

A. *Approaching the sound object: bases for an initial description*

... A sort of first aid kit, a minimum of equipment to undertake a basic inventory of the sound universe using “reduced listening”. But also the basic criteria for a more highly developed classification and description of sound objects.

» 58. TYPO-MORPHOLOGY

1) Typo-morphology is the initial phase of the programme of musical research, which groups together as complementary the two procedures of typology and morphology: these indeed constitute a stage of exploring, listing and describing sound; whereas the two procedures of analysis and synthesis involve the analysis and implementation of the *musical* capacities of the sound object. Thus, typo-morphology is a *descriptive inventory which precedes musical activity*.

2) The three tasks of typo-morphology are therefore: *identification, classification, description*.

- identifying sound objects, i.e. isolating them, cutting them up into sound units.
- then, classifying them into rough characteristic types.
- finally, describing their characteristics in detail.

Typology takes care of the first two; morphology, the third.

Naturally, our approach is through *reduced listening*, so that in theory, to identify, classify and describe objects we make no reference to their cause, their origin, what they evoke ... etc.

The interdependence of the two procedures is shown in the way that they are conditional upon and have determined each other: “*It was important to separate (sounds) into distinct types; without a preliminary screening, we could only describe morphologies so crudely that it was of very little interest. But on the other hand, the screening [114] could only be done in accordance with morphological differences. So, for many a long year we have hesitated between a scarcely-formulated morphology and an ill-defined typology.*” (393)

So we had to create an elementary morphology to be a preliminary for a typology; itself followed by a more highly-developed morphology than the first.

TYPO-MORPHOLOGY: 365, 369 (PROGREMU), 384, 392-400, 430, 475, 499, 584-587 (TARSOM).

» 59. ARTICULATION/STRESS

1) The first pair of *identification criteria* in typology, allowing every sound chain to be cut up into units, isolated sound objects.

- Wherever there is “*a breaking up of the sound continuum into distinct successive energetic events*” (396) there is *articulation*, as with consonants - and this articulation is related to the *sustainment* of the sound.

- Wherever the sound phenomenon is prolonged, like a vowel, there is *stress* and this stress is linked to the *intonation* of the sound, “*i.e. whether the sound is fixed or variable in pitch*”, or whether this pitch is tonic or complex. (366)

This pair is, therefore, modelled on cutting up linguistic chains into syllables, made up of consonants and vowels.

Such criteria must deliberately ignore references which help other non-reduced listenings, where the aim is always something other than the sound itself: recognition of a source, perception of a meaning in a known language, etc.

2) Thus, expressed in terms of pure reduced listening, Articulation and Stress are: “*the common bases for the identification of sound objects, whatever they may be*” (337) and are the starting point for typo-morphology, and therefore of the entire “*programme of musical research*” (cf. PROGEMU, fig.24, p.369). This is why they appear in sector 2, as a major relationship, a founder-axiom of *typology*.

a) *Explanation of terms.*

When he speaks of intonation insofar as it has been overlooked by phonetic classification, Pierre Schaeffer means sound characteristics which arise as much from delivery (*a drawling voice*) as from timbre (“*reedy, tonic or hoarse*”) and from variability in tessitura (“*fixed or sliding*”). But when he suggests that his typological classification is concerned rather with intonation, the context makes clear that he means more precisely “variability in tessitura”, the “locatability in pitch”, which is the first criterion for typological classification (pair *Mass/Facture*).

The word “stress” suggests fixedness in tessitura, in contrast to intonation which suggests variation: but in both cases, we are dealing with a sound phenomenon which is *prolonged*.

b) *Articulation/Stress, Articulation/Intonation, Sustainment/Intonation.*

In general, the author speaks of either *stress* or *intonation* to describe the second term of the pair of identification criteria for sound objects – [115] the first being almost always

articulation, but sometimes also sustainment. *Articulation/Stress*, *Articulation/Intonation* and *Sustainment/Intonation*, therefore, form three pairs whose relationships of complementarity or equivalence are not very clear (even a pair *Facture/Stress* is implicitly suggested as an initial approximation for the pair *Articulation/Stress*).

In the *Solfège de l'Objet Sonore*, the author resolves the ambiguity which prevails throughout the *Traité* concerning the subtle distinction between *Articulation* and *Sustainment*, *Stress* and *Intonation*, by stating that the pair *Sustainment/Intonation* is simply the “*musically-orientated*” version of the pair *Articulation/Stress*.

“*When it was orientated towards language, “Articulation” principally dealt with consonants. We shall ignore consonants and give importance to what we call sustainment, i.e. whether the energy given out at the moment of articulation is communicated instantly or over a longer period of time. As for “stress”, language paid little attention to describing intonation, it lingered over the colour of vowels. But we shall ignore this aspect of stress and retain only fixedness in tessitura*” (S.O.S.).

So, *intonation* becomes an initial approximation to the criterion of *mass*.

c) *Definition and function of the pair Articulation/Stress (or Articulation/Intonation)*.

The “experimental system”, breaking with the classical concept of the note, and starting from the position of reduced listening, initially came up against the necessity of identifying and classifying sounds:

“*Faced with so many disparate objects, belonging to no group at all (...) we must have a classification, even approximate, a sort of “grid” which would completely replace instrumental tablature or the natural repertoire of noises. For how can we study an infinite number of sounds that have not been in any way identified? We therefore use “sound identification criteria”. They will give us the means to isolate sound objects from each other, since we refuse to do this through the usual workings of sound or musical structures.*” (366)

Out of what hat shall we take these identification criteria, devoid of any “usual” reference and in the absence of an established musical system? Consider first that in language, “*the definition of units which seemed so obvious to us, inscribed in the sound itself, is relative to their meaning, and to our knowledge of this meaning*”. (285)

The criteria for segmenting into units, in linguistics, are not purely phonetic or acoustic, but *phonological*, i.e. deduced from analysis taken from the whole system. Similarly, in traditional musics, it is our acculturation to the system which allows us to isolate as “notes” sound objects as dissimilar, from an acoustic point of view, as a piano note in a virtuosic passage and a violin note in a melody. How can we extricate ourselves from this problem in the experimental enterprise when the higher level of the system is absent, and when we refuse to use the “natural” mechanisms for identifying objects (through recognition of meaning or sources), and stick to reduced listening?

Paradoxically, through the inspiration of a linguistic unit which, the author notes, is considered negligible by linguists (362): the syllable, that “*phonic object*” of language. It is to this degree of segmentation in the linguistic chain that “*the instrumental note in the traditional system*” (365) corresponds, and P.S. aligns it with the “*elementary sound object into which, ultimately, the most complex sound chain can be broken down*”. (365)

And the criteria for segmentation which he adopts are *articulation* (corresponding to consonants in language), and *stress* or *intonation* (corresponding to vowels). These criteria can be applied to the whole sound universe, “*provided we remain at the level of generalization and give them a very broad meaning*” (365), and constitute the “*first approximation to a [116] typo-morphology which should allow us, not only to identify, but also to classify and thus to choose sound objects*”, (365)

Note here the progression from identifying to classifying, and above all from classifying to *choosing*. It is with this musical end in mind that the identification criteria Articulation/Stress are not without “*musical choices*”. (366)

ARTICULATION/STRESS: 285, 337, 365-366, 369 (PROGREMU), 379, 384, 394-397, 497.

» 60. FORM/MATTER

1) The founder-pair of morphology, making it possible to give an elementary initial description of the sound object.

In a sound, *matter* is what persists almost unchanged throughout its duration, it is what could be isolated if it were immobilized, so that we could hear what it is at a given moment of listening.

Form is the course which shapes this matter in duration, and perhaps makes it evolve.

2) In most cases the form and matter of a sound evolve together, but in order to study them, it is easier to consider so-called “deponent” examples, where one of the two is fixed, highlighting the identity of the other. For example, to study the matter of sounds, “homogeneous” sounds of rigorously fixed form are used.

3) Some morphological criteria are particularly linked to the study of matter: these are mass, harmonic timbre and grain.

Others belong rather to form, such as allure and the dynamic criterion.

a) *Form, Gestalt, Structure.*

The word *form* in the *Traité* is usually used in the sense of the *temporal form* of the object, as opposed to its matter. To refer to form as an organized entity, the *Gestalt* of

“psychologists of form”, the word “*structure*” is therefore preferred, in order to avoid any ambiguity. So, with the exception of the accepted expression *well-formed* and the expression “formed sounds”, the word *form* does not have its gestaltist meaning in the *Traité*.

Otherwise, the word *form* is often used as a synonym for the *dynamic evolution* of sound (its evolution in intensity).

b) It was the *cut bell* experiment that led to the isolation of the respective roles of matter and form in the perception of timbre – because the suppression of the initial form of the bell-sound revealed the resemblance of its matter to the sound of a wind instrument.

FORM/MATTER: 275, 369 (PROGREMU), 399-403, 407, 417-419, 431, 500, 516.

» 61. SUSTAINMENT

1) The SUSTAINMENT of a sound object is the energetic process which maintains it (or not) in duration. It must not be confused with the material causality [117] which gives rise to it. If the sustainment is short-lived, we have an IMPULSE (prolonged or not by a resonance); if it is prolonged in a continuous fashion it is referred to as a SUSTAINED sound; if it is prolonged by repeated impulses we have a third type of occupation of duration: ITERATIVE sustainment.

The *three types of facture* are defined according to these three types of sustainment, making up the three large vertical columns in typology.

2) Sustainment binds the form and matter of the object at every moment by contributing two characteristic criteria: GRAIN and ALLURE, which can just as well be perceived as criteria of MATTER and FORM. However, grain and allure are discussed in the chapter entitled “Music Theory of sustainment”, as the two sustainment criteria.

Sustainment and causality.

Although it is distinct from the causality of sound, sustainment, which only exists as a *perceptual* law, nevertheless obeys various “laws” or categories of material causality.

For example:

α) no cause for duration: sustainment is non-existent or short-lived (the crack of a whip, a wood-block) – examples of passive sustainment;

β) the environment prolongs and colours the sound after the attack: sustainment through resonance (e.g. piano, guitar), which is still a “passive” type.

γ) the sound can be further prolonged by a renewed input of energy obeying the same law (sustainment of a wind instrument, maintained by breathing, of a violin, with the bow, electronic oscillation, etc.) – examples of *active* sustainment. (469-470)

So, in traditional music, different categories of sustainment are determined by simple physical and mechanical laws, consciously activated by the performer. With natural sounds these laws are more complex and intermingled, but still present. Electronic music, however, can allow itself to flout these laws and give ARTIFICIAL sustainments to sounds, where these laws no longer apply. But then these sounds are “against nature”, and the *Traité* prefers the richness, the logic and the meaningfulness of *natural* sounds, which it always takes as models.

Of the sustainment criteria, ALLURE most strongly displays a close link with natural causalities, by “revealing” the workings of the “energetic agent”. (547)

It is enough to say that SUSTAINMENT is a characteristic concept of the concrete attitude, which is attentive to the logic of natural sounds and to the links between making and hearing.

SUSTAINMENT: 402, 412, 444, 4669, 470, 500-501, 539, 547-560.

» 62. FACTURE

1) *Facture* is the qualitative perception of the energetic *sustainment* of sound objects and is closely related to it.

We could therefore say that some sound objects have “no facture” if it goes on too long and too unpredictably in duration (over-prolonged sounds), or if, on the contrary, there is not enough time for it to be heard (*impulses*).

The notion of *facture* therefore presupposes a certain balance of sound, in an [118] optimum time for it to be memorized by the ear, and a certain degree of predictability.

2) For typology, therefore, there are examples of *formed* factures in “well-formed”, balanced sound objects, and examples of factures which are *non-existent* (because they are too redundant and commonplace - *redundant* sounds) and *unpredictable* factures (because they are too unpredictable and disordered - *excentric* sounds).

Within *formed* factures there are again three types linked to the three types of sustainment:

- instantaneous facture (in the impulse);
- continuous facture;
- iterative facture.

These different types of facture, combined with other criteria, guide typological classification. (see MASS/FACTURE, 68).

3) *Facture and sustainment.*

A distinction can be made between sustainment and facture by saying that sustainment is a neutral notion and that facture is a qualitative, musicianly criterion which “describes sustainment”.

A sound always has a certain type of sustainment (including those which consist in not having any), but it is possible to have no facture, if there is too much redundancy or originality in its sustainment.

4) In a secondary sense, the term facture denotes the intention embodied in the instrumental gesture, or again, in traditional or modern musics, the active creation of sound; and, by extension, the realization of sounds in the electroacoustic studio, with sound bodies, sound recording facilities etc.

FACTURE: 271, 342, 371, 393, 410, 413, 432, 437, 438, 440, 442, 444, 447, 550
(also see **MASS/FACTURE, 68**).

» **63. IMPULSE**

1) The name impulses is given to very brief sounds with non-existent or short-lived sustainment (402), as opposed to sounds which are prolonged in a continuous manner (held sounds) and sounds which are prolonged in a discontinuous manner, in other words by repeated impulses (iterative sounds).

Examples of impulses: the crack of a whip, a pizzicato on a cello, the impact of a tennis ball on a racquet etc.

2) The symbol used to notate an impulse is the apostrophe '. Therefore, N' means: tonic mass impulse (i.e. locatable pitch). (see **65**)

a) Impulses (sometimes also called micro-objects) occupy the central column of typology, and are placed between balanced objects despite their short-lived duration, which in theory does not obey the criteria for “suitable” objects, which are supposed to have a minimum duration. But they are nevertheless included as an exception to the rule, because they frequently occur in classical music, and our ear has become accustomed to their use.

[119] b) An impulse can be *varying*, i.e. affected by a rapid variation during its brief existence (e.g. some bird-songs, some very rapid glissandi which are labelled Y').

c) If we refine this concept we can use different notations to distinguish instantaneous percussions, notated by a dot, and very brief sustained sounds, notated by a '. Typology simplifies the situation, using the apostrophe to notate both totally instantaneous sounds and sounds of very brief duration, and calling them *impulses*. (445-446)

d) Note that in their brief duration, impulses can sometimes present many details which are contracted and therefore indiscernible to the ear: they can have a facture which is “*clearly defined (...) but almost imperceptible as such*”. (438)

IMPULSES: 402, 437, 438, 439, 442, 445-446, 459 (TARTYP).

» 64. ITERATIVE (SOUND), ITERATION

1) The name iterative is given to sounds whose sustainment is prolonged by iteration, i.e. by repetition of impulses at close intervals. An example of an iterative sound: the noise of a machine gun in action.

2) In the typology of balanced objects, iterative sustainment is notated by the symbol " after the letters which denote the mass of the object.

E.g.: N (continuous [iterative (sic)] tonic form: held violin-note)

N' (tonic impulse: violin pizz.)

N" (formed iterative tonic note: rapid violin staccato on the same note)

3) The term iteration could just as well describe the phenomenon of repetition as the sound which is affected: in this case it is synonymous with an iterative sound.

a) In typology, iterative sounds occupy the whole right section in the general recapitulative table for typology (TARTYP).

b) If an iteration is accelerated, it gives a sound perceived as *continuous* and having a certain *grain*.

Conversely, if the iteration is too spaced out, the iterative sound is no longer perceived as a unit, and each impulse once again becomes an isolated sound object.

The concept of an iterative sound therefore illustrates the problem of the continuous and the discontinuous, as it occurs on the cusp between the two. It is just about possible that, depending on context and listening intention, the same sound phenomenon could be perceived in three different ways:

- as a grainy, sustained sound;
- as an iterative sound;
- at a pinch, as a series of isolated impulses.

ITERATIVE: 402, 438-439, 442, 445, 447, 458 (TARTYP).

» 65. TONIC

Sounds are called tonic, or of tonic mass, when their pitch is fixed and locatable, such as traditional instrumental sounds (e.g. a C# on the piano). Typology notates them with the letter N (since they fulfill the traditional definition of the note). As they have [120] the greatest degree of “locatability in pitch” they appear on the top row.

The author also sometimes uses “harmonic” pitch in the same sense (e.g. 366).

a) Through the morphological study of *mass*, we can distinguish in more detail so-called *pure* sounds (sinusoidal electronic sounds with no “harmonic timbre”) from true *tonic* sounds, which have a “harmonic timbre” in the same way as traditional instrumental sounds. *Tonic groups* are the masses formed by superimposing tonics, which can be isolated in listening (traditional chords) and *channelled sounds* those whose mass is formed of an amalgam of tonics and “nodes”. (see 89)

It would be wrong to think that tonics only occur in music; many natural, mechanical or industrial sounds also have tonic mass.

b) It is in tonic sounds that it is easiest to isolate and study what is called the “harmonic timbre” of sounds, which does not exist in “pure” sounds, and which it is difficult to isolate from mass in *complex* sounds (nodes, channeled sounds etc. and *varying* sounds.

c) If we can distinguish a *double pitch-field*, harmonic and coloured, and two ways of perceiving phenomena of mass, it is precisely because only tonic sounds can be perceived as an absolute value (cardinal perception) and arranged in “cardinal” calibrations. Whereas sounds of varying or complex (non-locatable) pitch result from a perception which is more diffuse and “impressionist” in colour and density. Hence the distinction between a so-called “harmonic” field, solely for the perception of tonic sounds, and a “coloured” field for non-tonic sounds (either complex-fixed or varying).

TONIC (SOUNDS): 366, 440, 442, 446, 447, 459, 510, 511, 516, 517, 518, 520, 584-587, (TARSOM) (sometimes designated by the term “harmonic sounds”).

» 66. COMPLEX

1) Sounds whose mass is fixed but not locatable in pitch are called *complex* sounds, or sounds of complex mass. E.g. a cymbal sound, the “hiss” of a piece of electroacoustic apparatus etc. They are notated by the letter X.

2) Typology also distinguishes between *tonic* sounds of defined and fixed pitch (N) and *varying* sounds, of variable mass (variable-tonic, or variable-complex). The sequence: N,

X, Y denotes a *diminishing locatability in pitch*, and TARTYP is organized vertically in the same way, with *complex* sounds on the middle line, between tonic sounds and varying sounds.

3) Used alone, and in capitals, the letter X denotes the 3 types of balanced objects of complex mass (X = continuous complex note; X' = complex impulse; X" = iterative complex note). In lower case and as a suffix to another letter denoting another type of object, it means that the mass of that object is complex (e.g. Hx = homogeneous complex sound; Ax = accumulation of overall complex mass etc.).

[121] 4) Morphology distinguishes more subtly between masses of complex type:

- *nodal* mass (or *node*) - a compact agglomerate, a “slice” perceived as a whole (see **90**);
- *nodal group* - where the mass is perceived as a superimposition of “nodes” (see **90**);
- *white noise*, which in theory occupies the entire tessitura (see **92**);
- “*channelled*” sound where the mass is a superimposition of “tonics” and “nodes” (see **91**).

a) In relation to the double perceptual pitch-field, sounds of complex mass and their corresponding harmonic timbres tend to be perceived in *thickness* in the so-called “coloured” field, whereas tonic sounds and their harmonic timbres are perceived in *degrees* and *intervals* (traditional “harmonic” field).

Being “complex”, and therefore without precise pitch, does not prevent them from *also* being situated also in the pitch-field as more or less deep, medium or high, and more or less thin or thick. The ear turns out to be very sensitive to very slight differences in the “colour”, the “thickness” and the pitch “site” of complex sounds; but it is not equipped to memorize and locate these difference in a fixed “discrete” manner (as opposed to tonic sounds).

b) *Complex sounds and varying sounds*: the great boldness of P.S. in typology is to consider that varying tonic sounds (developing as glissandi in the tessitura) and varying complex sounds (*idem*) present themselves to perception in the same way, are no more “locatable” one than the other and that there is therefore no need to classify them in separate boxes. The symbol Y is therefore used to denote all varying sounds. It can, it is true, be refined into Y_n (tonic-varying) or Y_x (complex-varying).

COMPLEX: 446-447, 462, 518, 586.

B. Typology: a classification of sound objects

a) Classification criteria

» 67. TYPOLOGICAL CRITERION

1) The concept of *criterion* appears in the two distinct contexts of *typology* and *morphology*, with two different meanings, but stemming from a common definition: the criterion is a “*property of the perceived sound object*”, allowing it to be identified, classified, described, analysed etc.

2) Within the framework of *typology* we have pairs of *sound criteria for identification* allowing units or *objects* to be located in any “sound chain”, and to be classified into *types*. These criteria for the identification and classification of objects function in pairs, which bring together two opposing complementary aspects of sound.

[122] 3) The minimum criteria for *identification* of objects, i.e. for segmentation of the sound chain into units, are represented by the pair *Articulation/Stress* (see 59).

4) On a more complex level, for the *classification of objects into types*, three pairs of criteria are used: *Mass/Facture*, *Duration/Variation*, *Balance/Originality*. These criteria are already “morphological” (descriptive) but they are used only to establish approximate distinctions, allowing main types of objects to be defined. It is their interaction in 6 dimensions (reduced by “contraction” to 2 in order to fit on a two-dimensional diagram) which generates the principle of typological classification (TARTYP).

5) What these four pairs of typological criteria have in common is that they have been chosen with a “musical bias”, i.e. they seek to identify sound objects which are most “suitable” for music. They are, therefore, more or less normative and hierarchical criteria.

a) These criteria are not devoid of musical choices (346), arising from “*musical bias as infrequent, as justified as possible*” (366). This means that they are not altogether neutral in relation to the “totality of sound” that they are aiming to dig out of the woodwork, but that they are to a greater or lesser degree intended to classify it with a view to using it for music. The criteria of *mass*, *balance* and *originality*, particularly, refer respectively to notions of locatability in pitch (which is the traditional musical value par excellence) “*well-formedness*” and listening “*interest*”, all of which display a concern with music.

b) We have already looked at the pair *Articulation/Stress* (see 59). There remain to be studied the three other pairs, which correspond to the elementary morphological concepts without which a typology could not get off the ground. Before taking each one in isolation (see 68, 69, 70), we shall explain how they came to be developed.

We have a jumble of objects in an attic, say: how can we classify them? Using the criterion of material (wood, cloth etc.), size? (“*They suggest I order my clothes by size: this doesn’t allow me to arrange birds or bottles...*”) (429) or function? The latter suggestion seems the most feasible, for “*we want to use sounds first and foremost to make music*”. (431)

Therefore, all the criteria which are chosen are determined by the concern to discover objects “suitable for music” and having well-balanced, complementary qualities.

TYPOLOGICAL CRITERION : 346, 366, 429-442, 459 (TARTYP).

» 68. MASS/FACTURE

1) The pair Mass/Facture, the first pair of criteria used to classify sounds in typology, combines respectively a criterion relating to the “*capacity for a sound object to be heard as pitch*” (432) with another relating to “*the manner in which energy is communicated and displayed in duration*” (432). The main criterion, Mass, has to do with the matter of sound, and the second, Facture, its form. This is how they complement each other.

2) The choice of mass as the first typological criterion arises from the [123] concern to start off this classification with an essentially “musical” criterion (as with the pair Musical/Musicianly), since it relates to pitch, whereas Facture would, in contrast, introduce a more creative, “musicianly” spirit.

3) The four types of Mass retained for typological classification are:

- where the pitch of the sound is fixed and identifiable (*tonic masses*);
- where the pitch is fixed and non-identifiable (*complex masses*);
- where it varies moderately and in an organized manner (“*variable*” mass - both tonic-variable or complex-variable);
- where it varies in a disordered and excessive manner (“*nondescript*” mass).

4) The three types of Facture selected in parallel are:

- where the Facture is prolonged and continuous (“*continuous*”);
- where it is reduced to a simple impulse, i.e. an ephemeral phenomenon (“*instantaneous*”);
- where the Facture is prolonged by repeated impulses (“*iterative*”).

5) These variables, in the same sound, are not necessarily strictly independent, they are often linked. For example, if the facture of a sound is very mobile and complex, so also will be its mass.

MASS/FACTURE: 431-432, 436, 437, 439, 442, 443, 444-448, 459 (TARTYP).

» 69. DURATION/VARIATION

1) The pair Duration/Variation, the second of the three pairs of criteria of typological classification, introduces a *temporal* factor into the selection of objects.

Duration is the time of the object as it is “psychologically experienced” (not the “chronometric” time), and *variation*, defined as “*something which changes over time*”, is a relationship “*which resembles a speed*”. (433)

2) Thus, we can distinguish *short, medium, extended* durations and *non-existent, reasonable or unpredictable* variations.

3) The author of the *Traité* puts forward the hypothesis that human perception functions best within an optimal temporal space, which is a medium duration. Below and above this duration, perception will be disconcerted. Hence the choice of the three values of duration: (too) short - (ideally) medium - (too) long.

a) *Temporal criteria.*

The concept of duration was already present in facture, but as the “total duration of the sound object”. Here duration is considered “*in a relationship that resembles a speed, which is the quotient obtained by dividing a deviation (what changes) by the duration of the change*” (433), since it comes under the criterion of variation (defined as “*something that changes in relation to time*”). (433)

b) These two factors are linked to the first pair of criteria. “*We shall deal with [124] durations and variations of objects using the criteria of mass or facture.*” (433)

c) *Connection between variation and perception of duration.*

The study of temporal anamorphoses shows that “[perceived] *musical duration is a direct function of the density of information*” (248). The more the sound is packed with events, which can be variations, the more it tends to be perceived as long, and vice versa (see chap. XIV, time and duration, p.244-258). The perception of duration is therefore linked to the variations of the object and vice versa.

DURATION/VARIATION: 248, 432-433, 436-438, 442, 459 (TARTYP).

» 70. BALANCE/ORIGINALITY

1) The third pair of criteria in typological classification, dealing more particularly with the *structural* dimension of the object, considered qualitatively. These two criteria, in this sense, explicitly introduce a *value judgement* into typological classification, calling on notions

of “full of potential” (balance, “well-formedness”) and “interest” (originality), to select objects.

2) *Balance* is defined as a variable “compromise” in the facture of the sound object, between the “*too structured and the too simple*”(435), and *originality*, as the greater or lesser capacity of the object to “*challenge expectations*” (436) as it progresses.

These two notions are not opposed, but complementary: in typology “*attention is given to the object, chosen from possible structures and, for this chosen structural level, to the greater or lesser degree of originality*”. (436)

This can go from non-existent originality (*redundant* sounds) to excessive originality (*excentric*, too unpredictable sounds), passing through medium and “suitable” originality.

3) In accordance with these two criteria, typology distinguishes so-called *balanced* objects, which are placed in the central boxes of TARTYP; *redundant* sounds on each side of the central box; and finally *excentric* sounds on the circumference.

Grouping of criteria for typological classification.

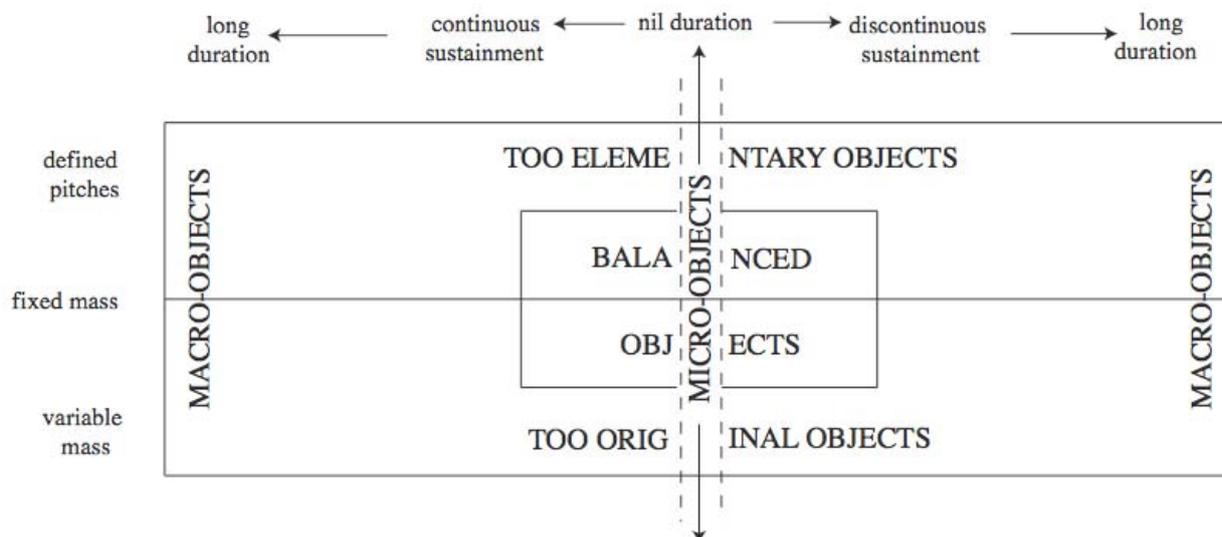
Since typology is intended to generate a diagram which can accommodate the main types of object, it is not possible to keep completely separate the 6 variables represented by the three pairs *Mass/Facture*, *Duration/Variation*, *Balance/Originality*, which would require a six-dimensional diagram. In fact, in objects they are not separate: the originality of an object, for example, is linked to its degree of variation in relation to its duration, and the complexity of its facture, etc.

So *facture* is combined with duration horizontally, and mass with variation vertically, “*arbitrarily simplifying their relationships*”. (437)

Facture and Duration are placed on the same horizontal axis in an arrangement starting at the centre (brief durations, non-existent factures: “impulses”) with sounds of medium and long duration, of continuous facture on the left, and on the right, sounds of medium and long duration, of discontinuous facture (iterative).

In the same way, Mass and Variation are combined on the same vertical axis, going

[125]



Recapitulation of typological criteria.

from top to bottom, starting with non-varying masses of defined pitch and going to the other extreme of “unpredictable” variations of mass: in the centre is the suitable mean of “fixed” masses, with non-defined pitch (complex mass) “*half-way between sounds of easily-locatable pitch (on the vertical axis above), and sounds with variable mass (below)*” (437)

The order of the associated criteria of mass and variation is as follows:

- fixed masses with pure pitch (“pure” sounds);
- fixed masses with defined pitch (“tonic” sounds);
- fixed masses with non-defined or “complex” pitch;
- masses with little variation;
- extremely variable masses (“unpredictable” variation).

“Arranged like this, the two axes form four quadrants on our drawing. So our classification has a centre.” (437)

The arrangement from a centre to a perimeter is then used to situate the pair of criteria Balance/Originality.

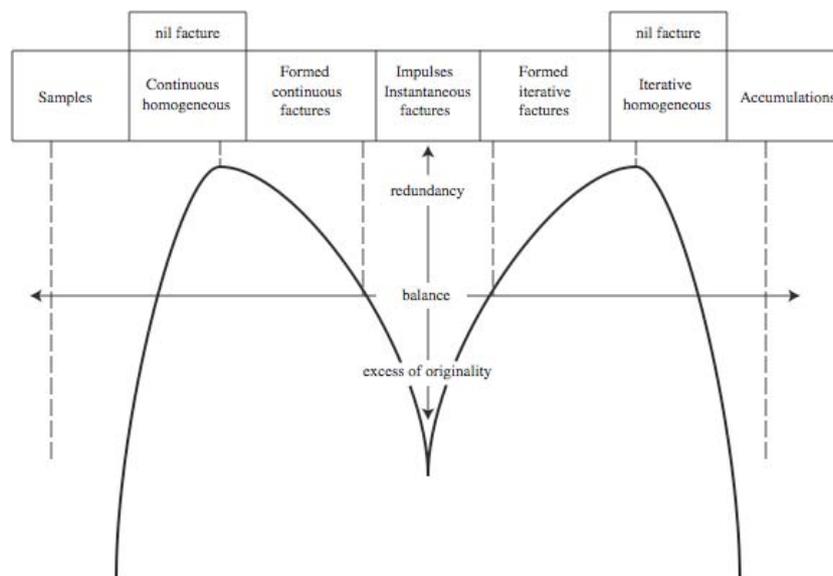
“Has this centre any significance in relation to our desired objective to organize objects on the model of balance-originality? We may hope so, if this classification manages to give central place to objects with good balance and neither excessive nor insufficient originality. In fact, and more precisely, we should expect to find a “vanishing point” (micro-objects), and around the centre an area of balance with, at the extremities, on the perimeter, an extensive zone of objects which are not well-balanced.

In the centre there is both a fixed mass, thus an acceptable balance and an adequate originality as far as the criterion of matter is concerned, and a shorter and shorter duration: we are moving towards micro-objects for which we need a vertical band in the middle of the page for temporally unbalanced sounds which appear as structurally elementary (...).

Vertically, originality will, of course, increase from top to bottom. The more the sound is stripped down, of determined pitch and at the limit of electronic purity, the less original it will be. The more the sound is of variable mass, the more originality it will have, but the more it will tend (towards the bottom) to be unbalanced, both in the complexity of its structure and in its unpredictability.” (437-438)

We can imagine how much time it must have taken to complete such an

[126]



ingenious combination, based on the areas of interdependence of each of the six variables in the three pairs of criteria.

“Thus along the horizontal axis we can situate seven fairly clear zones where facture and duration occur in a consistently characteristic way, and which have various degrees of originality or redundance, as is indicated on the diagram above by a curve of originality whose ordinates go from zero (redundancy) to infinity (total unpredictability).” (439)

The contraction of the 3 pairs to 2 dimensions gives a provisional diagram whose boxes must be filled in later: the TARTYP retains this diagram, but with some slight simplifications (for example it does not distinguish between pure sounds and tonic sounds).

BALANCE/ORIGINALITY: 435, 436, 438, 439, 440, 442, 443-448, 459 (TARTYP).

b) First series: Balanced Objects

» **71. BALANCED (SOUNDS)**

1) In the typology of sound objects, the 9 types of *balanced* sounds are those which present “a good compromise between the too structured and the too simple” (435), which have a suitable duration, are “well-formed” and have a strong “unity of facture”.

Balanced sounds are, therefore, *a priori*, those which can be *suitable* for music, but we must not confuse the typological notion of balance with the broader concept of suitability, which indicates an intention to use objects in music.

[127] 2) Balanced sounds are often called *notes*, with reference to traditional music. In the TARTYP (459) they have a privileged place: the nine central boxes which are assigned to them in accordance with the principle of typological classification.

	<i>Criteria of facture</i>			
<i>Criteria of mass</i>	Ordinary note	N	N'	N''
	Complex note	X	X'	X''
	Varied note	Y	Y'	Y''

The letters N, X and Y refer to types of mass, tonic, complex and “reasonably” variable respectively.

The letter N, X or Y without a particular sign refers to a balanced, continuous facture; the sign ' refers to a very brief facture of the impulse type; the sign '' refers to a balanced iterative facture.

3) Although *impulses* appear amongst **balanced objects**, although they do not fulfill the criterion laid down by the author of “*optimum memorisation time for the ear*” (443), they

are included, as it were, by adoption, as they are commonly used in traditional music, where our ear has learnt to listen to them.

4) In the study of *internal morphology*, sounds are called “balanced notes” when they display clearly and distinctly the three temporal phases: attack, continuant and termination. Sounds which present two of these phases, or even all three, fused into one are called “deponent notes” and these are commonly the case, balanced notes being the exception.

a) *Criteria for definition of balanced objects.*

Underlying the principle of typological classification is the idea of bringing out, separately and in a central position, “good objects” which are memorisable, full of potential, fit to be used in musical structures.

These central objects (literally and metaphorically) should not be “...*either too elementary or too structured. If they are too elementary, they will tend to be subsumed by structures more worthy of memorisation (...)* If they are too structured, they will be capable of breaking down into more elementary objects” (435). To this criterion of well-formedness is added a criterion of duration: “...*the adjective memorable, while it indicates a meaningful form, [128] also implies a suitable duration: neither too short nor too long, about the optimal duration for listening to objects*” (435)¹.

b) *Summary of balanced sounds.*

- 1) N: continuous tonic formed sound
or: ordinary sustained note (447)
or: formed sustained tonic (459)
- 2) N': tonic (or “tonic mass”) impulse
or: ordinary note, “impulse” type (447)
(e.g. xylophone note)
- 3) N'': iterative formed tonic sound
or: ordinary iterative note (447)
or: formed tonic iteration (459)
(e.g. violin staccato)
- 4) X: continuous formed complex sound
or: sustained complex note (447)
or: formed complex sustained mass (459)
(e.g. sound of a cymbal “*stroked with a metal brush*” (447))
- 5) X': complex (or “complex mass”) impulse
or complex note “impulse” type (447)

¹ The idea of an “*optimal listening duration*” rests on the experiments recorded in book III on the perception of sound in duration (254).

(e.g. cymbal “*clashed and immediately muted*” (447))

- 6) X": complex formed iterative sound
or: complex interactive note (447)
or: complex formed iteration (459)
(e.g. not too rapid percussion tremolo (447-448))
- 7) Y: continuous formed varying sound
or: continuous varying note (447)
or: formed slightly variable sustained (459)
(e.g. violin glissando)
- 8) Y': varying (or “slightly variable mass”) impulse (459)
or: varying “impulse” type note (447)
(e.g. brief glissando)
- 9) Y": varying formed iterative sound
or: iterative varying note (447)
or: formed iteration of slightly variable mass (459)
(e.g. “kettledrum” tremolo glissando (448))

The definition of Y sounds can be refined by notating varying tonic mass sounds as Y_n (or Y'_n, or Y''_n) or varying complex mass sounds as Y_x (Y'_x, or Y''_x).

In this summary of balanced objects we have brought together some of the varying (but equivalent) definitions given by P.S. for each type, and concrete examples which he gives, generally taken from the field of traditional music. However, while this list contains most objects from traditional music, it also includes types of objects encountered in experimental music – notably sounds of varying complex mass.

c) *Balanced objects, suitable objects, musical objects.*

These three concepts must not be confused although in certain contexts they can be considered as the same.

[129] Indeed “...*the most suitable sound objects for music are apparently sounds that fit in with the criteria in the nine central boxes...*” (443) thus balanced objects. But:

- *the balanced object* is defined in “concrete” terms within the framework of a typology which is the first step in a programme of musical research in 4 stages. It obeys precise typological criteria;

- *the suitable object* is a “founder” concept whose definition must remain open: often it is the bringing together of objects, the context of their structuring, which defines their criteria for mutual suitability and suitability for music, just as much as, if not more than, their intrinsic characteristics;

- the definition of the *musical object* is relative to an even broader (and vaguer) context: musical intention and implementation.

So, each of these concepts fulfills a fairly decisive function at different stages of musical research. They are interlinked, but independent, because they are located, the first in the precise framework of a general typology of sound objects: the two others, in the framework of a “musical project”, defined in broader terms.

BALANCED (SOUNDS): 435, 443, 447, 459 (TARTYP).

» 72. FORMED (SOUNDS)

1) In typology, *formed sounds* are medium duration sound objects with a feature that is “closed” or “formed” (i.e. describing a complete curve of “*sufficient originality*”) (438) and presenting a *temporal unity*. E.g. a piano note. This, as opposed to very brief sounds (micro-objects, or impulses) or very long ones, without temporal unity (macro-objects). The sustainment of formed sounds can be *continuous* or *iterative* (i.e. discontinuous, through repetition of impulses). In the TARTYP they are in the two columns to the left and right of the central impulses column.

Due to their similarity to the note in traditional music, they are sometimes called *notes*.

2) Two types of formed sounds can be distinguished:

a) basically, “well-formed” sounds as such (in the gestalt sense of well formed), corresponding to *balanced sounds in typology, with the exception of impulses*.

b) additionally, two *excentric* objects, because they are of excessively variable mass, but of medium duration and with temporal unity; the *Large Note* (W) and the *Cell* (K).

3) The list of formed sounds should not therefore be confused with the list of balanced sounds. There are indeed balanced-formed sounds as well as balanced non-formed sounds (Impulses) and formed non-balanced sounds (Large Note and Cell).

FORMED (SOUNDS): 438-439, 442, 443-446, 455, 459, 461.

[130] c) Second series: redundant sounds

» 73. REDUNDANT (SOUNDS)

1) In typology objects are called *redundant* when they offend by being too commonplace and regular, or insufficiently original or too predictable over a fairly

extensive duration. These sounds are “*almost without shape*” (in the sense of the pair Form/Matter) and are in theory, therefore, not suitable for music.

2) In accordance with the principle which guides the organization of types of objects in the TARTYP, redundant sounds occupy two columns on each side of balanced objects (one column for *continuous redundant* sounds, one for *iterative redundant* sounds).

3) The main types of redundant sounds are *homogeneous* sounds H, which do not evolve at all; there are also the particular examples of redundant “*wefts*” and “*ostinati*”, (notated Tn and Tx for redundant wefts and Zy for the redundant ostinato; finally the siren \bar{Y} (continuous) or \bar{Y}'' (iterative)).

a) *Criteria for the definition of redundant sounds*

Redundancy results from the relationship between a too summary or elementary facture and a duration which is too long: “*to arrive at redundant objects, we only need to start from balanced objects (...) and to extend their duration up to the point where every dynamic form disappears*”. (448)

There are two types of redundancy: one in which the matter is fixed (and the idea of redundancy is obvious) and one where it is variable, which could seem paradoxical, but where the variation itself becomes redundant because it is too predictable and extensive (the example of the “siren” \bar{Y}).

b) The arrows in fig. 32, p. 451 which lead from the central balanced objects (indicated by the dotted lines) towards our redundant objects, signify that the redundant sound could be the product of a balanced sound which has “deteriorated” by being excessively prolonged. Note that the siren \bar{Y} is omitted in the TARTYP summary.

- Note also that the Weft and the Ostinato are normally excentric objects.

REDUNDANT (SOUNDS): 435, 436, 437, 438-439, 441, 442, 448-451, 459 (TARTYP).

» 74. HOMOGENEOUS (SOUNDS)

1) Belonging to the family of redundant sounds, homogeneous sounds are those which remain entirely unchanged throughout duration, without any variation or development of matter, intensity etc. (401, 509). E.g. a “white noise”, an electronic “hiss”, a fixed held note on the organ.

It could be said that they have a non-existent *form* and fixed matter. Their origin is usually mechanical and artificial.

2) Homogeneous sounds are notated H or Z according to whether [131] they are continuous or iterative. On the one hand, there are tonic *continuous homogeneous* sounds (H) and complex continuous sounds (Hx) and on the other hand tonic iterative homogeneous sounds (Zn) and complex iterative sounds (Zx), according to whether their masses are tonic or complex.

3) Because of their absence of form, homogeneous sounds are particularly deponent and lend themselves more easily than others to the study of the criteria of matter: *mass* and *harmonic timbre*. This is why the chapter on these two criteria is called *Music Theory of Homogeneous Sounds*. (chap. XXX, p. 509-528)

In order to study the matter of certain sounds which have a dynamic development, we might be tempted to “homogenize” them, i.e. artificially flatten out their dynamic shape.

4) In relation to the three pairs of criteria which form the basis of typological classification: *Mass/Facture*, *Duration/Variation*, *Balance/Originality*, homogeneous sounds are easily defined as being of fixed mass, non-existent facture, non-existent variation, non-existent balance and non-existent originality. All that we need to do is evaluate their mass (tonic or complex) and their sustainment (continuous or iterative). They appear in the two vertical columns for redundant sounds in the TARTYP, to the left and right of central balanced objects.

a) *Origin and interest of homogeneous sounds*

The typology of homogeneous sounds, the author notes, is “*the best defined, the easiest to analyse*” (509) because in these sounds, mass is, as it were, immobilised and can be observed with the greatest precision. On the other hand, this typology is “... *often the least straightforward to obtain in practice*” (509).

Sounds that are of homogeneous origin (i.e. not created by a homogenizing manipulation) are, therefore, generally of artificial origin: either electronic (white noise, “*a synthetic sound imitating an indefinitely long bow movement*”) (438) or coming from instruments whose sustainment is maintained mechanically (hurdy-gurdy, organ).

The interest of homogeneous sounds for the study of matter is obvious, on the other hand they are “*unrewarding from the aesthetic point of view*” (401) and therefore more useful to research than to music.

b) We should point out that there may be a slight difference between “quasi homogeneous sounds” indicated by a dash above them, and which display slight dynamic fluctuations (\bar{N} , \bar{X} , \bar{N}'' , \bar{X}'') and sounds which are perfectly mechanical, smooth homogeneous (Hn, Hx, Zn, Zx). However, in its final state, the typology does not take account of the first and implicitly integrates them with the second. (cf. TARTYP, fig. 34, p. 459).

In addition, varying redundant sounds are not characterised as “homogeneous sounds” in the strict sense (despite what the *recapitulative table of redundant sounds* seems to show,

fig. 32, p. 451), even if their variation is of an implacable regularity (e.g. the siren), nor are *wefts*, “fusions of slowly evolving sounds”, which display internal variations.

c) A summary of the general types of homogeneous sounds H and Z can be found in box 21 of the TARSOM (types of dynamic criteria, 584), as representative of absolutely flat, non-evolving dynamics.

HOMOGENEOUS (SOUNDS): 401, 416-417, 449, 451, 459 (TARTYP), 509, 517.

[132] » 75. SIREN (\bar{Y})

1) A type of redundant sound characterised by a slow, continuous variation in tessitura, prolonged and regular, uneventful. It is notated \bar{Y} , since it can be considered as a “stretching” in time of the balanced note Y.

The name siren alludes to the most characteristic example of this process; the sound of a warning siren.

There is also a variation, the “iterative siren”, notated \bar{Y} ”.

2) The siren is mentioned in the study of redundant sounds, but does not figure in the final summary table of the TARTYP.

a) In the complementary typology of variant objects, (570-572) the continuous siren \bar{Y} is relocated beside the *weft* T, but more closely linked to traditional musics. The author is perhaps thinking of the slow glissandi of certain non-European (Japanese) or contemporary musics (the opening of *Metastasis* by Xenakis).

b) The siren also appears in box 41 of the TARSOM in the summary of types of melodic variation, as an example of the “progress” type of variation (slow and prolonged).

c) *Note*: In the different editions of the T.O.M. the line above the \bar{Y} is hard to see in box 41 of TARSOM, p. 586, and can be confused with a balanced object Y.

SIREN: 449-451, 570, 571, 572, 586 (TARSOM).

d) Third series: excentric sounds

» 76. EXCENTRIC (SOUNDS)

1) In typology, sounds which display a lack of balance in the sense of being too original and complex are classified as excentric.

In accordance with the provisional diagram of typology they are in the “excentric” boxes of the TARTYP, on the periphery.

2) The types of sounds classified as excentric are: the **Accumulation** (A), the **Cell** (K), the **Sample** (E), the **Fragment** (Φ), the **Large Note** (W), the **Ostinato** (P), (except the special ostinati Zy, which are redundant) and the **Weft** (T) (except the special redundant wefts Tn and Tx).

a) *Status of excentric sounds in typology.*

The “peripheral” position of excentric sounds in typology takes on a symbolic meaning: they are “at the limit” of the field of sounds which can be used for music: *“If indeed one of these sounds occurs in a work, there is a danger that it may distract the listener’s attention to itself, because as it is too structured, too unpredictable, and generally too bulky (...) in the structure where it occurs, it becomes the central point rather than simply one element amongst others.”* (452)

To study excentric sounds, only examples “*where a certain unity can be perceived [133] in the sound, which causes it to appear as a sound object again.*” (452) are considered, i.e. examples are omitted where an excess of information, of variation, etc. disrupts the unity of the object.

EXCENTRIC (SOUNDS): 435-437, 438-439, 442, 452-457, 459.

» 77. LARGE NOTE (W)

1) A type of excentric sound which presents a variation of medium duration, a variation “*both slow and multiple but interconnected*”, i.e. fused together by a coherent unity of facture and by the perception of a “*permanence of causality, which links the successive moments together*” (441). Example of a large note: the sound of a bell with its successive harmonics; the singing of a hotel plumbing system creating “*a unique object arising from a clearly determined aquatic episode*” with “*a beginning, a middle and an end*”. (441)

2) The Large Note is notated W. In the TARTYP it is in the column “formed sounds”, under the balanced varying note Y, of which it is an “*extrapolation*” (456) an excentric, “*giant variety*” (457).

a) *Details about the Large Note.*

“*The object spreads out in many-branched, multiform variations, an interweaving of motifs always interconnected in a logical manner: this is a large note W. It is not only hotel plumbing, (...), but the interminable gong, the bell with successive partials, also new objects*”

from electroacoustics whose complex melodic-harmonic development is clearly technologically determined. If this is not the case, if the technical equipment does not hold the object together in such a way, the large note loses its unity and tends rapidly to become a sample (456)".

Why such sophisticated distinctions?

"This rather too original unit has not only the merit of providing a box for classifying a great number of new sounds, unclassifiable elsewhere; it also has the merit of reminding us that some musical motifs, notated on the score, are not really heard in isolation, but are blended into one large note: for example, the notes which Bach adds in an arpeggio above a low fundamental, in the following example" (456).

Here P.S. reproduces the famous dominant ninth arpeggio at the beginning of the *Tocatta and Fugue* in D minor (fig. 33, p. 456).

b) *The large note in the Typology of Variations* (see **30**).

In the complementary typology of variations, the large note is redefined more narrowly, and at the same time divided into two varieties: large note W with a moderate speed of variation and micro-large note W' with a lively speed of variation (572).

The nature of its variation is defined as being of the "development" type, i.e. progressive and continuous (as opposed to the "modulation" type, which is **scalar**); on the other hand it now only designates objects which are the product of a "natural development", as opposed to those which result from a musical intention. Bach's organ arpeggio is, therefore, implicitly redefined as a *motif* (see **84**).

In the summary table of melodic variations, the large note W is placed side by side with the formed varying sound Y which is its "counterpart" in the field of traditional music, [134] likewise the micro-large note W' is next to the varying impulse Y'.

LARGE NOTE: 240, 441, 455-457, 459 (TARTYP), 462, 571, 572, 576, 584-586 (TARSOM).

» **78. WEFT (T)**

1) A type of excentric sound of prolonged duration, created by superimposing prolonged sounds, "sheaves", "*fusions of slowly evolving sounds*" (450) which are heard as groups, macro-objects, slowly developing, scarcely differentiated structures.

The weft is denoted by the symbol T.

2) In addition to the usual so-called "mixed" wefts T, in which the variations of details are quite complex and unpredictable, there are also specific examples of redundant wefts of

scarcely variable mass, notated Tn (“harmonic” weft based on tonic sounds) or Tx (“complex” weft of complex sounds).

3) Wefts are not encountered solely in natural phenomena and musique concrète, but also very commonly in traditional symphonic music.

a) *Originality of the weft.*

The weft belongs to the type of prolonged sound that could be analysed as an amalgamation of different intermingled constituent objects, but which present to the ear as macro-objects bound together by the sensation of a “causal unity”.

As a macro-object with mobile parts, but whose general profile is fairly continuous and fixed, the weft takes its place in the TARTYP in the column of homogeneous sounds “*where it extends the category in the direction of originality*”. (457)

b) *The weft in the typology of varying objects.*

The complementary typology of variations begins by considering the possibility of new distinctions between “fluctuating” wefts Tz, developing wefts Ty and “modulating” wefts (i.e. developing by stages) Tx, but ultimately it classifies the general type weft T with objects *varying slowly in a progressive and continuous manner* (variation of the “progress” type, see 30).

WEFT: 449, 450, 457, 459 (TARTYP), 510, 572, 586 (TARSOM).

» **79. CELL (K)**

1) A type of excentric object, which is created artificially by removing a fragment of magnetic tape containing a recording of “*disordered micro-sounds*”. Thus, an original object of fairly short duration, made of disparate and discontinuous impulses, is obtained (571). It is notated by the letter K, and is placed in the box next to iterative formed sounds, in the same row as sounds with “*unpredictable variations of mass*” (TARTYP).

[135] 2) Artificial repetition, by “looping” a cell, creates the cyclic macro-object which in typology is called “cell-ostinato” and notated P or Zk.

a) *Originality of the cell.*

Compared to the Large Note (W), which has coherent facture and fairly slow variation, the cell presents incoherent execution (facture) and rapid variation between “*disparate and scalar*” impulses (571) i.e. in stages. It is equally distinct from the Fragment (see 80), which is another type of artificial object, produced by splicing a balanced note N, X

or Y, and which is generally short and abrupt, whereas the cell is of a more prolonged, though moderate, duration.

The cell K, “cell-ostinato” P or Zk and Fragment Φ are three types of “artificial” objects (which can be created in the studio by “cutting” into objects and, possibly, repeating them by means of a loop) which in typology are given a place in the excentric boxes. Even if they implicitly reveal their artificial origins, they are heard as objects with an inherent unity, and must be taken into consideration.

One could even say, paradoxically, that it is their clearly audible characteristic of artificiality which welds them into a unit in relation to other objects whose causalities are more “natural”. They are nonetheless “at the limits of typology”. Moreover, the cell is close to the *accumulation*, the only difference being a more “measured” duration and a more “formed” facture.

b) *The cell in the typology of variations.*

In the complementary typology of variations, an appendix to the typology as such, the cell occurs as a type of melodic variation, as a group of “*disparate and (...) scalar impulses*” (571), whose variation is of the “*modulation*” type (in stages) and of rapid speed (“anamorphosed” variation), as an example of the “*most general music*”, compared to the micro-group G' which, while displaying the same characteristics, applies more to the “*materials of traditional music*” (572).

In box 41 of TARSOM, which recapitulates this typology (types of melodic profile), the cell K is no longer next to the micro-group G', which it seems to subsume as a particular example.

CELL: 438, 441, 454-455, 456, 457, 459, 471, 571, 572, 577, 584, 586 (TARSOM).

» **80. FRAGMENT (Φ)**

1) A type of artificial sound obtained by editing out a fairly brief “fragment” of a formed note X, N or Y.

2) The fragment should not be confused with the impulse. It does not follow a natural energetic logic and its artificiality is evident. But it is often found in experimental music.

3) The symbol of the fragment is the Greek letter Φ . As it is a brief object, it is placed in the column of impulses in the same row as sounds of “very variable” mass. With the Cell and the Ostinato, it forms the group of the 3 “artificial” sounds distinguished by typology.

[136] a) Examples of fragments: “*spliced piano or violin notes*”, “*cut bell*”, “*cut cymbal*”.

b) The author specifies that “*these are short sounds, but not necessarily so (...) Just as the cell does not entirely satisfactorily fit in with iterative formed notes (...), the fragment can be included as an impulse only because of a certain abruptness of presentation*”. (455)

FRAGMENT: 455, 459 (TARTYP).

» 81. OSTINATO (P)

1) A type of artificial excentric sound created by the mechanical looped repetition of a cell (therefore of a relatively complicated micro-object). The ostinato is therefore a kind of prolonged and cyclic iterative sound. Examples of an ostinato are: a “closed groove” in a musique concrète work, or else certain repetitive electronic phenomena. Normally the ostinato is notated by the letter P.

2) A *particular example* of ostinato which arises from redundant and not excentric sounds is represented by ostinati in which the element of cyclic repetition is more summary than a cell. This particular example of a cyclic iterative sound (which can be caused by something repeated naturally) is called a “*redundant ostinato*” and is notated Zy (Z in so far as it is an iterative redundant sound, y to characterise the cyclic variations which can be heard within it).

a) *Originality of the ostinato.*

In most cases the ostinato P is, therefore, the product of artificial repetition (looping of a recorded fragment, or repetition by an electronic procedure) of an equally artificial sound, as it is made either by cutting out from a complex sound phenomenon (the cell), or by electronic synthesis.

On the other hand, the 2 examples given by the author of the redundant ostinato Zy (the interminable chirping of a bird, and the creaking of the water-wheel) belong to the domain of natural sounds and are the products of a single causality which is repeated cyclically.

b) In the *complementary typology of variations* the ostinato is again quoted as a type of object with a slow speed of variation (progression) and a scalar type of variation (in stages) together with the macro-group G. This seems to contradict the definition given earlier.

c) In the TARSOM, on the other hand, in a summing up of different types characterised by a variation in dynamic level (box 12), a symbol Zk (cyclic repetition of a cell) occurs in the place where we would expect to find P, and seems to be completely synonymous with it.

OSTINATO: 450, 451, 455, 457, 459 (TARTYP), 572, 584-586 (TARSOM, denoted by the symbol P or Zk).

» 82. SAMPLE (E)

1) A borderline example of a prolonged excentric sound, continuous but disordered, which is nevertheless perceived as a unit because we recognise [137] “*behind the oddness (...) the permanence of a cause, the persistence of a single agent in pursuing its aims*”.(453)

An example of a sample: the prolonged and incoherent sound produced on a violin by the clumsy bowing of a beginner.

2) The symbol of the sample is the letter E, and in the summary table of typology (TARTYP, 459) it occurs in the column to the extreme left of continuous sounds with “unpredictable facture”, in the bottom row of sounds with “unpredictable variation of mass”.

3) Going further and with some reservations, as well as the usual type of the sample notated E there are three other examples where the mass is relatively fixed and tonic (En), or else relatively fixed and complex (Ex), or else even moderately varying (Ey).

4) In typology, the sample is exactly symmetrical with the accumulation A. In these two cases “extremes meet” (454) for certain objects which resemble one or the other, according to the listening intention.

The sample in the Typology of Variations and in the TARSOM.

The complementary typology of variations points out that a motif M can be made by splicing a varied sample (572). Finally, the sample occurs again in the TARSOM, in box 21 (types of dynamic criterion) (584). Curiously, it is there as an example of “reiterated dynamic” right next to the accumulation (“accumulated dynamic”). (584)

SAMPLE: 438-439, 453-454, 456, 459, 466, 470, 471, 572, 577, 584 (TARSOM).

» 83. ACCUMULATION (A)

1) A type of discontinuous (iterative) *excentric* sound of prolonged duration (macro-object) characterised by the disordered piling up of micro-sounds which are fused together by their similarity of facture into a single characteristic object. Examples of accumulations are: a stream of pebbles pouring out of a skip, an aviary of twittering birds, an orchestral “cloud” (accumulation of pizzicati or short glissandi) in a work by Xenakis (453), or any other “*profuse reiteration of brief, more or less similar elements*” (439). This is in contrast to the

sample E, an excentric object which is symmetrical with accumulation, since through a *continuous* facture it displays the “*permanence of a single cause*”, whereas accumulation is the product of “*multiple but similar causes*”. In some cases the distinction between the classification of a sound object as a sample or as an accumulation can be a matter of context and personal evaluation (453-454).

2) The symbol for an accumulation is the letter A, and in the summary table of typology (TARTYP, fig. 34, p. 459) it is in the far right column of prolonged discontinuous sounds of unpredictable facture in the row with sounds of “*unpredictable variation of mass*”, in a box symmetrical with samples.

[138] 3) Going further and with some reservations, three particular examples could be added to the usual type of accumulation notated A where the mass is:

- either fixed and tonic overall (An);
- or fixed and complex overall (Ax);
- or moderately varying (Ay).

a) Accumulation and the *cell* K have in common that they are composed of disordered micro-sounds, it is their difference in duration (and facture) which differentiates them, at least according to the TARTYP which links them with an arrow indicating that both come from “*multiple but similar causes*”. (459)

b) The accumulation also occurs in the TARSOM (584) in box 21, as an “accumulated” dynamic type, near the sample E.

ACCUMULATION: 438-439, 453, 454, 459, 584 (TARSOM).

e) Fourth series: variant sounds

We have seen that along with the main Typology which we have examined, the author outlines a complementary typology of Variations, dealing solely with variant sounds in the light of other criteria (see **VARIATION, 30**).

This complementary typology, nevertheless, takes up the types of objects already distinguished in the general Typology: Weft, Accumulation, Siren etc., and refines, sometimes even slightly changes, their definition to make them fit into its framework. This process is not without its ambiguities: the word Weft, for example, does not denote exactly the same thing in each Typology.

Most types of variant objects have already been examined along with the study of excentric objects in the general Typology (see *above*), but there are still two objects to be examined which have not yet been mentioned: the *Motif* and the *Group*.

» 84. MOTIF (M)

1) A type of variant object characterised by a relatively long duration, which evolves in stages, in a scalar (discontinuous) manner. The motif can, therefore, possess an embryonic musical organization, which makes it a border-line example, as it is already musically structured. But its materials are experimental sound objects, in contrast to the *Group*, which has more or less the same definition, but is made of traditional notes. Motifs, therefore, can be found in new music, whereas the Group belongs to traditional music. They are symbolised by the letter M.

2) In the typology of variations, the *motif* is distinguished from the large note W, (which in other respects it greatly resembles), by the fact that the large note progresses by continuous development and not, like the motif, by discontinuous modulation, and that it results generally from a “natural” evolution in [139] a sound phenomenon (whereas the motif reveals a *musical intention* applied to objects from the outside, or demonstrated by being deliberately cut out from a natural phenomenon).

3) The motif is characterised by a medium speed of variation, between the Ostinato (slower) and the Cell (faster).

MOTIF: 278, 471, 485, 572, 576, 586 (TARSOM).

» 85. GROUP (G)

1) The group is a type of object which is most commonly encountered in traditional music, in the form of a structure of notes, “*which can be easily broken down, but whose overall structure one might wish to study*” (571), and which has a variation of the scalar type (in stages). The Group is close to the Motif, which is also a very structured object, revealing an authorial intention and varying in a scalar manner, but which is built up of experimental “sound objects”, and not of traditional notes like the Group.

The two types *Group* and *Motif* complement each other as they are associated with classical music and experimental music respectively. The group is notated G.

2) The typology of “melodic variations” (expressed in the TARSOM as a criterion of “melodic profile”) describes three types of Groups according to their speed of variation. If the speed is slow (**progress**), we have a macro-group notated \bar{G} ; if it is moderate (**profile**) we have a group G properly speaking; if it is lively (**anamorphosis**), we have a micro-group notated G'.

3) In the typology of melodic variations, each type of Group defined within the framework of classical music has its counterpart in the domain of experimental “sound

objects”: the ostinato P corresponds to the macro-group \bar{G} ; the motif M to the group G; the cell K to the micro-group G'.

GROUP: 571, 572, 586 (TARSOM).