLIOGRAPHY

Books

- Baumgartner, Anne S. *A Comprehensive Dictionary of the Gods from Abaasy to Zvoruna*. New York: Carol Communications, 1984.
- Bell, Carla Huston. *Olivier Messiaen*. Boston: Twain Publishers, 1984.
- Boivin, Jean. *La Classe de Messiaen*. France: Christian Bourgois, 1995.
- Blume, Friedrich, ed. *Die Musik in Geschichte und Gegenwart*, vol. 9. Basel: Bärenreiter Kassel, 1961, s.v. "Messiaen."
- Burrow, T. *The Sanskrit Language*. London: Faber and Faber Ltd., 1955.
- Dalhaus, Carl, ed. *Reimann Musik Lexicon*, vol. 2. Mainz: B. Schott's Söhne, 1975, s.v. "Messiaen."
- Einstein, Albert. *Theory of Relativity*. New York: Brentano's Publishers, 1920.
- Gol  a, Antoine. *Rencontres avec Olivier Messiaen*. Paris: Julliard, 1960.
- Griffiths, Paul. *Olivier Messiaen and the Music of Time*. Ithaca: Cornell University Press, 1985.
- Halbreich, Harry. *Olivier Messiaen*. Paris: Librairie Arth  me Fayard, Fondation SACEM, 1980.
- Halporn, James W. Martin Ostwald, and Thomas G. Rosenmeyer. *The Meters of Greek and Latin Poetry*. Suffolk: Methuen and Company, Ltd., 1963.
- Hill, Peter, ed. *The Messiaen Companion*. Portland: Amadeus Press, 1995.
- Hsu, Madeleine. *Olivier Messiaen, the Musical Mediator: A Study of the Influence of Liszt, Debussy, and Bart  k*. London: Associated University Presses, Inc. 1996.
- Johnson, Robert Sherlaw. *Messiaen*. Los Angeles: University of California Press, 1975.
- Jonsson, Lars, *Birds of Europe with North Africa and the Middle East*, trans. Christopher Helm. New Jersey: Princeton University Press, 1992.
- Kendris, Christopher. *501 French Verbs*. New York: Barron's Educational Series, 1982.
- Kipling, Rudyard. *The Second Jungle Book*. New York: Doubleday, Doran and Company, Inc., 1895.

- Messiaen, Olivier. *Technique de mon langage musical*. Paris: Alphonse Leduc, 1944.
- _____. *Traité de Rythme, de Couleur, et d'Ornithologie*, vol.2. Paris: Éditions Musicales Alphonse Leduc, 1995.
- Mythologies*, vol. 1, comp. Yves Bonnefoy. Chicago: Chicago University Press, 1981.
- The Old and New Testaments of The Holy Bible*. New Jersey: Thomas Nelson, Inc. 1946.
- Payne, John, comp. *Ballades and Lyrics of François Villon*, trans. Dante Gabriel Rossetti. Mount Vernon: The Peter Pauper Press, n. d.
- Perry, Edward D. *A Sanskrit Primer: Based on the Leitfaden für den Elementar-Cursus des Sanskrit by Professor George Bühler of Vienna*. Boston: Ginn and Company, 1885.
- Rilke, Rainer Maria. *Les Élégies de Duino – Les Sonnets à Orphée*, trans. Gérard Signoret. Paris: Éditions Tūm/Michel de Maule, 1996.
- _____. *Uncollected Poems*, trans. Edward Snow. New York: North Point Press, 1996.
- Samuel, Claude. *Olivier Messiaen: Music and Color*, trans. E. Thomas Glasow. Portland: Amadeus Press, 1994.
- Simms, Bryan R. *Music of the Twentieth Century: Style and Structure*. New York: Schirmer Books, 1986.
- Symonds, John Addington. *Studies of the Greek Poets in Two Volumes*. New York: Harper and Brothers, Publishers, 1880.
- Wells, H. G. *The Time Machine*. London: Ernest Ben Ltd., 1960.

Dictionaries

- The American Heritage Dictionary of the English Language*, ed. William Morris. Boston: Houghton Mifflin Company, 1981.
- The Concise Dictionary of English Etymology*, ed. T. F. Hoad. New York: Oxford University Press, 1986.
- Elsivier's Dictionary of Trees and Shrubs in Latin, English, French, German, Italian*, comp., Hugues Vaucher. New York: Elsivier Science Publishers, 1986.
- Evans, Bergen. *Dictionary of Mythology*. New York: Dell Publishing, 1970.
- La Grande Dictionnaire Encyclopédique Larousse*. Paris: Librairie Larousse, 1982.
- La Grande Dictionnaire Universelle du XIXe siècle*. Paris: Administration du Grand Dictionnaire Universelle, n. d.
- Harper Collins Español-Inglés Diccionario*. New York: Harper Paperbacks, 1990.

Harvard Dictionary of Music, 2nd ed., comp., Willi Apel. Cambridge: The Belknap Press of Harvard University Press, 1972.

The New College French and English Dictionary, comp., Roger J. Steiner. New York: Bantam Books Inc. 1972.

The New Grove Dictionary of Music and Musicians. ed., Stanley Sadie. London: Macmillan Publishers, Ltd., 1980, s.v. "Messiaen," by André Boucourechliev, 204-208.

Oxford English Dictionary, 2nd ed. [CD-ROM] Oxford: Oxford University Press, 1994.

Petit Robert 1. Paris: Dictionnaire LE ROBERT, 1986.

Pocket German Dictionary. Berlin: Langenscheidt KG, 1987.

Pocket Oxford Latin Dictionary, ed. James Morwood. New York: Oxford University Press, 1995.

Internet Sites

Aether and Relativity – Einstein (1920) – Theories of the Aether (Articles relating to the Emergence of Scientific Theories of the Cosmic Aether). Australia: Mountain Man Graphics, 1996. URL: http://magna.com.au/~prfbrown/aether_0.html

A Glance: The Song of God: Bhagavad Gita. Amazon.com, Inc., 1998. URL: <http://www.amazon.com/exec/obidos/ASIN/0451627571/u/qid=0/sr=0-0/002-2365716-3879434>.

Biosis and the Zoological Society of London. *Index to Organism Names*. London, 1997. URL: <http://www.york.biosis.org/triton/indexfm.html>

Burglass, Roger. *Birds of Europe-Bilingual Checklists*. URL: http://ourworld.compuserve.com/homepages/roger_buglass/gbfr.html

Collins, Russ. *Birds Beyond the French Riviera*. Grasse, France, 1998. URL: <http://www.beyond.fr/birds/index.html>

Lepage, Denis. *Les Oiseaux du Québec*. Québec City, Canada, 1998. URL: <http://www.ntic.qc.ca/~nellus/quebangl.htm>

Monroe, Burt Jr. and Charles Sibley. *Bird Families of the World: The Sibley and Monroe Classification from Distribution and Taxonomy of Birds of the World*. New Haven: Yale University Press, 1993. URL: <http://wwwstat.wharton.upenn.edu/~siler/birdframe.html>

Shree Rama. Vishwa Hindu Parishad, n.d. URL: <http://www.hindunet.org/god/rama.html>

Towner, Howard F. *Southern California Natural History: a multimedia textbook*. Los Angeles, California, 1997. URL: http://eco.bio.lmu.edu/WWW_Nat_History/nathist.html

Letters

René Babineau, Canada, to [the author, Norman Oklahoma], email, April 12, 1998.

Jean Leduc, Paris, France, to [the author, Norman, Oklahoma], letter, October 10, 1997,
Alphonse LEDUC & Cie Éditeurs de Musique.

Nicolas Meeus, Université de Sorbonne, Paris, France, to [the author, Norman,
Oklahoma], email, September 3, 1998.

Judith Howcroft, Special Projects Manager, North Yorkshire, UK, to [the author, Norman
Oklahoma], email, April 14, 1998, BIOSIS UK.

Recordings and

Bartók, Béla. *Mikrokosmos*, vol. 6. New York: Boosey & Hawkes Music Publishers
Ltd., 1987.

de Falla, Manuel. *El amor brujo*. New York: G. Schirmer, Inc., 1924.

Le Jeune, Claude. liner notes for *Le Printans*, Huelgas Ensemble, Sony 68 259.

Messiaen, Olivier. *Cinq Rechants*. Paris: Editions Salabert, 1942.

_____. *Quatuor pour la fin du temps*. Paris: Edition Musicales Durand, 1942.

_____. *Vingt Regards*. Paris: Edition Musicales Durand, 1942.

Ravel, Maurice, *Daphnis et Chloé*. Paris: Edition Musicales Durand, 1913.

_____. *Gaspard de la Nuit*. Paris: Edition Musicales Durand, 1909.

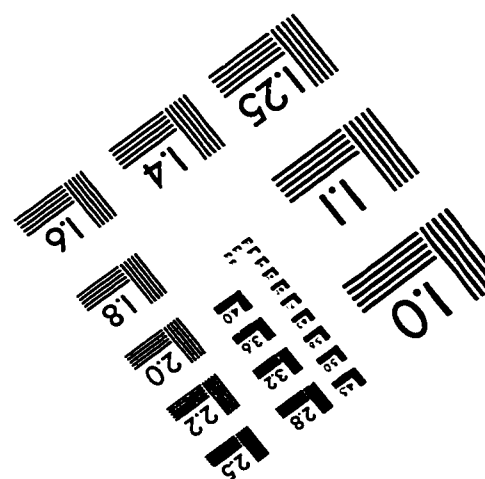
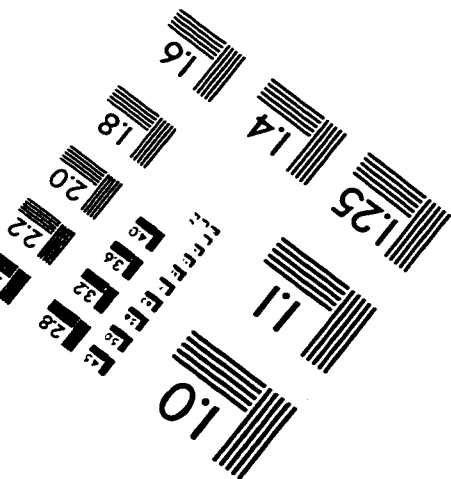
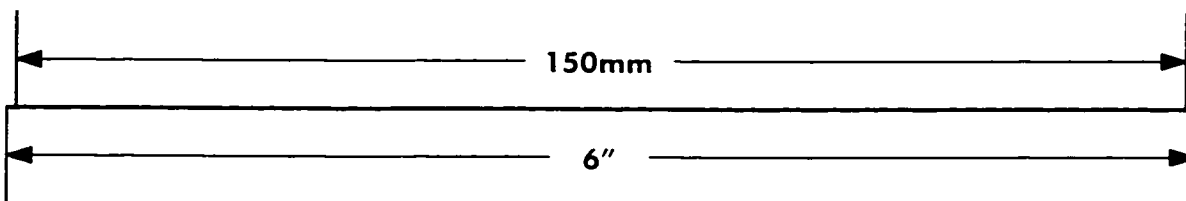
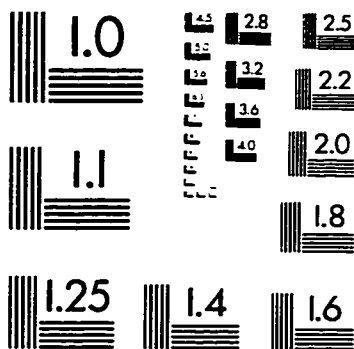
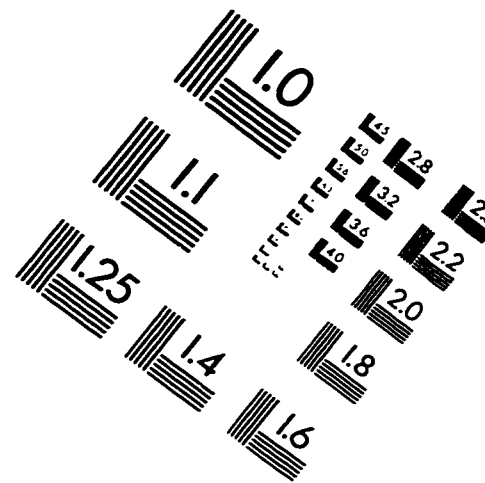
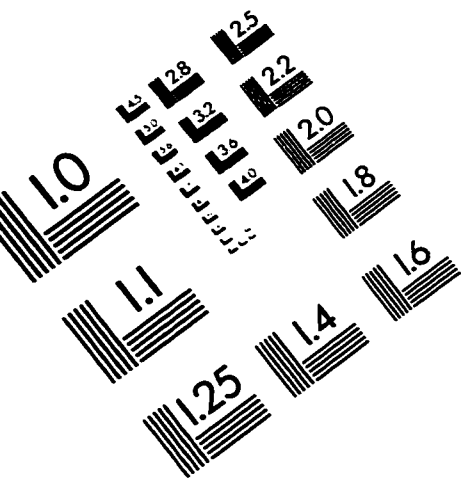
Stravinsky, Igor. *Histoire du soldat*. New York: Chester Music, 1987

_____. *Les Noces*. New York: Chester Music, 1980.

_____. *Petrouchka*. New York: Boosey and Hawkes, 1948.

_____. *Le Sacre du Printemps*. New York: Boosey and Hawkes, 1921.

IMAGE EVALUATION TEST TARGET (QA-3)



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