

A. *Towards a new Music Theory*

Now we must tackle those tasks to which P.S. contrived to give the most forbidding names that he could find in the educational tradition: “Music Theory”, “Prose composition”, and “Translation” and all this to make “suitable” objects! A whole programme which, incidentally, is not lacking in humour: nevertheless we must give attention to it.

Without any doubt, with these words P.S. wanted to deter dilettantes, or those who thought they knew everything already, and whom he invited to start a new process of learning.

» 36. INTERDISCIPLINE, INTERDISCIPLINARY

1) The name interdisciplinary is given to research which, alongside specialist studies, seeks to find the functional link or the lateral relationship which can create a single subject, whose various aspects are scattered over disciplines which ignore each other either deliberately or by default. Music, insofar as it is an inclusive activity which cuts across many specific disciplines, is the privileged area for interdisciplinary research. This desire to demolish compartmentalizations and specializations is expressed in the subtitle of the *Traité*: “interdiscipline essay”.

2) There is also an intention to denounce the pseudo-interdisciplinary attitude in modern music which consists in mapping every discipline involved on to one privileged, usually scientific, model, (physics, mathematics, informatics etc.).

a) *Wariness of specialists: the general misapprehension.*

Contemporary practice is to “*publish only with extreme caution within the well-defined field of one’s competence*” (12).

This wariness is the source of much misunderstanding and leads to a neglect of broader fields of study and omission of the essential:

[89] “*For Westerners, music cannot be dissociated from a ‘theory of music’ which, if the manuals are to be believed, rests on a scientific basis, acoustics. University and conservatory teaching back each other up, and this is expressed in a certain number of definitions: musical note, scale, chord etc., considered as principles established once and for all, under the*

discreet keeping of specialists, physicists and musicians, who mutually support each other, or else declare themselves incompetent in a field which is not theirs” (18).

These specialists only labour so well in the field “*because they implicitly accept that there is a common stock, even a precise language, so that when they talk about music, they can understand each other. But as a result many well-known people work in good faith on principles which are only postulates, and terms which are ambiguous” (28).*

This is what the author calls the “common misapprehension” (28).

Hence his preoccupation: “*to discover the missing link between one discipline and another, not based on those crude or fragile links, physical content or literary analogy, but on a relationship cutting across all these, whose original workings are yet to be discovered” (11).* This exposes him to the constant risk of being at odds with the established order.

“*It is to be feared that the author (...) may be in possession of a powder to make the specialists sneeze” (12).*

The main disciplines which the T.O.M. discusses in relation to music are basically *physics* (book III) and psychology, as it happens, *phenomenology* of perception (book IV) and also *linguistics*.

“*An interdisciplinary project is always ambitious, because of the specialisms it seeks to bring together. Either one researcher must take them all on, and he knows in advance that he will be no more than an amateur in each (...) or he must gather the specialists around himself, which is possible in theory but unmanageable in practice” (640), and P.S. adds, in 1974 “a delicate matter socially”.*

b) *Music, a special challenge for interdisciplinary research...*

“*Music [as a universalizing activity which mobilizes several disciplines] validates what each contributes through synthesis, facts as much as ideas, and, in the same way as they do, presents itself as an act of discovery, which aims as much or even more to establish a branch of knowledge as to create works” (31)* But it is not “*pre-established harmony*” that reigns between music and mathematics, psychology and acoustics, it is “*the disparate and the scattered*”. Why?

“*If disciplines are so ill-met in music, even though this is a favoured place for them to come together, it isn’t because there’s something wrong with them, or that their coming together is badly organized, it’s because each one is pursuing its own specific goal, without any of them aiming for the main objective.” (29)*

c) *Temptations for a single discipline to take over.*

We often try to unify the various disciplines under the umbrella of a single one.

“*Tempted by the idea of unity, the only objectivity imagined by the typical scientist is physical objectivity. His acknowledgement of non-physicist truths is for him only the stage*

which precedes their being annexed. He doesn't see that all specialized auditory activity establishes a field of objective practices which are entirely original, and not one of which can use the results of another unless it disqualifies its truths." (127)

The authentic interdisciplinary attitude is therefore, rather than hastily to claim unity, first to shed light on the *difficulties of moving* from one discipline to another: [90] this is what, for example, is being done by the study of *correlations* between physics and music, which is initially the study of their non-correlations (discrepancies, interpretative differences, double meanings of words, misunderstandings about concepts and finally actual mistakes in facts and statements).

So we must fight against "*scientific prejudice*" (the title of chapter 7, 1) which is responsible for the imperialism of mathematical and physics models taking over in music. The "rigour" of procedures based on these models comes to nothing if it gives "*results that cannot be interpreted in the field of music*". (138)

INTERDISCIPLINE: 11, 12, 18, 28-30, 31, 126-127, 137-138, 292, 640.

» 37. PROSE COMPOSITION/TRANSLATION

1) A pair of complementary activities referring respectively to "Doing" and "Hearing". Prose composition consists of *making* sounds, manufacturing them, recording them etc. with a scheme, a notation, an intention. Translation consists of *hearing* them, and trying to define precisely our perception of them in order to provide a (verbal) account which is as explicit as possible (460-461).

2) Considered in this way, contemporary music is characterized by a radical imbalance, favouring *prose composition* (we make many types of musics and sounds which are devised and justified solely by the procedures through which they are made) and completely neglecting translation, i.e. the *art of hearing*. To sum up, today: "*we do not know how to hear what we make*".

The experience of *musique concrète*, based initially on sound objects which are made by sampling (technique of the closed groove), has however led concrete musicians to concentrate on *hearing* them, thereby reestablishing translation. To give a *method for translation* is one of the principal aims of the T.O.M.

3) Translation, which raises the problem of identifying and sorting objects, leads to *typology*.

Prose composition, which raises the problem of describing and making objects, leads to *morphology*.

The programme of Music Theory thus comprises *exercises in translation* (a kind of "musical dictation" of sound objects, which we try to describe and evaluate in relation to the

perceptual field) and *exercises in prose composition*, which deals with *creating* sounds, starting from a preconceived schema.

4) Generally speaking, the spirit of the T.O.M. is to *restore translation*, and encourage musicians to practise prose composition (that is to say musical composition) only when they have a more solid foundation in translation so that they can hear what they make.

PROSE COMPOSITION/TRANSLATION: 86-87, 147, 341, 390-394, 397, 460, 468, 490-491, 596, 614.

» 38. MUSIC THEORY (AND PROGRAMME OF MUSICAL RESEARCH)

1) In the renewed sense which P.S. gives it, Theory becomes “*the art of practising better listening*”; it is an “*experimental ... and realistic*” [91] approach to the sound object, a kind of becoming aware of the new materials of music while distrusting preconceived ideas, and relying first and foremost upon what is *heard*.

But it is also a “*GENERALIZED MUSIC THEORY*”, without notation, because it is intended to apply to the whole universe of sounds already available, or capable of being made, and not only to the sounds of traditional music, of measurable pitch, and produced by a limited number of instruments.

2) This MUSIC THEORY is situated rather in the area of HEARING than MAKING, it is descriptive rather than operational. The criteria which it seeks to bring out are not expressed by symbols leading to (premature) notations for new scores, but as a deepening of the act of listening, seeking in sounds their musical potential, prior to any plan of notation or composition.

3) This music theory “*is not yet music*” (488); it is the indispensable preliminary to it.

It is embodied in the five procedures of the programme of musical research: typology, morphology, characterology, analysis, synthesis (PROGREMU)

a) *The ideal of musical theory.*

From the beginnings of *musique concrète* P.S. sought not only a new music, but also natural perceptual bases which could establish a “concrete experience” of music. His first work on the subject, *A la Recherche d'une Musique Concrète*, published in 1952, concluded with a reflection on the concrete experience, which argued the need for a new “theory of music” to establish the new technique properly and authentically, and within the “outline of a concrete Music Theory”, drafted jointly with Abraham Moles. We can already find the seeds of what became the Music Theory of Sound Objects, but also hypotheses which were rapidly abandoned by Schaeffer (such as the “trihedron of reference” which attempted to give a 3

dimensional representation of the sound object, harmonic, dynamic and melodic). Was the still systematic nature of this Music Theory (which even calculates the possible number of families of “synthesizable” sound based on their constituent criteria) due to Abraham Moles? But also some of the notions, the criteria investigated in greater depth later in the T.O.M. are already there in a more or less rudimentary and early stage of definition.

P.S. recalls these first attempts in the historical summary in the first pages of the T.O.M., expressing his regret that in its theoretical development, musique concrète claimed at that time to be an expression of the “*trihedron of reference*” and Moles’ theory of the “*slab of sensation*”. The concepts of reduced Listening and sound Object had not been developed as they were later. However, it is these notions which allow us to bypass any ambiguous reference to acoustic parameters. Once these notions had been clarified, “*sound was no longer considered in relation to the three acoustic parameters; now we had perceived “sound objects”, which a new music theory aimed to study*”. (62)

b) *Generalization of music theory: from traditional to experimental music theory.*

Traditionally, music theory is “*the means of notating musical ideas, quite as much as translating these ideas into sounds*” (490), and the verb “*solfier*” means “*to get from an [92] instrument (which could be the voice), sounds corresponding to symbols in the sense of prose composition*”. (490)

This traditional music theory, enacted “*after the event*”, within the framework of a collectively constituted and assimilated system, can approach the description and the definition of sound material in very sketchy terms, since it has reference to a code of practice. The system functions very well without any need for a very precise perceptual or physical definition of its sound materials, these being always produced by a limited number of instruments with known timbres. Therefore, the definition of sound in the *Theory of Music* by Danhäuser, which was a reference work for learning theory at the conservatories, could be made in brief and simple terms, to which P.S. says, physicists simply added “*the idea that timbre coincided with the spectrum of frequencies*”. (165)

He had to *refute* the traditional equating of the perception of musical values with the simple perception of a signal “*read*” by the ear, and only the, *build up* a new music theory, new both in its foundations and principles.

c) *Experimental music theory and notation.*

Experimental theory challenges the validity of *traditional symbols of notation* for notating new sounds, and disputes the possibility of inventing others immediately, because “*notation is not the beginning, but the end, of the process*” (492). It is even harmful, since it *prejudges relationships between musical objects*. Now, these new relationships should be discovered by experiment, not laid down prescriptively.

Therefore, “*there is no notation, and for the moment, there should not be one*”. (492)

Notation, in “parameters” is no less misleading in this context than traditional notation: “*everything is naively related to a fussy notion of pitch, notated in frequencies, which no longer has any relationship to what is heard*”. And “*finding the way on an incorrect map is the same as being lost*”. (493)

d) *Programme for a generalized music theory (PROGREMU)*

This programme is presented only partially completed (given the amplitude of the task) in the T.O.M. It has five stages.

α) *Typology* (sector 2) consists in identifying i.e. *distinguishing* and *isolating* sound objects, then *sorting* them into *main types*.

β) *Morphology* (sector 3) consists in *describing* these objects by identifying the *sound criteria* that they are made of, and classifying these criteria into *classes*.

γ) *Characterology* (sectors 1 and 2 of the traditional system) consists in going back to the sound as a whole as a *bundle of different criteria* combined together, and trying to distinguish the different *genres* of objects according to their characteristics.

δ) *Analysis* (sector 4) consists in evaluating the sites and calibres of one or other criterion in relation to the perceptual field, in other words, exploring “*the structures of the perceptual field which can bring about perceptions of cardinal or ordinal calibrations*” (497); this means exploring the possibilities for abstraction, for putting into calibrations, new criteria (other than pitch), which are given to us by the natural capacities of the ear.

ε) *Synthesis* (the utopian stage) would consist in using the results of the previous stages to draw up rules for making sounds objects which could be used as elements in a *generalized music*, with a fully established theory (musical objects) (369, 383-385, 496-498).

The various types, classes, species, genres of objects are summarized in a huge [93] TARSOM (Summary Diagram of musical Objects) which the author presents as a “tool for investigation” and not as a table of results.

The general procedure in this music theory is to move forward in a series of approximations rather than in a straight line.

e) *From theory to music.*

P.S. did not just bequeath this music theory as it was, more descriptive than operational, without thinking about its possible “implementation”. He suggested at least two uses:

- In traditional, non-Western music, this music theory could help to remedy the inadequacies of the western classical symbols which ethnomusicologists have to use. “*On the contrary, we suggest a more universal approach to musics.*” (604)

- In contemporary music, this “realist music theory” (602), is put forward as an authentic means of rethinking music, and building new musical structures which take into account our perceptual structures, and can hope to create a collective consensus about their language, their systems of reference. The ambition of the theory is to enable these emergent systems to fit into a certain *perceptible order*, which does not however claim to predetermine them.

f) *Explanation of the diagram entitled Programme of Musical Research (PROGREMU) (369)*

This diagram, based on the four listening sectors, is in fact *two* embedded diagrams, one on the functioning of the traditional system of music (“outer” boxes numbered in Roman numerals I to IV), the other on the “experimental system” (inner boxes forming a diamond inside the square and numbered in Arabic numerals 1 to 4: i.e. going from box 2, *Typology, Morphology, Analysis, Synthesis*).

It is presented as a journey, a sort of game of snakes and ladders: you start at 2, go on to 3, and before going to 4 and 1, you make a detour through sector I of the traditional system for an extra stage called *Characterology*.

Leaving aside the traditional system, we will limit ourselves to a summary of the information given in each experimental system box. For each stage, in order, we find:

- the distinctions it makes (*types, classes, species, genres*);
- the “perceptual procedures” it requires (*identification* for typology, *description* for analysis and synthesis; both, according to standpoint, for morphology);
- what is studied at each stage: the *sound object* at 2, the *sound criterion* at 3, *structures of criteria* in the musical field at 4, *musical structures* at 1 – which shows that the lower sectors (Typology-Morphology) are still in the “sonorous”, while the higher sectors (Analysis-Synthesis) aim to achieve the “transition to the musical”;

- the contrasting pair or pairs which form the basis for the procedure under consideration. They are respectively.

α) - *Articulation/Intonation* (a variant of Articulation/stress) for *Typology*, sector 2.

β) - *Form/Matter* for *Morphology*, sector 3.

γ) - *Criterion/Dimension* for *Analysis*, sector 4.

δ) - *Value/Characteristic* or *Variation/Texture* for the *Synthesis* of musical structures and musical objects, sector 1, depending on whether we have a discontinuous structure or a continuous structure.

[94] g) *Musical and musicianly invention in the PROGREMU.*

In addition, these four stages suggest two distinct pathways for musical and musicianly invention.

According to the diagram, *musicianly Invention* moves directly from the *Typology* of sound Objects to the concrete *Synthesis* of musical Objects (1-2) and *Musical Invention* moves from the *Morphology* of Sound Objects to the *Analysis* of these Objects, inclining towards abstract research into structures and values (3-4).

“In 4 [Analysis], we form collections of objects in which we distinguish a particular sound criterion and try to see whether, despite the disparity of their other criteria, these objects display any meaningful connections with the criterion under consideration, i.e. connections which can be described, ordered or located in our field of musical perception (...)” (381)

This is the “*invention of the musical*” (381) which the author describes as a delicate operation and which he defines in similar terms at the conclusion of book IV (*Objects and Structures*), p.384.

MUSIC THEORY: 62, 162-165, 384, 488-489, 490-508, 509-528, 529-546, 547-560, 561-579, 580-597, 601-603.

» 39. ACOULOGY

[94] 1) A neologism coined by P.S. to describe the new discipline, the foundations of which he lays down in the *experimental Music Theory*.

The subject of acoulogy is the study of mechanisms of listening, properties of sound objects and their musical potential in the natural perceptual field of the ear. Concentrating on the problem of the musical functions of sound characteristics, acoulogy relates to *acoustics* in more or less the same way as *phonology* relates to *phonetics*.

	PHONETICS	PHONOLOGY
System of LANGUAGE (established)	“The study of the sounds of language in their physical expression independently of their linguistic function”. ¹	“The study of the sounds of language from the viewpoint of their function in the system of language”. ¹
	ACOUSTICS	ACOULOGY
System of MUSIC (to be established)	The study of the physical production of sound	The study of the <i>potential</i> in perceived sounds for producing distinctive characteristics which can be organized into music

2) *Acoulogy*, therefore, tries to forge a way between the “lower” level of the material and the higher level of organisation, of meaning, knowing that in traditional music there is between these two levels an *intermediate level*, of referential structures [95] and codes appropriate to each tradition, which permits communication. How, in contemporary musics which are abandoning these referential structures, can we go directly from the level of objects to the level of their organization except by strictly applying the principles of this organization to the perceived properties of the material, *music* to the laws of *acoulogy*?

3) Hence, for researchers, the importance of a rigorous investigation of this acoulogical level, which, by virtue of the fundamental dualism of (natural and cultural) music should find its foundations in the structures of human perception, before any cultural conventions. But acoulogy does not make assumptions about the musical organization to come (even if it is its prerequisite): “*it’s not acoustics, but it’s not quite music yet*”. (Solfège de l’Objet Sonore, side IV, 8th idea). In this sense it is the same thing as the *experimental Music Theory* put forward by P.S.

a) *Acoustics and acoulogy*.

The term *acoulogy* (or its derivatives), rarely appears in the T.O.M., and is never clearly posited or defined: sometimes it appears to be a straightforward synonym for typomorphology; elsewhere it refers to a more important undertaking. It seems, however, that for the author *acoulogy* is more or less the same as *experimental Music Theory*, an expression which, with his terminological modesty he prefers to use to describe the same undertaking.

The term acoulogy, apparently a Schaefferian neologism, derives from the term acoustics, modeled on the distinction between *phonology* and *phonetics* in modern linguistics.

¹ Definitions taken from the *Dictionnaire de Linguistique Larousse*

The definition of these two linguistic disciplines, as P.S. enunciates them, are as follows: phonology is: “*the science of differential sound units whose aim is to establish the system of phonemes*”, and phonetics is the “*study of the physical and physiological nature of the distinctions made*” (295).

We are less concerned here with discussing the validity of these definitions (which can be compared with those *above*) than to know how they can help us better to define acoulogy. Acoulogy is distinct from acoustics in that it is the *study of perceived sounds and perceptual structures*, seeking to distinguish *criteria* in the object and to situate these in perceptual fields for a musical purpose.

Unlike language, where the system is already established and where it indicates the units to be studied, here we must find in the object “potential units”, hypothetical distinctive features which could help us build up an as yet non-existent music.

In the same way that, for defining linguistic units, the links between phonetics and phonology are not simple, the links between acoustics and acoulogy are not straightforward: here we find “*the complex links between acoustics and an acoulogy operating on the same distinctive level*” (295), i.e. the definition of units.

In language, *language* itself, an established system, gives phonetics its units for study *via* phonology. On the contrary, there is no established system in experimental music to set out its units for *acoulogy*. So, should it take them from *acoustics*?

On the contrary, it is “*the sound object, given during perception, which shows the acoustician the signal to be studied*”. (269)

So acoulogy cannot turn to acoustics to “carve out” its [96] objects, it finds its own criteria for identifying sound objects and a *phenomenological* definition of the object at its own level, the level of perception.

The problem of the “distinctive level” remains in acoulogy, if we consider the higher level of musical organization, where we assume that acoulogy will only retain from the objects it assembles “distinctive features”, which perhaps will not tally with the “identification criteria” laid down in the Music Theory, which serve to identify objects prior to music.

b) *From acoulogy to music.*

The place of acoulogy in the programme of the T.O.M. is made clear in the last pages of the work (Book VII). The author distinguishes three “stages” which are in theory necessary for an emergence of a musical meaning: the “acoulogical” level of objects; the intermediate level of code and referential structures specific to each musical tradition; finally the “*higher level of meaning*”. (626)

“*In the traditional system we could clearly perceive these three levels of musical language. The “acoulogical” stage, so well integrated that it seemed almost immutable, with*

no possible variants, was a certain number of sounds given by a well-determined range of instruments, which defined a “musical” totally purged of the “sonorous”. Then there were structures given by musical theory and (...) the whole melodico-harmonic code (...) which of course gives rise to the entire traditional system of reference. Finally, there were the works, their meaning guaranteed by their internal economy.” (626)

In such a type of music, the acoulogical level is narrowly defined by the system, which determines the types of objects and the characteristics to which they should correspond, as well as the conditions under which they should be assembled to fulfill their function: for example, in traditional music, the objects can only be of tonic mass (defined pitch) with the typological features of “balanced objects”, and must be grouped together in such a way that pitch, and secondarily duration, emerge as a value in relation to their other sound characteristics.

In experimental music, and in musical research, where the intermediate level of “referential systems” is passed over, as it is impossible to reinvent from the dictates of mind, there are only the two outermost levels which we can try to articulate directly with one another. The function of acoulogy must then be reconsidered. Alone, it cannot provide the key to music, which comes from the higher level: we have “*the dead end of a music in itself, which only plays with objects, an acoulogy as devoid of meaning as phonology. It is clearly, of course (...) from the higher level that music, like language, takes all its meaning*”. (311)

In this difficult situation, the role of acoulogy, or experimental Music Theory, could be to prepare the ground for the reclaiming of musical meaning, by means of which we could just about “*place objects into structures directly, going straight from the “acoulogical” level to the level of overall organization, just as a structure is built in accordance with the logic of the material*”. (628)

So, in the last analysis, acoulogy is the study of the hypothetical logic of the material at the most elementary level; a logic which we assume to be potentially rich enough to dictate the laws of a structure without a code.

A severe discipline, then, this acoulogy which examines the object for its musical potential, but must always remain at the outer limits of music. For it starts out from below, from the sonorous, and no preconceived musical organization from above can in accordance with its own rules hold out a hand to help it haul itself up to the heights where meaning is enthroned.

ACOULOGY: 295, 309, 311, 314, 502, 504, 626, 628.

[97] » 40. SUITABLE (OBJECT)

1) Sound objects are called *suitable* when they seem to be more appropriate than others for use as a musical object. For this they must fulfill certain criteria:

- be simple, original and at the same time easily “memorable”, with a medium duration; therefore be *balanced* typologically;
- lend themselves easily to *reduced listening*, therefore not be too anecdotal or too loaded with meaning or emotion;
- finally, combined with other sound objects of the same genre, be capable of producing a predominant and easily identifiable musical value (the law PCV2).

2) We can also speak of a *suitable collection* of objects, which are only suitable *in combination* (relative suitability) for producing a musical value.

3) *Suitable, balanced, musical objects*: it would seem likely that suitable objects would be the 9 types of *balanced* objects of typology. But the notion of suitable object is an abstract and general notion whose concrete definition must remain open, whereas the balanced object is defined by precise typological criteria. A suitable object might at a pinch not be balanced, and vice versa.

In the same way, we could consider the suitable object (suitable for music) to be the same as the *musical object*. But the more general notion of musical object refers to a function, to musical structures. Suitable objects are, at most, objects which are judged “good enough”, without being thought of as “musical” beforehand: a certain context and a certain intention are needed for this. Even if the author says “*the musical is no more than a suitable sound*” (358), a deliberately tautological definition (“suitable” meaning nothing more than “suitable for music”).

The *suitability* of the object cannot therefore be defined by criteria which are, a priori, too precise.

4) *Creation of suitable objects*: in musical research, the suitable object is created and defined by a series of approximations, by going back and forth between *doing* and *listening*: first in *musicianly listening*, which is limited to “*the most simple, least anecdotal objects, which have a spontaneous, albeit minimal, musicality*” (337-339); next by *musicianly invention*, which must create suitable objects for a musicality which remains to be defined; lastly by *musical* (as opposed to musicianly) *listening*, which seeks to discover the potential musical values in these sound objects.

5) The Programme of Musical Research (PROGREMU), in its five stages, uses criteria for identification and description of sounds which give a central, favoured position to “balanced objects”, thus to objects which are most likely to be suitable, without ruling out sounds that are in theory too simplistic or too variable.

[98] a) *“Suitable Collection”*

Sound objects can be suitable in two ways: either in isolation, *a priori*, through their intrinsic characteristics, or collectively, if we compare several sound objects as a collection in order to carry out a “structuring” experiment on, for example, the characteristic of *pitch* of these sounds. We shall then discover that some are not suitable for this experiment, if we want to form a suitable collection for the experiment in progress: *“So, when comparing objects, there are three stages simply for a value to emerge: objects which are unsuitable because they do not carry the value as a characteristic; objects which are only just suitable because they have this characteristic, but completely mismatched with other characteristics; objects which are very suitable (to music, let us remember, therefore musical objects) because the perception of a value is reinforced, not necessarily in a simple way, by the other characteristics, which cause it to dominate.”* (374). This example does not mean that any sound object can become suitable in an appropriate context.

b) *Suitable, balanced, musical objects*: *“The sound objects most suitable for music are apparently those which fulfill the criteria in the nine central boxes”* of typology (443), therefore balanced objects, but the author never combines the two notions. In the same way, while it is said that *“the musical is simply a suitable sound, i.e. purified, simplified, selected in order not to be too complex”* (358) and *“objects which are very suitable for music can be called musical”* (see also above, 374), the author nevertheless takes care to distinguish these three notions, and to use them in different contexts.

SUITABLE (OBJECTS): 337-339, 344, 348, 354, 357, 358, 374, 392, 443.

B. *Five stages to reclaim the musical*

A typology to distinguish types, a morphology to classify classes... here, in theory, we are going to the heart of the subject. Indeed we are. It must be said immediately that *Characterology, Analysis* and *Synthesis*, the three final stages of this programme remain more or less precisely at the level of a programme: they are models for a method. They hold together, they provoke debate, but above all they are there in order to ask the right questions, the basic questions.

a) Typology

» 41. TYPOLOGY

1) The first stage of the programme of musical research, typology is the process of *identifying* and *classifying* sound objects, which should be able to encompass the whole range of possible sounds – *identification* [99] is a procedure which consists in isolating, cutting out sound objects from every possible sound context (rule: articulation/stress); *classification* is a procedure which consists of arranging them in families, in different types.

2) Typology thus carries out “*a process of selection from which sound material will emerge cut into pieces, categorised into (musical) types of (sound) objects*” (371). “*Musical types*” means that the classification is not random, that there is an idea behind it which is, by classifying them, to select the objects which will be the most “suitable for music” (suitable objects). *This process of selection is therefore based on a hierarchical principle*: it orders the objects into a hierarchy according to the greater or lesser facility with which they can be perceived and memorised and their (presumed) greater or lesser capacity for carrying musical values.

3) Three pairs of criteria are chosen to form the basis of this classification: a “morphological” pair, *Mass/Facture*, a temporal pair, *Duration/Variation*, a “structural” pair, *Balance/Originality*. The latter is the most explicitly “normative”, since it makes a value judgment about the sound object. Incidentally, it is difficult to contain these six independent variables in a single, two-dimensional diagram.

4) Typology distinguishes *about thirty types of object*, summed up in the table which is given the code name TARTYP (recapitulative table of typology). These objects are divided into three families: *balanced objects* (which are given a central and privileged place, as in theory they are the most “suitable”), *redundant objects* (not original enough) and *excentric objects* (too original and irregular).

5) This general typology is completed by an additional typology of *variations*, i.e. sound objects which vary significantly. (570-572)

It is important not to forget that the types put forward by typology are not always easy to identify, and we might be unsure whether to place a certain object in one box or another, depending on the context, the intention, the level of precision of listening etc.

6) A methodological problem which has for a long time deterred people from undertaking a typology, is that you cannot select objects without, albeit sketchy, criteria for describing them. It was therefore necessary to create an *elementary morphology*, represented by the notions of *mass*, *sustainment* and *facture*, and, more precisely, of the distinctions between tonic sounds, complex sounds, variant sounds etc. and between three types of sustainment. “Elementary”, because otherwise there would be too great a number of types of objects, and an infinite, unusable and over-crowded classification.

Typology and Morphology have thus developed by a sequence of approximations; an elementary morphology has enabled typology to put the final touches to its classification criteria, after which a more complex morphology can re-examine the objects and describe them accurately and in depth.

TYPOLOGY: 346, 363, 369 (PROGREMU), 371, 384, 397-399, 429-442, [100] 443-459, 459 (TARTYP), 466-467, 497, 499, 515, 570-572, 584-587 (TARSOM).

» 42. TYPE

In the most general sense, the classification of sound objects or their constituent criteria into different *types* comes from the need for an initial crude selection of a few limited examples (whereas the placing into *classes* is made after a more refined, more differentiated evaluation of the contexture of objects).

1) In the main, strict sense we have the 29 types of sound objects finally retained by typology (and additionally the 18 types of variant objects from the complementary typology of variant objects, which takes up some types of object from the first list).

The type of the object is, then, is its *general physiognomy, resulting from the combination of elementary morphological characteristics*. As we differentiate between the physical types of “long limbed” or “squat” individuals, the typology of sound objects differentiates types of homogeneous sounds, sustained sounds, “cells” etc.

Each of these types is identified by a name, and a symbol (generally a letter of the alphabet, perhaps further qualified by another letter).

2) In a secondary sense of the term, we have elementary types of certain *morphological criteria*: three types of mass and three types of sustainment are thus distinguished, which act as a basis for typological classification. For Grain and Allure there are also three types derived from an initial rough evaluation, which is eventually refined by the study of different classes of the same criteria.

3) P.S. insists on the idea that the typological criteria which are used to define the main types of objects or morphological criteria convey an implied *musical intention*, that they are chosen with a view to “selecting” sound objects “suitable” for a musical purpose.

4) The different types of sound objects or morphological criteria are summed up in the first column of the TARSOM; in particular the types of objects summed up earlier in the TARTYP are reclassified, after a fashion, in the various rows for morphological criteria (but this “reclassification” is necessarily a little haphazard).

TYPE: 369 (PROGREMU), 371, 379, 384, 444-447, 497, 499, 505, 515, 551, 552, 553, 556-558, 570-572, 584-587 (TARSOM).

b) Morphology

» 43. MORPHOLOGY

1) The second procedure in the programme of musical research, morphology, is a *descriptive procedure* (P.S. often says “qualification”) of *sound objects*, once they have been identified and classified by typology.

[101] This description essentially consists in distinguishing features called *criteria* in the fine detail, the “contexture” of sound objects, their number being limited to 7: these are the 7 *morphological criteria* - *mass, harmonic timbre, dynamic, grain, allure, melodic profile, mass profile* - which are examined one by one, defining different *classes* for each.

In other words, sound criteria are identified in the sound object and the object is described as a structure of these criteria (497) in accordance with the principle that Object/Structure are interlocked.

2) The pair: Form/Matter, the key to an elementary description of sound, inspires morphological investigation (see 60).

3) To study the criteria, we will focus on objects called *deponent*, i.e. objects where a certain number of criteria are absent or remain fixed, giving prominence to the criterion which is the object of study.

It must not be forgotten that, as in typology, these analyses and descriptions are relative, likely to be refined or challenged because of a change of context, viewpoint, experience.

4) Three different morphologies can in fact be distinguished, linked to different stages:

- elementary, preliminary morphology, which gives elementary criteria for description, sufficient to allow typology to classify sounds;

- the main morphology, which examines one after another the seven morphological criteria quoted above: this is the most developed, and makes up the second stage of the programme of musical research;

- a far less developed external morphology dealing with the particular example of sound objects formed of distinct (successive or simultaneous) elements (see 86 and 87).

MORPHOLOGY: 365, 369 (PROGREMU), 371, 379, 384, 389-403, 431, 461-465, 497, 499, 500, 584-587 (TARSOM).

» 44. CLASS

1) The differentiation by morphology of the different classes of objects depends on a “*description of sound objects in their contexture*” (369), once their constituent criteria have been identified. In other words, when morphology distinguishes different *classes* for each of the seven criteria which it studies, we must understand by this different *typical examples of these criteria*, which result from a more refined and more differential observation than was previously done by typology. Thus, morphology distinguishes 7 classes of mass, whereas typology distinguishes only 3 types.

2) As experimental theory progresses, every sound object or criterion is, therefore, individually situated in types (typology), in classes (morphology), in genres (characterology), in species (analysis). The different classes of sounds for each criterion are summed up in column 2 [102] of TARSOM. They are listed under each of the seven morphological criteria in the section on each criterion.

CLASS: 369 (PROGEMU), 371, 384, 487, 497, 505, 515, 517-518, 524-525, 531, 535-539, 555, 558-559, 574, 583, 584-587 (TARSOM).

» 45. DEPONENT (SOUNDS)

1) The term “deponent” (from the Latin *deponere*: to leave) is employed “*in a figurative sense, to denote the (phonetic or sound) objects which have one of their morphological components missing*”. (396)

2) The term deponent is therefore applied to “*phonetic objects (...) which consist of isolated stresses, without consonants: a, e, etc.*” or, conversely “*the consonants which are pronounced silently (...) giving only attacks without stress*” (396) (see 47).

3) The term “*deponent note*” is applied to sounds which, in the study of the internal morphology of objects (§27,3; p. 462-463), do not present in a perceptible and distinct manner the three temporal phases of what P.S. calls a “balanced note”: attack, continuant, decay. With deponent notes “*two of these phases, sometimes even all three, are fused into one*” (463). These are the most common examples, balanced notes being the exception.

4) The morphology of sound objects studies the criteria from examples of deponent sounds, i.e. sounds where a particular criterion stands out by the absence, the fixedness or the faintness of the others. This is because it is difficult to study these criteria from “*evolving sounds, which do not lend themselves at all well to analysis of matter and form*” (449). The

study of evolving sounds will be done separately, therefore, by means of two specific criteria (*melodic profile, profile of mass*).

Deponent sounds and the study of criteria.

By studying most criteria in deponent sounds, and by treating evolving sounds with two particular criteria, we can partially resolve the difficulty which continues to “*weigh upon all musical theory as it has influenced all musical evolution: the traditional system tends (...), visibly, to eliminate those criteria which elude any attempt at classification (...). How can we include them without making the same mistake as mathematicians of music, who without raising an eyebrow, haphazardly put together stimuli that are sometimes elementary, sometimes of formal values?*” (499)

Taking a “*qualified stance*” gives a way out of this dead-end: “*By using deponent examples, chosen from a general range of sounds, we can already considerably broaden the descriptive range which until now was limited to the identification of physical parameters [frequency, amplitude, duration] or of the three values recognized by music conservatories [pitch, intensity, duration].*” (499)

We can then elicit “*the main morphological criteria for a theory of music for borderline cases*” (500) taken from “deponent sound objects”:

α) to study *mass* (and with it *harmonic timbre*) we take sounds that are homogeneous, without dynamic or variation of matter (chap. XXX: music theory of homogeneous sounds, criterion of mass p.500-529);

β) to study the *dynamic criterion* we restrict ourselves to “*forms of mass which remain relatively fixed in tessitura*” (500) (chap. XXXI: music theory of fixed masses: dynamic criterion, p. 529-546). These objects can be called homogeneous “*if we abstract their dynamic*”, they are not therefore pure homogeneous sounds;

[103] γ) the criteria *grain* and *allure* which are characteristics of sustainment of sound, are best studied in homogeneous, or not very varying sounds (chap. XXXII: music theory of sustainment, p.547-560).

δ) the variation criteria (mass profile and melodic profile) which can currently be found in “natural” sound objects, are best studied in sounds which present only one of these variations (so-called “*deponent*” variations, 578).

We should add that studio resources allow us to obtain deponent sounds which display one single criterion (“homogenization” or “procedures to modulate form” which can separate the harmonic and melodic profiles of sound, which are normally linked together) more easily than in the raw state (where the criteria are generally mingled together) (541).

DEPONENT (SOUNDS): 396, 463, 499, 500-501, 578, 583.

c) Characterology

» 46. CHARACTEROLOGY

1) The definition of genres of sound, or characterology, is the third procedure of the five in the theory. After typology and morphology, where the criteria of sound are isolated in simple examples, characterology is a *return to the concrete*, since it considers the main examples of combinations formed, in sound and musical reality, by *bundles* of characteristic *criteria*, in accordance with natural acoustic laws which most often link them together.

2) Characterology and musical analysis complete one another, being respectively the *practical* pole (timbres, instrument-making, registers) and the *theoretical* pole (research into musical structures) of a process which aims to *synthesise* the musical. But these two procedures are presented in the *Traité* as working hypotheses, unlike typology and morphology, where a complete and assured account is given.

Difficulties of a characterology.

“In order for analysis of the sound field (...) to take place under the best conditions, we must reach a better understanding of which bundles in real sounds make up the criteria to which the criterion under study belongs; in other words, it would be necessary for the characterology of real sounds to be known. This is not the case... we can only refer to the practical knowledge we have about sound bodies (sector I) and factures (sector II) to discover the connections between criteria, approximately based on what is known of morphologies”. (505)

Everything associated with *connections* between criteria is, in effect, well known in its principle, but difficult to catalogue, to classify: we know that in instrumental and “concrete” sounds the characteristics of the sound evolve in an interrelated fashion, and that this combined development helps to make the form of the sounds more vivid, more assured: to produce *living* sounds, electronic sound synthesis must proceed precisely by *linking together evolving criteria*, since it has been noticed that sounds in which the parameters evolve independently from each other are not well perceived, appearing thinner, more artificial.

Only it is not easy to draw up a catalogue of these *genres*, to distinguish [104] well “characterized” examples, if we can put it this way. It is not surprising that *characterology* is the stage of the Music Theory that is dealt with most rapidly in the T.O.M.

CHARACTEROLOGY: 369 (PROGREMU), 497, 505, 584-587 (TARSOM).

» 47. GENRE

1) The *genre* of a sound (or characteristic) is defined by a certain combination of criteria, a “bundle of criteria”, which *characterizes* it, it defines a physiognomy which is simple, immediately perceptible yet complex to analyse. Indeed, with natural sounds (as opposed to electronic sounds), “*genre is the most common example*”. In other words, sound is not a sum of features, simple independent criteria; these features are combined and interdependent.

So, the study of the *genres* of sounds by means of characterology strives to distinguish what are typical combinations for each criterion “apart from pure examples”, and possibly examples of when the criteria correlate with other criteria.

2) Generally speaking, the *synthesis* of musical objects, if it were possible, would aim to produce *series of objects of the same genre* leading to the emergence of a variation of a relevant feature, or *value*. In this sense *genre* becomes synonymous with *characteristic*, in the sense of the concrete, sonorous, instrumental aspect of the sound rather than its abstract aspect, which functions as a musical value. *Genre*, therefore, replaces instrumental *timbre*.

a) *What is genre?*

“*The common expression: a “---like” sound, expresses the notion of the character of a sound very well. Because it does not only cite the example: piano, bell, electronic sound, it generalizes it, it postulates that a given sound, beyond any particular example can be presented as representative of a general structure. If I play bundles of notes which produce a thick mass on the piano, I will no longer hear the tonics, I will no longer analyse the chord, but I will do more than appreciate a width of more or less vague thickness. (...) I will distinguish a texture, a certain organization of mass, as for example in the sound of a bell.*”
(519)

b) *Genres of sound according to the criteria.*

In the Summary Table for the Music Theory of Musical Objects we can see *characterology* applied with varying degrees of success to each of the seven criteria, in order to define their genres. We refer to the articles on these criteria for more detail, limiting ourselves to the remark that the genres of sound are defined in many different ways according to the criteria. Thus, the characterology of the *dynamic criterion* is in fact based on the study of *attacks*, which are so important in the perception of instrumental timbre, and which are a characteristics example of the relationship between criteria connected to the facture of sound; in the characterology of the *criterion of grain* six genres of grain are suggested, obtained by combining in twos the three types of sustainment (resonance, friction, iteration) which define

the three types of grain; the characterology of criteria of *mass* or *harmonic timbre* is briefly outlines, etc.

[105] GENRE: 369 (PROGREMU), 487, 505, 506-508, 515, 519, 531-534, 552-553, 574, 580, 582, 583, 584-587 (TARSOM), 630.

d) Analysis and Synthesis

» 48. ANALYSIS/SYNTHESIS

Analysis and synthesis are the two final stages of the experimental Music Theory programme.

1) Analysis brings morphological criteria into the dimensions of the perceptual field, in order to estimate their capacities to emerge as musical values, and possibly to be used there in *calibrations*. To do this, it studies the *sites* and *calibres* of the criteria in relation to these three dimensions: this leads us to distinguish different *species* for each criterion, defining the different positions it occupies in the perceptual fields (see **SITE/CALIBRE**).

2) As for *synthesis*, it aims to create *musical* objects, made of “*bundles of criteria*”, which “*placed together, may display (...) an easily perceptible structure of values*” (385). To do this, it has to conceive of a new type of ‘instrument making’, or “*tablature*”, adapted to a new theory of musical structures.

3) In the T.O.M. the stage of analysis is only just sketched out; this is even more true for synthesis, which is very briefly set out as a “*working hypothesis*”. Moreover, whereas some hypotheses for analysis are summed up in the TARSOM (columns 4-9), where they occupy an important place, the results of synthesis do not appear, and for good reason: there is only a practical stage, merely postulated. The author does not conceal that he will perhaps need years to complete the whole enterprise, and wants to suggest a method rather than results.

4) Whereas typology, morphology and characterology aim to identify and describe *the sonorous*, analysis and synthesis seek to effect *the transition from sound to the musical*.

5) *Analysis* depends on the pair *Criterion/Dimension*, with the aim of describing structures of criteria in the musical perceptual field, and seeing if the positions in the field can give rise to *calibrations*; it occupies sector 4 of the 4 listening modes.

Synthesis depends on the two pairs: *Value/Characteristic* and *Variation/Texture*, according to whether what is being studied is a discontinuous or a continuous relationship; it occupies sector 1...

From Analysis to Synthesis: the impossible transition.

Whereas in traditional systems, syntheses and whole structural units are given at the same time, here we are attempting to restructure and recompose them artificially from their elements. But the author is under no illusions about the difficulty of moving on to a synthesis based on even very detailed results provided by analysis; “*synthesis cannot be safely deduced from analyses*” (381).

[106] If we can say that synthesis consists in attempting to create new structures from objects, we can then say that the object-structure chain, “*like our grandmothers’ knitting, unravels in one direction. It is not so easy to knit it up again by progressing from preexisting objects to automatic structures*” (381), and the author states clearly that it is “*probable that the quest for what we might call the philosopher’s stone of new music will not succeed with the analytical method. (...) In this sense, the present work proposes to go as far as possible, but (...) it would be unwise, and certainly make no sense, to want to reach authentically musical structures directly by this path*”. (487-88)

But “*the important thing for other researchers is to have the benefit of a method*” (498), and principles which are *necessary, but not enough*.

ANALYSIS/SYNTHESIS: 362, 369 (PROGREMU), 372, 376, 379, 381, 384-385, 487-488, 497, 498, 584-587 (TARSOM), 630.

» 49. SPECIES

1) The study of the *species* for each morphological criterion consists in comparing each of these criteria to the three dimensions of the natural perceptual field of the ear, to try to assess their different *sites* and *calibres* and, if possible, to put them into graduated calibrations (let us be clear that the site of a criterion, in relation to a particular field, is its situation in this field, and its calibre is its bulk in the said field). After the study of *types* in typology, and *classes* in morphology, the study of species is the first attempt to give an assessment of the “states” of different criteria other than qualitative, which is graduated and organized in such a way as to allow the establishment of calibrations, even rudimentary ones (calibrations of size of grain, calibrations of intensity from 1, ppp to 7, fff), clearly constructed on the model of calibrations of pitch.

2) Situated thus on their “co-ordinates” in the perceptual space, sound objects could not only be identified and described in all their variety, but also be *articulated* one with another in accordance with the relationships in the calibration. (Thus, the “species” of a mass, in relation to the field of pitch and in tonic sounds, is identified quite simply by its *pitch*.)

3) The species of criteria are summarized in columns 4 to 9 of the TARSOM, but most of the suggested graduations and calibrations are only hypothetical and provisional.

SPECIES: 369 (PROGEMU), 487, 505, 515, 519, 526-527, 544, 554-555, 559, 574, 581, 583, 584-587 (TARSOM), 588-591.

» 50. CRITERION/DIMENSION

1) The Criterion/ Dimension pair is the “major relationship” in the analysis of objects. It is concerned with the relationship between morphological criteria and the dimensions of the triple perceptual field (pitch, intensity, duration) where these [107] criteria occupy a particular *site* (“localisation” in the field) with a particular *calibre* (“bulk” in the field).

An example of the working of the Criterion/Dimension pair: a given “allure” of a sound object is evaluated as of “strong” calibre in relation to the pitch-field (its width in tessitura is very large) and of “tight” module in relation the field of durations (rapidity of oscillation).

2) The relationship Criterion/Dimension is all the more close because, from a certain point of view, a criterion is also a dimension. This is what gives prominence to every variant object: “*Let us listen to an object as classical as a fairly slow glissando on the violin. What is the dominant criterion at each instant of the sound? Pitch. What varies? Pitch again. In what space does it vary? In the field of pitch.*” (503)

Pitch is, therefore, both the “*criterion defining a sound*” and the “*dimension of its variation*”. The same is true of a profile of intensity evolving in the dynamic field and of a development in allure varying in the field of durations etc. The qualities of sound can, therefore, be evaluated both as “*an identification criterion*” of the sound, or as “the dimension of its variation” in one of the three perceptual fields (pitch, intensity, duration). The “criterion”, identified in an object, (grain, mass) and the “dimension”, evaluated in the perceptual fields, are the two facets of the same phenomenon.

“*The criterion and the perceptual field make up the relationship of indetermination which so complicates our ordinary vocabulary.*” (383)

3) Once their inventory and their sound description have been decided by typomorphology, the purpose of the *analysis* of objects and their criteria is to bring into play “... *the musical ear from which we expect, hypothetically, a field of qualitative, indeed progressive, appreciation.*” (384)

The question posed in analysis, with the help of the pair Criterion/ Dimension is: “*How do collections of objects, gathered together to be measured against such and such a*

criterion, become structured in the natural field of the ear, developed, of course, by specialized training?” (384)

CRITERION/DIMENSION: 369 (PROGEMU), 379, 383-384, 503, 504, 584-587 (TARSOM), 596.

» 51. SITE/CALIBRE

1) The *site* of a criterion is its *position*, its place, in each of the three perceptual fields of the ear. For example, the site of a tonic sound relative to the pitch-field is its degree of pitch; in relationship to the field of intensities, its inherent degree of intensity, etc. The location of the site is less or more easy depending on each criterion, and its particular relationship to each perceptual field.

2) The *calibre* of a criterion is its *bulk in the field* (for example, a white noise which occupies the whole tessitura has a maximum calibre in the pitch-field); it comes across as thickness, volume.

3) The evaluations of *sites* and *calibres* of criteria in relation to [108] perceptual fields have as their goal to detect the capacity sound objects have to convey *values*.

In other words, we rely on these graduated differences of site and calibre in objects to present to perception types of scales, calibrations, which are capable of functioning on the model of calibrations of pitch.

We therefore presume that it is because of the differences in sites and calibres of one characteristic in different objects of the same *genre* assembled in phrases that this characteristic can emerge as a musical value, in accordance with the law PCV2. The listener should nevertheless be able to perceive these differences adequately and perceive them in the framework of a calibration, however rudimentary. The intention of the stage of analysis is therefore to *test the ability of each of the 7 morphological criteria to be situated in the different perceptual fields and to be “calibrated” there*. A huge programme, only just sketched out.

Why these two complementary concepts? We can understand this if we recall the dimension/criterion dialectic: each criterion occupies the three perceptual fields as spaces where it occupies a certain place (its site) but at the same time itself filling a certain portion of this space (its calibre). Now this space is *limited* at its two extremes by the capacities of the human ear (the limit of the very high and the very low for the pitch-field). These limits therefore give a framework, and mark out a territory where the criterion in question can evolve, occupy more or less space etc.

We can, however, anticipate that the concepts of site and calibre, so clearly of use for perception of pitch in the pitch-field, will sit less easily for other criteria, in other dimensions. Hence the apparently obscure and complicated concepts of *weight*, *relief*, *impact*, *module*, which in the intensity- and duration-fields, “overtake” and replace the too-elementary and linear notions of sites and calibres and adapt them to the specific nature of each perceptual field. Why do they seem so difficult to handle, to calibrate? Because the perceptions they correspond to are more intuitive, plastic, diffuse, more difficult to single out and calibrate than the usual perceptions of pitch.

We would be wrong to attack only the concepts here, to judge them as ill-defined; they correspond to perceptions which may be both very subtle and well-differentiated, yet impossible to define in words, and even more to put into series or calibrations – except on paper, in the abstract, and thus without dealing with the sounds themselves.

So, for each of the three fields, site and calibre are described respectively in terms specific to each field, and with a different shade of meaning.

α) *In the double pitch-field:*

- the site of a criterion is called *tessitura*,
- the calibre of a criterion is called *width*.

β) *In the intensity-field:*

- the site of a criterion is called *weight*,
- the calibre of a criterion is called *relief*.

γ) *In the duration-field:*

- the site of a *duration of variations* is called *impact*;
- the calibre of a duration is called *module* (a term which has various meanings).

[109] SITE/CALIBRE: 497, 505, 515, 521, 526-527, 542-546, 554, 559, 574-575, 577, 584-587 (TARSOM), 588, 589.

» 52. WIDTH

1) *Width* is the name given either to the bulk of a criterion in the pitch-field, its “thickness” in relation to this field, or the calibre of the variation of this criterion in the pitch-field, in other words how much of the tessitura it occupies. For example, the vibrato of a singer who is said to have “too much” vibrato, has a large width.

2) This notion of *width* therefore concerns not only the criteria of mass and harmonic timbre but also the three criteria characterized by variations in the pitch-field: *allure*, *melodic profile*, *mass profile* and even *grain*.

The classifications of *width* are in column 5 of TARSOM.

a) *mass-widths*. This is quite simply the ‘interval’ for tonic sounds (harmonic field) and *thickness* for complex sounds (coloured field).

b) *grain- and harmonic timbre-widths*. This is a “thickness” or a “fullness” in relation to the lower or higher limits in tessitura.

c) *allure-widths*: for allure, which is a more or less regular oscillation in the sustainment of a sound, this is its width in tessitura, assessed by a rudimentary calibration with three degrees: *weak, medium, strong*.

d) *melodic profile- and profile of mass-widths*: for these two variation criteria, this is respectively the overall melodic width (extent of the tessitura covered) and the width of interval or thickness of the variation. (Let us remind ourselves that the concepts of “interval” and “thickness” correspond respectively to the two modes of pitch perception: as interval for *tonic* sounds, in the so-called “harmonic” field, as thickness for *complex* or *varying* sounds, in the so-called “coloured” field.) These widths are also assessed as *weak, medium* or *strong*.

e) for each of these last three criteria, the width can be compared to the duration of variation, which allows the *speed of variation* to be assessed in relation to one or other perceptual field. The *widths* of “pitch-calibres” are in column 5 of the TARSOM (boxes 15, 35, 45, 65, 75).

f) more generally, width denotes the fullness of any difference or variation in any perceptual field. For example: the *intensity-width* between two sounds

WIDTH: 433, 565, 570, 574, 575, 584-587 (TARSOM), 588-589.

» 53. WEIGHT

1) Weight is the relative intensity of a given sound (or component of a sound) in relation to one or several other sounds (or the other components of the same sound). The evaluation of a particular weight depends on the specific context, and cannot really be reduced to a limited number of simple examples: because of the particular property of the field of intensities that it only allows us to make very approximate and changing [110] evaluations of the *relative* intensities of several simultaneous or successive sounds. And this is for several reasons: *the effects of masking*; *the effects of reference to the sound agent* (a “fortissimo” on the violin although much lower in decibels than a pianissimo on the piccolo, will be perceived as louder); and also the *perceptual phenomenon when a variation emerges in the midst of an undifferentiated din*, even if the latter ought to possess a greater “weight” (for example, the weak meowing of a cat emerging from a general tumult). It is this last phenomenon which is described as *impact* (see 55). The notion of impact “*the effect of the*

nature and speed of a variation” (545) in a given context is, therefore, complementary and, as it were, concurrent to that of weight, since impact can succeed in masking a heavier sound with a sound of less weight.

2) While the definition of the notions of weight and impact is fairly clearly established, in practice this is less so, and gives rise to certain confusions, ambiguities and imprecisions. We must simply conclude that it is extremely difficult and risky to construct “gradings” of intensity and to use them as scales as is done with pitches, since perceptions of intensity are eminently fragile and relative, and influenced by particular contexts (cf. the work of Messiaen, *Modes de valeurs et d’intensités*).

3) The classifications of weight are in column 6 of TARSOM.

WEIGHT: 316, 543, 545, 554, 565, 583, 584-587 (TARSOM), 589.

» 54. RELIEF

1) Relief is, in theory, the “calibre of intensity of a criterion”. In other words, the relief of a criterion is its bulk in the field of intensities. The relief of an allure would, therefore, be the amplitude of its variations of intensity (the width between the maximum and minimum intensities of its oscillation).

2) Relief can really only be measured according to a rudimentary calibration with three stages: weak, medium, strong. Classifications of the relief of a certain number of criteria are in column 7 of the TARSOM.

Thus clearly defined, as it seems, the notion of relief, in the T.O.M. and particularly in the TARSOM, undergoes strange disappearances and substitutions: in effect it denotes either a pitch-width (544) or a weight; or else the concept it denotes is described by using the apparently improper term *impact* (comments on box 17 of the TARSOM, p.589). Finally, the term relief is absent from the three pages of comments explaining the TARSOM, in which it nevertheless occurs, and even from the comments on the boxes in the “reliefs” column (column 7).

RELIEF: 544, 559, 584-587 (TARSOM), 589.

» 55. IMPACT

1) Impact is a very “subjective” concept which describes the “*effect of the nature and speed of a variation*” in a given context, and particularly the manner [111] in which this variation *brings out* the criterion or the object affected by it from within a sound context, where normally it would be covered over or drowned out. In other words, impact denotes the “*capacity*” of a varying phenomenon “*to stand out*” in a sound context which contains it, by means of criteria which are as “psychological” as: the effect of surprise or “disturbance” (the coughing of a member of the audience in the silence before a concert performance), or the sudden and unexpected nature of a variation in a hubbub of sounds (the meowing of a cat emerging from a commotion where nevertheless its relative intensity is very weak). (545)

2) The concept of impact is complementary to the concept of weight (see 53), since it “*takes up what weight leaves out*”. (546)

3) Impact can be measured by comparing the amplitude of the variation (its “width”) to the time (“temporal module”) it takes to happen. In the TARSOM impact is “calculated” by means of tables with nine boxes intersecting *three degrees of width of variation* (*weak, medium, strong*) with three speeds (*slow, moderate, fast*). For example, for the dynamic criterion, the number 7 describes a marked but very progressive dynamic evolution; for melodic profile, the number 6 denotes a medium width with a lively speed of variation.

a) Whereas *weight* seems to express a discontinuous relationship of intensity between relatively fixed phenomena, impact is used for examples of continuous variation in short phenomena. Thus it can be seen that the particular impact of a sound could “*mask a heavier sound with a sound of lesser weight*”.

If the concept of weight seems to apply to the pitch- and intensity-fields most of all, the concept of impact, in variation phenomena, applies to every dimension, and in particular includes the concept of speed (density of a variation in duration).

b) In theory, impact occurs in the TARSOM in column 8, “sites for duration of emerging variations”. In fact on reading the comments on it, it appears that the notion of impact “goes walkabout”, being used to describe phenomena of another order: either under the name “harmonic impact”, the “*profile of a texture of mass*”, or “*the relative weight of the various elements of its texture*” – a sense in which any notion of variation is eliminated (but perhaps here the editor has confused it with *relief*). Or else impact is used to denote a perception of dynamic variation, etc.

IMPACT: 257, 545-546, 565, 584-587 (TARSOM), 588-590.

» 56. MODULE

1) Module is a “calibre of duration” i.e. a duration-value. More precisely, for criteria such as grain or allure, which are defined by oscillations or periodic and frequent unevenness, *module* is a measurement of the relationship between the amplitude of the oscillation and its “speed”. It can also denote the rapidity of the oscillation of this criterion (the number of pulsations in its duration).

The concept of module, therefore, expresses various dimensions, in which [112] the only common bond is that they are situated in *duration*: duration of existence or duration of variation, for criteria linked to a variation which is periodic (*allure*) or non-periodic (*melodic profile, mass profile*).

2) In certain cases module is expressed by a number which arises from a convention of classification, and not a measurement of size. Thus, module “8” is not larger than module “5”, it simply refers to a different box in a diagram with two types of entry. All this can be more easily understood by referring to the study of the *species* of each morphological criterion.

MODULE: 504, 559-560, 568, 574, 577, 584-587 (TARSOM), 588-591, 593.

» 57. TABLATURE

1) The “old word” (630) tablature is revived to describe “*the development of an ‘instrument making’ which is more than instrumental technology developed at random and open to all influences*” (630), but which attempts to make sounds of a particular *genre* produced specifically to be part of a musical discourse. Tablature, in this sense “*describes the value-relationships available in the sounds of a particular group of instruments*” (630) and, of course, uses research into the experimental music theory, particularly *characterology* and *synthesis*.

2) If we refer to the perceptual field which is the most full of promise and the best calibrated of the three, pitch, we may expect “*two extreme types of tablature (...): a ‘harmonic’ type where all the sounds have a tonic pitch [i.e. fixed and locatable], and a ‘complex’ type where there are only non-harmonic mixtures*” [complex sounds]. (630)

a) These tablatures should give rise to two types of music: the first to a “harmonic” music (which is traditional music) and the other to a music which P.S. calls “plastic”, which may, of course, include ambiguous or mixed types.

TABLATURE: 320, 366, 630, 632, 637.