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### MAUPERTUIS' INTEGRATIONISM IN OLDEN DAYS AND TODAY\*

The index of contents is the "calling card" of a book and also the leading notion concerning the author, all the more so if we face his *Opera Omnia*. In Maupertuis' case his collective works started to appear still during his life; this makes first approximation easier, disclosing also the author's own appreciation of his work.

Maupertuis' intellectual genius has three aspects. The main field of his interest is geophysics. He conceived it very largely, striving to clear—as we see it distinctly today—the total of phenomena appearing in our globe. It was certainly his pilot-science, to which he subordinated astronomy, geography and mathematics. Their auxiliary role becomes clear in the light of his many times forwarded postulate of the utility of every discipline. This is why to his *Essay on Cosmology* and his treatise *The Earth's Measurement*, we also find the dissertation *Physical Venus, Elements of Geography, Discourse on the Various Figures of Astral Bodies* and the *Letter about the Comet*.

The second place is that of epistemology, conceived also very vastly. Maupertuis' writing was often far from the principal point, embracing instead distant peripheries of classic cognitive science. Here shall we mention: *Letters on the Progress of Science, Philosophical Reflection on the Origin of Languages*, and *The Academician's Duties*. Also in many other works did he approach concrete epistemological problems, for instance in his *Academic Discourses, Graceful Acknowledgements*, etc.

Finally, his third range is ethics. The most outstanding work is here the *Essay on Moral Philosophy*, although leading motifs of that work are to be found also in some other of his dissertations, letters and so on.

This classification is bound to be imperfect, so as all others are, but it seems here less ominous, than a more schematic and dichotomic division, which impose itself

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sometimes, namely the differentiation of two fields that Maupertuis was studying: the World of Nature and the World of Man, and some mutual relations linking and separating them at the same time.

Such a division would seem to often lead to a conflict with the valuable reflection pronounced 23 centuries ago by Theophrastus, when he finalized his considerations on the *History of Plants*, and declared that "forcing comparisons where they do not exist is loss of time". This would also be contrary to the basic foundation of the present deliberations, which aim at establishing a certain working hypothesis and subjecting it to preliminary verification.

This is the next step towards acquiring first approximation, I mean a glance on some of the titles and first of all certain announcements that drew your attention, already during a superficial reading of the author's introductory pages. A thinker of the German Enlightenment, Lichtenberg, rightfully determined all forewords and prefaces to be "lightening conductors", although they certainly contain the author's characteristic declaration ("confession") rather directly formulated, or else disclosing his more or less hidden intentions. Let us e.g. quote the title of a dissertation presented by Maupertuis in 1744 at the Académie Royale des Sciences: "The Accordance of Different Rules of Nature that had so far seemed Impossible to Agree", in which words a tendency of unification is clearly breaking through. So it is indeed, often moreover stressed by Maupertuis. For instance in his record concerning an expedition to the Far North, his foreword mentioned likenesses connecting particular disciplines: "the same elements directing the advance of a ship on the sea, lead to the knowledge of the Moon's motion and are also helpful in the construction of irrigation systems"<sup>1</sup>.

The tendency to unification might suggest that Maupertuis wished to establish a unified system of knowledge. On the contrary, we are informed by the "Warning and Preface" of his *Essay on Cosmology* that he is against all systems, which is close to Condillac attitude concerning the impossibility of complete systems. Not at all on account of their being opposed to the Rules of Nature, but because Man's mind is unable to master such a task. We therefore read that Newton's principle of Uniformity is obliging in the whole of Cosmos, and that the Supreme Being is indeed present, but is not everywhere equally visible.<sup>2</sup> In this respect the simplest objects and the simplest principles hold a foremost place,<sup>3</sup> therefore, fearing to get himself lost among unimportant details, does Maupertuis concentrate his attention on the former items. It becomes, however, clear that a kind of systems is always necessary in order to present the problem, and he further tells us that the system

<sup>1</sup> *Relation du voyage fait par ordre du roi au cercle polaire*, introduction. *Œuvres de Maupertuis*, Lyon 1768, p. 85. (First edition in Paris, 1738). There is no difficulty in finding the bibliographical data about Maupertuis' particular and collective works. So, it seems necessary to give all details concerning some quotations (the page, the edition, etc.) only in case when the verification of author's opinion would be particularly desirable.

<sup>2</sup> *Essay de Cosmologie*, Berlin (?) 1750, p. 39.

<sup>3</sup> "la nature agit toujours par les voyages les plus simples", *ibid.*

he applies will not be treated as an "explication", but simply as a "picture".<sup>4</sup> And, as to the method, Maupertuis declares himself already in the preface, saying that the more geometrical reasoning, highly appreciated by thinkers of the 17th century is not always satisfactory.<sup>5</sup>

Not so often, it is true, as the representatives of the former generation, but not quite seldom either, do we meet the adjective "new", which is synonym of today's progress in science. Starting to write his treatise on geography, Maupertuis does not place that word in the title, but already in the first sentence of its introduction he states that the argument he offers contradicts the traditional conception of the Earth having a perfect spheric shape, and induces the elaboration of a "new geography".<sup>6</sup>

The already mentioned principle of unification is accompanied by the principle of interdisciplinary connections. We are informed of the above by it only by reading the preface to the *Discourse on the Moon's Parallaxe*, where the following part of the title discloses the author's intention, saying namely it is meant to "Improve the Theory of the Moon and that of the Earth", for it proves that such studies will not only perfect astronomy and geography, but will also enrich our knowledge on gravitation and the construction of pendulums.<sup>7</sup>

The continuation of such an impressionistic acquaintance of the intellectual climate that produced Maupertuis' works, does not seem useful here, all the more so that there exist already since many years publications that manage to seize the character of that phenomenon. It will be sufficient to mention referring to the *International Encyclopedia of Unified Science*, edited in Chicago, the considerations published by Lodovico Geymonat in 1960, in a book dealing with the philosophy of Science, the work of R. Mc Rae of 1961 *The Problem of the Unity of Science — Bacon to Kant*, and, of course, the activity of the International Cultural Foundation, sponsor of the successive International Conferences on the Unity of the Sciences (first in New York in 1972 under the theme "Moral Orientation of the Sciences"). We therefore know that till the decline of the 18th century prime philosophy was even for the majority of eminent minds a kind of *mathesis universalis*, linking all sciences into a single whole. Bacon built his conception on the idea of Nature's uniformity, Descartes on the homogeneity of the rules of human mind and Leibniz on the idea of a universal Encyclopaedia, including the total of human knowledge. Not only Bacon and Descartes but also many other thinkers forwarded identical comparisons: the root of Omniscience was to be metaphysics, its trunk was physics and its branches were formed by particular disciplines, among which mechanics, medicine, ethics and others, were chiefly mentioned.

<sup>4</sup> "comme un tableau, et non comme une explication", *ibid.*

<sup>5</sup> "les démonstrations géométriques tout évidente qu'elles sont, ne sont point les plus propres à convaincre tous les esprits", *ibid.*

<sup>6</sup> *Eléments de géographie. Ouvrages divers de Monsieur de Maupertuis*, Introduction, Amsterdam 1744.

<sup>7</sup> *Discours sur la parallaxe de la Lune pour perfectionner la théorie de la lune et celle de la terre*. Introduction. See above.

How does the state of studies on the total of Maupertuis' genius present itself in the light of the above reflections? Older publications are clearly more or less erudite, biographical and at any rate specialistic. Therefore attention is drawn to a collective publication, which is a documentation of the "Maupertuis' Day", held in France, in December 1973.<sup>8</sup>

Already in the introduction pronounced by René Bloch, professor of the University of Paris, do we find two interesting remarks. The first one contains a characteristic of the man himself, saying: "Maupertuis is certainly no first class personality, he is, however, a man of first importance in the history of the 18th century". The second remark contains a characteristic of his works: during the preparation of the Session it became clear that an interdisciplinary work, appealing to specialists, such as philosophers, historians, connoisseurs of literature and other scientists and sciences, will here be necessary.<sup>9</sup> During the Session, communications, reports (there were 12 in all) and discussions revolved mostly in the circle of problems connected with some central figures (Euler, Diderot, Dom Deschamps, Montesquieu, Cassini, Voltaire and Newton) and finally groups of scientists of that period. Many more special problems are seen to surge on this very "personal" background, but the most general ones were presented in the communications concerning Maupertuis' views in the range of philosophy, metaphysics, theology, morals, physics and the theory of evolution.

The problem of integrationism was first approached by P. Cassini (Bologne), who thus ended his record: "Maupertuis's works do not belong exclusively to the history of geodesy, for they also mark an important overturn in the ideas of the 18th century, which means the range of the Enlightenment's ideology".<sup>10</sup> P. Costabel (Paris) noticed that when writing on morals, Maupertuis uses the idea of sum, presenting the advantage of a collaboration of philosophers with scientists, so, the joint research would be indispensable.<sup>11</sup> In further discussion R. Hahn noticed Maupertuis' desire of "arriving at general systems".

Not taking account of several other reports, especially that of M. Fichant and A. Robinet, who raised that subject speaking on "physical theology", we shall now remind the report of Madame Salomon-Bayet (Paris), who brought useful material to reflection on the subject discussed. While searching for a "reasonable, if not quite rational principle of unity" between various Maupertuis' attempts, she shows his efforts, leading to join Letters with Sciences. This unitarian or irenical tendency clearly wished to reduce the gulf dividing the two cultures, distinct particularly in his activity in the range of speculative philosophy, which was one of the particularities of the Academy of Sciences and Arts in Berlin. In this way would the Academic Institution have made possible the serious acting of a conscious pluridisciplinarity, seeing Maupertuis as mathematician and also geographer. Moreover

<sup>8</sup> *Actes de la Journée Maupertuis*, Créteil, décembre 1973, Paris, Vrin, 1975.

<sup>9</sup> *Ibid.*

<sup>10</sup> *Ibid.*

<sup>11</sup> *Ibid.*



Maupertuis—astronomer contributes to the history of the generation, proposing a model of naturalistic imagination and sensitiveness in respect to problems of inheritance, that appeal so strongly to people, that since about a century they never cease to tend seeing in them a sort of premonitory augury of Darwin and Mendel". It is necessary to add that, in spite of his long-standing attitude concerning inheritance, Maupertuis' scientific imagination was unable to reach the threshold of Darwinian reflections *On the Origin of Species by means of natural selection*, published in 1859.

However, what Maupertuis aspired at, was connected not only with the structure of the institutions, since the organization of the scientific life of those times, as well as the people linked with it, represented a specific style of thought. The later called "Great Century of Science" was drawing swiftly to an end, giving place to the "Century of Enlightenment", whose symbol was the *Great French Encyclopaedia*, appearing since 1751. A platform between those two periods was chiefly reflection on the so called "natural" characteristics of Man: similarly as superiority over the body was conceded to the soul, equally was the reason understood to be superior to human desires. In this situation was the intellect expected to be regulator of the behaviour of reasonable beings, understood to create most natural rules of behaviour, initiated into Man's mind by the divine Creator. While in the middle of the 17th century Gerard Winstanley, the radical leader of English "diggers", proposed to substitute the idea of "God" by that of "reason" (he wrote about it in the *Law of Freedom*), not many were his followers; human mind, however, progressed in emancipation. This did not initially mean a separation between faith and reason, introducing on the contrary attempts at connecting two concepts. We consider faith up what in Man's life seems irrational, but things were different in the 18th century, and it was just faith that made it possible to put order into phenomena, considered to be rational. Therefore the co-existence of sound and illogical attitudes, used to be frequent in those times.

How those opposed currents acted Maupertuis' work, are we informed by his conception of the Universe. He namely puts the question "whether the Universe is indeed a total — yes or no?" This was the principal question in the contest between Maupertuis and Diderot, and its importance continues to weigh on his works when during their lecture do we hit on this thesis, the variants of which appear repeatedly in many of Maupertuis' works. He declares namely that: "whateve, exists in Nature is in universal connection, in physics as well as in ethics".<sup>12</sup> This meant a divorce with dualism and a return to the very sources of philosophical thinking, i.e. to the Ionian philosophers of Nature. Not were the latter, however, the chief source of Maupertuis' inspiration, but — as was noticed by Yvon Belaval<sup>13</sup> — it were rather the Stoics, praised by Maupertuis himself in many of his

<sup>12</sup> *Lettre sur la comète. Ouvrages divers...*, Amsterdam 1744, p. 93.

<sup>13</sup> *Actes...*, p. 158; A. de Quatrefages, *Charles Darwin et ses précurseurs français — étude sur le transformisme*, Paris 1870, p. 181: "Expliquer tout était une des aspirations et la grande pré-tention du XVIII<sup>e</sup> siècle, digne héritier, en cela, des philosophes de l'antiquité".

writings and particularly in his *Essai de Philosophie morale*, in which their superlative qualities are raised. It was they, who had started the energetic conception of existence (essence) brought in, it is true, only by Aristotle, but originating still from hilosoism. Maupertuis had formulated it already in the first words of *Essai de Cosmologie*, stating that motion is principle characteristic of Nature.<sup>14</sup> Similarly as for Stoics, there existed for him only "matter" itself, but he attributed it divine qualities, which invested his system with a pantheistic character, in accordance with a late Stoicism, represented by Seneca and Marc Aurelius. "The Universe is One, wrote the Ceasar on his throne, and God is One in all things, and Substance is One and Right is One, Reason is One in all reasonable beings, and Truth is One and One is the aim for all homogeneous beings, making use of One and the same Reason". Supported by this leading thread of thought (*Leitmotiv*) and putting accent on one of its fragments, and always taking the reasonable and purposeful character of the Universe for our starting-point, we could freely balance between theology and teleology, and proclaim the primate of considerations that refer to most fertile thoughts of antiquity's philosophy, modifying their currents in case of need.<sup>15</sup> It is difficult to overestimate the inspiring role of that tradition and its importance towards what became Maupertuis' chief purpose: substituting in the consciousness of "decent people", Descartes' dominating picture of the world by a new one, raised owing to Newton's discoveries. This was perfectly understood by d'Alembert, who wrote in the introduction to the *Encyclopaedia*: "Maupertuis believed that one can be a good citizen not accepting blindly physics, recognized in the country and, attacking the very idea, he showed courage for which we owe him acknowledgement". Somewhat modifying Pasteur's well-known sentence we may say: Maupertuis is the man, who showed that a learned man, although having his own fatherland—ought to serve science, which has no fatherland.

Science, in Maupertuis' eyes, is the second complex of problems, more complicated than that of the Universe. We have already spoken of his epistemology, remarking its particular character. We must now therefore say that it is a question of various principles, not always forming a homogeneous assemblage of rules of thinking. And there comes now forward a basic question of this range: what is the origin of knowledge? As Maupertuis did not accept ideal factors of being, similarly did he reject aprioristic elements of knowledge, which connected him moreover with the views of Stoics. He was shortly a sensualist, but, as we shall later see, a very particular one. Similarly as had earlier Bacon postulated linking the senses and the mind in the task of learning about the Universe (he had written about it in his introduction to *Instauratio Magna*), so did equally Maupertuis join the chief current of opinions of those times, that claimed the necessity of linking reason with experi-

<sup>14</sup> "Le plus grand phénomène de la nature, le plus merveilleux, est le mouvement: sans lui tout serait plongé dans une mort éternelle..."

<sup>15</sup> *Essai de cosmologie*, Leide 1751, p. 104.

ence.<sup>16</sup> He moreover postulated a permanent widening of the sphere accessible to senses and a simultaneous improvement of principles of reasoning.

Let us begin with the experience of senses. He wished to widen it in the range of two basic dimensions of our existence: time and space, we could even say that he created a specific cognitive sphere named "time-and-space". Although he considered the present to be "our only good",<sup>17</sup> he was also interested in the achievements of ancient thinkers, he studied the origin of languages and problems of heredity, i.e. the transmitting of characteristic features down to further generations (for instance in the *Dissertation on the White Negro*). The intellectual penetration of space was to embrace all countries to the North as well as to the South (he bestowed particular attention to Africa and South America) and wrote about it in his considerations on the subject of the development of science, connecting thus new horizons of thinking with learning to know new spaces of the Earth. Besides that, he called not only for macroscale investigations, but also for deep studies on this "new world", in a manner possible only with the use of a microscope. Finally: plans of exploration concerning distant spaces did he connect with the exploration of very remote ages. When drawing attention to the necessity of making acquaintance with lands so far unknown, he wrote that, wishing to have an idea of the mentality of peoples inhabiting those countries, he would rather have an hour's talk with one of the so called "savages", than spend the same time in discussion with one of the European intellectualists.<sup>18</sup> It can be assumed that one of the causes of Maupertuis' distrust towards systems (although he was himself author of the treatise *The System of Nature*) were specific and well-known today troubles, concerning induction, that prevented making good use of "cognitive time-and-space" naturally limited. For how should indeed conclusions be drawn on the basis of incomplete observation of unknown phenomena that appear in other places and at different times? An illustration of this trouble of his is described in the introduction to his *Elements of Geography*, in which he remarks that the "table of degrees of longitude" will be more exact if it includes not only his investigations already accomplished in Lapland, but also those that shall be elaborated by the expedition to Peru, that was just being prepared then. This was closely connected with the necessity of verification (or should we even use the term falsification) of every system, while it seems certain that "systematicians" are inclined to reveal only those examples that confirm their opinion. This does certainly not increase our confidence to any system.

Another aspect of this problem is shown by one of the motifs of the contest of Voltaire with Maupertuis. We well know the words directed by Voltaire to his antagonist:

<sup>16</sup> *Lettre sur le progrès des sciences. Œuvres...*, p. 350.

<sup>17</sup> *Lettre II — Sur le souvenir et la prévision.*

<sup>18</sup> *Lettre sur le progrès des sciences. Œuvres...*, p. 330:



“Vous avez confirmé dans des lieux pleins d’ennui

Ce que Newton connut sans sortir de chez lui”.

He was not right saying this, similarly as then when he made fun of Leibniz’s, laying in *Candide ou de l’optimisme* the sign of equality between an ideal world and “the best among possible worlds”. Voltaire failed to understand—or did not want to—that Maupertuis was aiming at providing empiric proofs of the Earth’s shape. Their lack was disturbing learned men, equally as the lack of “extramathematical” proofs had disturbed believers of Heliocentrism for many years. In the 17th century did Joachim Jungius complete Copernicus’ mathematical proofs by logic ones, John Wilkins strived to master principles of mechanics in order to get loose from the Earth and display its mobility, and Adam Kochanski wrote in “Acta Eruditorum” that the conception of Copernicus is right, but remains still in the limits of a hypothesis, standing so far no mathematical calculations, while to make it recognizable as a certainty is should still provide empiric confirmation. Maupertuis’ anxieties were very much the same and so were those of people, who encouraged the idea of distant scientific expeditions. This made the voyage to Lapland extremely important and, at the same time, confirms his permanent vacillation between metaphysical temptations and positivistic prudence.<sup>19</sup>

Maupertuis’ mind was moreover intent on one more question—the fertility of methodological pluralism. He was most interested in studies achieved along the butt of different sciences, such as for instance “ethical arithmetic”, which is indeed a kind of “psychophysics”<sup>20</sup> or “geophysics” integrating geodesical, cartographical and logarithmic research. This is the source of his critical remarks (in the *Essay on Cosmology*) towards mathematicians, whose only business are numbers.

However, his chief attitude was not critic. He postulated new disciplines or at least new possibilities, opening before earlier sciences. This is what we read in a dissertation, to which Maupertuis gave the title *On the Origin of Languages and the Significance of Words* and his own comment to the above: “this study is important not only because of the influence with which languages weigh on our knowledge (connaissances), but also because in the construction of languages is it possible to find traces of first steps of human mind (esprit).<sup>21</sup> So thus, making use of a then very popular problem, which was forming a universal language, Maupertuis raised several other problems, that were overreaching that idea. He namely displayed the role of the language in two ranges: it is first of all the platform linking reality that surrounds us with our mind, and besides that, has to be the link among different disciplines, operating in the sphere of similar conceptions, which is important as basic argument on behalf of new conceptions of unification of sciences, supported by languages.<sup>22</sup> Maupertuis did not develop those ideas and even presented

<sup>19</sup> J. Ehrard, *l’Idée de nature en France à l’aube des Lumières*, Paris: Flammarion, 1970, p. 104.

<sup>20</sup> P. Naudin, *Une arithmétique des plaisirs? Esquisse d’une réflexion sur la morale de Maupertuis. Actes...*, p. 15–31.

<sup>21</sup> *Sur l’origine des langues et la signification des mots.*

<sup>22</sup> L. Geymonat, *Filosofia e la filosofia della scienza*, Milano: Feltrinelli, 1960.

them in a form, causing that the above interpretation may not be the right one. It is, however, difficult to be opposed to the impression, that this was just the direction of his design, connected with what he postulated in his experiments on the language, when he repeated that important are not only its first rudiments, but also many "matters concerning the origin of ideas and basic notions of the human mind".<sup>23</sup> We are near these intentions of his when, approaching his "metaphysical experiments" on sleep. He treated these investigations—that were to be achieved moreover by the use of opium—as a way of transforming human consciousness,<sup>24</sup> which might be very interesting, but we shall draw attention for the moment to another aspect of the matter. The purpose of these experiments was innovative research on human mentality,<sup>25</sup> which gives them simultaneously a different aspect. Let us remind the fact that Descartes treated his theory of sleep as a chief argument against the certainty of sensitive observations,<sup>26</sup> and that the interpretation of dreaming visions is the object of contest and passionate theories till today (we know of renowned professors in Japan and the United States quite infatuated in the problem). The borderline between rightful thinking and pathological deviations did Maupertuis connect with a problem, which he treated very closely, i.e. with the development of a science, very approximate to studies on the language, which is one of the chief elements shaping human knowledge. In this way did Maupertuis join the current, that had been flowing since Aristotle to Wittgenstein, treating the language as a specific reflection of reality; epistemology crossed here with ontology, and the centre of interest became here the role of language on the background of the role of senses, forming in one or another manner our conceptions.<sup>27</sup> The unitary vision of material nature, containing, however, immanent non-material properties, led in this way to meditations concerning the signs of speech, their origin and importance.

The vision of reasonable Nature, understood by Man owing to his intellect, led straight way to the cult of Nature and Reason, where—once more—Stoic influence is not difficult to trace. It was not dominant, but sufficiently strong to be the base of all changes, namely the perfecting of reasonable beings. Maupertuis explains therefore that Man, the being most worthy of attention, should be examined by the help of well tested scientific methods, but in this particular case, because of the quite special qualities of human beings, science itself is not a sufficient instrument: "the heart is to assist here the mind (esprit)".<sup>28</sup> This was no superficial metaphor, for in the same work does he place the hope that "reason instructed by

<sup>23</sup> *Lettre sur le progrès des sciences. Œuvres...*, p. 351.

<sup>24</sup> "moyen de modifier l'âme" — cf. *ibid.*, p. 350.

<sup>25</sup> Cf. *loc. cit.*

<sup>26</sup> W. Röd, *l'Argument du rêve dans la théorie cartésienne de l'expérience*, «Les Études Philosophiques» 1976, p. 461–473.

<sup>27</sup> *Sur la manière dont nous apercevons, Lettres*, p. 30.

<sup>28</sup> *Essay de philosophie morale*. Introduction.

a new light, may go further in advance".<sup>29</sup> The object of research that he had in mind, was not indifferent, for it meant Man, as the representative of the species, whose characteristic is "the desire of happiness". He also meditated on "means, that could improve our lot"; the title of the second chapter of *Essay on Moral Philosophy* is: "On the Means of Making our Condition Better". Here again does Maupertuis stress the connection that exists between Nature's bases principles and the basic principles of searching Truth, warning at the same time against the danger of exaggerated abstraction.<sup>30</sup> Wishing to decide so important a subject, he proceeded to seek possibly best models and found them mostly, though not exclusively, in the doctrines of Stoic philosophers, who "seem to provide most rightful reasoning".<sup>31</sup> The choice of method remained initially unsettled, so it is no wonder that Maupertuis chose the science of mathematics as the most important branch, recognized, moreover at that time to be the most perfect one. He moreover argued that since good is the sum of happy moments and evil that of unhappy ones, those conceptions ought to be subjected to calculating operations, which gave birth to his "arithmetic of pleasures". Much was written about this, treating it as a specificity of his ethic reasoning, while it was then indeed no exotic achievement, if we remind the work of a Jena philosopher and Leibniz's teacher: Erhard Weigel, and also that of Shaftesbury, author of the famous book that appeared in London in 1711 — *Characteristics of Men, Manners, Opinions and Times*. Both these authors had attempted a risky operation, deserving attention, which was transferring the whole research instrumentary from one group of sciences to another, in order to make it more exact and what would certainly follow—more perfect.

We have already dealt with the central position of Man in the world of Nature. In respect to Maupertuis this is not quite exact, in the light of what he had been writing about animals, and what makes him particular attractive. When, in one of his letters he meditates on "the soul of beasts", he starts to criticize Descartes, judging him to be mistaken, when refusing that property to animals. Maupertuis not only observed animals but he loved them, and his home was indeed a sort of menagerie.<sup>32</sup> He devoted one of his letters to the relation of Man towards beasts, standing fast in their defence and granting them the ability of reasoning. In his 18th letter he moreover put forward analogies existing between the animals and Man. It should be reminded that other thinkers had claimed the like. Pierre Bayle argued in the *Critical-Historical Dictionary* (1695) that animals possess the ability of abstractive thinking and he highly estimated writers, whose attitude was identical or close to his own (Charron, La Chambre etc.); Condillac developed that idea half a century later in his *Treatise on Animals* (1755).

The question of Man's standing among other living beings assumed far larger

<sup>29</sup> Cf. *ibid.*, p. 51.

<sup>30</sup> Cf. *ibid.*, p. 404 and *Lettre sur le progrès des sciences. Œuvres*, p. 351.

<sup>31</sup> *Essay de philosophie morale*, p. 390.

<sup>32</sup> P. Brunet, *Maupertuis*, Paris: Blanchard, 1929, p. 179.

character than might be expected. Man was understood to be "the king of all creatures", which moreover resulted from the Bible, cleaming that the Universe had been created for the benefice of Man, most perfect (owing to his Mind) being living in the Earth. Anthropocentrism was closely linked with geocentrism and represented one of the chief arguments on behalf of Man's dominating role in the world of Nature. This conviction was criticized by many an author, among them Cyrano de Bergerac and Fontenelle, who speaking about the plurality of worlds said: "our folly is the conviction that all of Nature with no exception is meant to be our service". The anthropocentric attitude that favoured the growing exploitation of Nature by Man, assumed various forms in the sphere of social and scientific opinions: it supported on the one hand conservatists in their contest with heliocentrism, supposed to degrade mankind, and allowed on the other hand to proper selection, not granting equal reason to all living men, and Leibniz not by accident only reserved the term "souls able to act on reflection" to men governing countries. Maupertuis, referring to lovers of animals, not only cleared the way to new outlooks in this respect, but also stepped over the limits of conservative zoology, extending its range by considerations on the consciousness of animals.

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It seems that the so far presented material authorizes the forwarding of certain conclusions. They first of all concern the relation of the history of science to the philosophy of science. In spite of the recently growing wave of speculations on that subject, the words pronounced about half a century ago by Henri Berr have not lost their actual value, as well as those placed in the first number of the periodical "Isis" of 1913, by George Sarton. Both those authors, referring to Comte, treated the History of Science not as an individual purpose, but as the way leading to the Philosophy of Science.<sup>33</sup> From that point of view the present line of thought of several historians of science arouses anxiety, and the quantitative development of that branch does not correspond to its qualitative increase. The ever more frequent connections with the "history of techniques", threaten to become an avalanche of elaborations, having not much common with the history of technical and scientific thought, and only trying to dazzle the reader by descriptions of various "spectacular techniques" (interplanetary flights, etc.). On the other hand, the connection with science policy is getting ever more anachronic, i.e. linked with the development of technical civilization and the obstinate and self-justifying opinions of the routine apparatus (or rather apparatchiks) repeating indefatigably their axiomatic conservative dogmas (or rather slogans).

This situation causes that only philosophically directed history of science will be able to save that discipline from a conceptual atrophy. Karl Jaspers was indeed

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<sup>33</sup> H. Berr, *la Synthèse des connaissances et l'histoire. Essai sur l'avenir de la philosophie*, Paris 1899; G. Sarton, *l'Histoire de la science*, «Isis» I (1913).



right when in his *Philosophical Autobiography* he wrote about the interdependence of both these aspects of approach to science: "Scientific cognition is the indispensable factor of acting philosophically. No truthful advance is now possible otherwise than in the steps of science". Particularly worth reminding is here the example of Aristotle,<sup>34</sup> who started his research on basic categories of metaphysics—i.e. being and truth—by philosophical reflections on the inheritance we owe to former generations of scientists. The here postulated requalification is, however, not possible without a reconstruction of the whole model of thinking in this—and not only this—field. The question namely is the substitution of a "technological" model by a "biological" one, with particular reference to an attitude, that might bear the name of a "pan-ecological" one, whose base would be the chief problem—or rather: plexus of problems—concerning the co-existence of Man with Nature and humans among themselves. The risk of making mistakes is in the range of this kind of thinking not larger than in others, and it is certainly true that the aim of thinking should not be an elimination of all mistakes, since the history of science just teaches us that no thinking creature is able to avoid them. The fear of making mistakes is certainly more dangerous than the mistake itself, wrote Henry Elzenberg.

Maupertuis was free of that fear and bravely undertook the risk of integrating ideas, trying, however, consequently to be safe against critic by formulating many of his announcements in a way, which allowed them to be variously understood: once, as the praise of bold philosophical generalizations, and next as critic of specialization, for which he often suffered reproach from their context, which resulted clearly in option on behalf of philosophical thinking.<sup>35</sup> Being "wiser" today by those few centuries, we could quite easily enumerate his mistakes. This was moreover certainly done already in his lifetime—so had then acted his enemies, as well as his friends, and particularly his former friends, which confirms the very ancient opinion, that no one is a more cruel enemy than the ex-friend. One of his antagonists, in a recueil, entitled *Maupertuisiana*, that appeared in 1753, therefore still in the lifetime of the philosophizing scientist who very distinctly wished to be not only a scientist, placed a sketch, presenting Maupertuis as Don Quichote fighting with windmills. It is, therefore, high time to put the question: should always those who wish to step over the close—but thence quite safe! — circle of specialization be considered knights-errants, whose efforts are a priori sentenced to be defeat?

<sup>34</sup> W. Voisé, *Die erste Vorlesung über Wissenschaftsgeschichte oder die Einleitung zur aristotelischen Metaphysik*, «Südhofts Archiv» 1977.

<sup>35</sup> «Tout est permis au philosophe, pourvu qu'il traite tout avec l'esprit philosophique... qui distingue l'évidence, la probabilité, le doute...», *Harangue...*, *Œuvres*, p. 288. See also *ibid.*, p. 272.