Père Maldamé's Consideration of the Current State of French Evolution Theory

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In the two works of the Toulouse Dominican, père Jean-Michel Maldamé, on Christ and the cosmos (see 'The Dialogue between metaphysics and religion and science: four continental examples', *New Blackfriars*, April 2002), he related the biological development to the anthropic principle, re-interpreted as relating to the terrestrial and cosmic significance of the resurrection of Christ. A provisional judgement on the theory of evolution was not made there. But he has given a judgement on the theory in the course of a chronicle of recent books, mainly of French origin, yet giving pride of place to a German study: H. Jonas, *Philosophische Untersuchungen und metaphysische Vermutungen* (Frankfurt am Main 1992, cited according to the French translations by S.Cornille and P.Invernal: *Évolution et liberté* (Bibliothèque Rivages, Paris, 1999)), and including a select number of translated 'Anglo-Saxon' works, mainly of American provenance, in the *Revue Thomiste* of January – March, 2002 (pp. 73–105) under the title of 'L'emergence de l'homme comme avènement de l'âme'. He says 'Here we are extending a study previously published in the *Revue* [*Thomiste*], which was not related to the question of the origin of the human race'. This was his article, 'Évolution et création' (*Revue Thomiste* Oct–Dec 1996). He also refers to his contribution to the Round Table on the Problems of the Origin of Life, held at a plenary session of the Pontifical Academy of Sciences from 22–26 October 1996, and published as their *Commentarii* IV/5 (Vatican City 1997).

I Père Maldamé's First Article

We begin with 'Évolution et création'. Like the other article it is a systematic ordering of information, with references to the systematic philosophical theology of Saint Thomas Aquinas, which an English (or Anglo-Saxon) reader may find initially unfamiliar. Such a reader will expect an anti-Darwinian polemic, and will be surprised to find that the key-note, announced in the opening lines, is a crisis among evolutionists themselves who find that more recent evidence has put in question the conclusions of Darwin's theory,

https://doi.org/10.1111/j.0028-4289.2005.00094.x Published online by Cambridge University Press

taken in their original purity. So the article begins with a reference to the work of a New Zealand writer, M. Denton: *Evolution, A Theory in Crisis* (London 1985, cited according to the translation of N. Balbo, *Évolution, Une théorie en crise* (Paris 1992); in 'L'émergence' (p. 994, n.52) he refers to a later writing: *The Long Chain of Coincidence*[1], cited, so he says, according to the translation of D.Perroux, *L'Évolution a-t-elle un sens?* (Paris 1997). Père Maldamé characterizes the thought as 'Anglo-Saxon natural theology', which finds God's activity in a fortunate series of coincidences in the development of the processes of life. Besides this author he mentions two other works in French, written in the same anti-Darwinian mode. They are the book by Rosine Chandebois, *Pour en finir avec le darwinisme* (Montpellier, Espaces 34, 1994), and the reactions to an article of M.-P.Schützenberger entitled 'Les failles du darwinisme' (*La Recherche*, No. 283 (January 1996) pp. 87–90, et No. 285 (March 1996) pp. 6–9). One should note that père Maldamé is bringing into order the speculations of those who are *au courant* with the matter but are without the scientific rigour of the original works, even though their conclusions can now be faulted, and which yet manage to cater for the current investigators and those who wish to inform themselves of the latest conclusions of the specialists.

With commendable loyalty to his tradition of choice, though with a technicality which does not respect Saint Thomas's overall intention of finding a wisdom in which both can find a place without excluding overlapping, père Maldamé, appeals to the Thomist perspective of the two formally different orders of knowledge for creation as belonging to theology, and for evolution as belonging to scientific theory; and he gives himself the task of discerning the relations of the theory of evolution with the theology of nature and the theology of creation ('Évolution et création' p. 575).

With French formality, he sets out three domains as necessary for a systematic ordering of the material: in terms of its being a science, i) evolution as a scientific theory; how philosophical method has been brought already to this material, ii) philosophies of evolution; and tentative discernments of the action of God within it; and iii) the activity of God in the evolutionary process (which, of its nature, must be speculative).

[1] It needed contact with the author himself (senior research fellow in biochemistry at the University of Otago) to establish that this material has not been published under that title in English, but that a variant version has been published as *Nature's Destiny: How the Laws of Nature Reveal Purpose in the Universe* (New York "c.1998".)

https://doi.org/10.1111/j.0028-4289.2005.00094.x Published online by Cambridge University Press

I Evolution as a scientific theory; how philosophical method has been applied already to this material

Given the difficulty of speculating on evolution within both the older and the newer sciences, either singly or together (biology, palaeontology, geology, ecology, genetics, embryology, mathematics: the latter showing through thermodynamic equations how entropy can promote order where a lapse into disorder seemed inevitable), we think it premature, at this point, to define scientific method restrictively as the following out of the necessity found in logical formalism and mathematical quantification. Even Aristotle (whom he introduces later) was frustrated by the *aporia* that, whereas scientific theory demanded the finest possible universalisation, the brute fact of individuality was then incorrectly represented. The German distinction between individual as instance of a universal (Besondere) and as true individual (Einzelne) represents the factors in Aristotle's perplexity. And in view of the large number of qualifications made on long- or short-term established norms, the scientific theory of Schelling, enunciated at the end of his philosophy of mythology, according to which logically supposed consequences of a position within a science expressed mere possibilities, on which judgement should be suspended until the factual outcome is known,[2] has, despite its being normally unknown, much to recommend it (ib., pp. 576–8).

The metascientific complex of factors which touch evolution theory effectively prevents it from being the spread-out single coherent act which was Thomas's conception of a science. Père Maldamé finds that the facts have to be examined within seven branches (better, orientations) of science: that of universalities, to which he includes mathematical statistical laws; the self-sufficiency of nature which excludes an exterior intervention upsetting the natural course of transformations and even exchanges of energy; the universality of laws which validates present experimental verifications of events occurring millions of years before, or outside the solar system; that one may place human history within the biosphere, even in the formation of the solar system, and even in the genesis of the cosmos; the supposition that there is an underlying continuity in the form of a

[2] v. Schelling's *Philosophie der Mythologie* (*SW* II, 2): 'Always the first task of philosophy is research of what is possible. After the identification of possibilities, there is the further task of seeing whether there is a corresponding reality' (ib., p. 439). But especially the end of his 29th lecture: the objects of nature, as also the constructions of the spirit, must be explained from themselves [aus sich selbst erklärt werden müsse], by the appreciation of their 'inner necessity' (p. 671). He claims that he has given, through the development of the cosmic potencies evident in the mythological process, 'an example of the power of scientific method', with 'thoughts developing organically from a first seed', which is of 'universal significance', and which must always draw on 'the richest knowledge of individual things' (p. 672).

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tree [arborescence]; the presence and competence of the researcher cannot be excluded; the study cannot be confined with classifying facts from the past: there have to be predictions and hypotheses, deriving from palaeontology and genetics, to fill in the lacunas in the tree-form, as it is now known. Conscious of its shortfall from the completeness within the complex of orientations just given, evolution theory must comport itself as a theory, without designating a fact, or an ensemble of facts (id., pp. 578–9). And to be more precise, the status of 'hypothesis' is too precarious to designate it, because the theory of evolution is, in relation to our present knowledge, the only theory which can find an explanation for all of the facts that are known (id., pp. 579–80). It can designate a general theory which can cover particular theories, proposing its recasting (id., pp. 580–1: we abstain from citing all the revisions mentioned). In the same way that mechanism was used as a general paradigm in science, biological evolution has become a paradigm in other sciences. A realisation of the presence of contingency, regardless of the exact circumstances, takes it, as paradigm, into the realm of philosophy (id., p. 581). Here one must add that the type of contingence in view, cited from a work of I.Prigogone and I.Stengers (*La nouvelle alliance*, *Métamorphose de la science* (Paris 1979), is one open to all real possibilities: 'the only explanation must be historical or genetic: one must describe the way which the system took in the past, and list the places where the branches had divided, as also the series of waverings which produced the real among all the possible histories' (ib., p. 168). This so falls within the methodology, used and set out formally in Schelling's late philosophy (v. n.2 supra: 'consider all the possibilities, and note the one which was realised'), that one regrets again that this is not more widely known: it would appease a conscience become unnecessarily uneasy by having to deviate from models drawn from logic (syllogistic or otherwise) and mathematics.

Within the prehistory of evolution theory one must confront the relentless and irreversible development of factors, at least for the solar system: the original synthesis of hydrogen and helium with carbon-compound gases and ammonia of volcanic origin, and with water, out of which the amino-acids were formed, resulting in proteins. In such conditions proto-bacterial and then unicellular organisms were fixed by a thermodynamic process, which reversed the tendency to entropy, imposing order on disorder, and within a time not prescribed by regular physical change. From this presupposed unicellular condition onwards, living reality displays a separation between what belongs to itself and what is outside it. Inside it is a 'self', which by its immune system prevents 'the not-self from altering its integrity and specificity, while the digestive system destroys what has entered into it by assimilating it'. Matter and energy are the objects received and transmitted by a living being, but there is a

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higher function of organization which constitutes an organism: information is passed on within it, making it a system of systems. Linear causality, with an extrinsic continuity, falls short of this; it must be appreciated by the thermodynamics of networks, however rudimentary, and that according to degrees of complexity but always such that a function of closedness, within which life can progress, remains superior to openness, whereas openness enriches the milieu. Modern debates on evolution centre on this feature (id., pp. 582–4).

Lamarck, with whom the theory began, thought that the factors of attraction, warmth and electricity, working within the power which belonged to animal life, could produce living beings more organized than those from which they were derived. In his three major works, Darwin had applied the conception drawn from the knowledge of artificial selection to the selection by advantaged species within nature, and within the principle of Leibniz that nature does not make leaps. Darwin saw the process as related to the environment and the nature of the organism. Without any knowledge of genetics, he could not have discerned its role. The insufficiencies and ignorance of both thinkers have been brought to light, and the positive result has been the production of a more satisfactory 'synthetic theory' (pp. 584–5).

Père Maldamé uses a passage from A. Bourguignon (*Histoire naturelle de l'homme*, vol.1: *L'homme imprévu* (Paris 1989, p. 92)) which unites the view of T.Dobzhansky, who thought that natural selection does not result from the mutation of a single gene but out of common pool of genes, E.Mayr, for whom species defined themselves through a collection of individuals capable of producing fecund descendants, with new species arising from an isolation which modified the genetic capital of a group of individuals, and G.G.Simpson, who drew attention to the gradual character of evolution, arising out of the accumulation of small variations. This generalised view has been succeeded, he says, by the renewed attention given to the factor of animal behaviour (even though the link with genetic inheritance remains unclarified), as also by the developments in molecular biology, which no longer sees genes as unvarying, but as being in the midst of many interactions. The latter factor obscures the selection of the finally effective one, but confronts the researcher with a creative power within a unitary organism. Genetic findings have opened out new possibilities: when not overwhelmed, a self-organizing organism reacts to disturbances by increasing its initial complexity, and, in consequence, reorganizing itself and engendering unforeseeable new properties in itself, all within a degree of indeterminacy. 'Self-organization' has been invoked to explain the jump from non-living to living. It offers a means of passing from one stage of complexity to another by means of the laws of thermodynamics, without any appeal to teleology. In the light of fossil evidence, two palaeontologists, N. Elredge and S.J. Gould, have proposed a change in scenario

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from a gradual change to a brutal replacement of old unchanged species which were in a state of static equilibrium by new ones, resulting in a disorder in which aberrant or non-viable species are immediately destroyed (pp. 585–8).

For their evaluation, all of these theories raise considerations which are, properly speaking, philosophical. This leads him to consider the philosophical foundations of the idea of evolution, a procedure natural to himself, but hardly entertainable in an English academic climate.

ii) Philosophies of Evolution and Philosophies of Nature

Père Maldamé points out the proto-evolutionary element in Heracleitus's conception of an inflexible course of antagonisms arising from a primeval fire and leading to a fulfilment, in Empedocles's teaching on chance, and in Democritus's atomism. He notes the significance of Aristotle's higher notion of a soul which effectively produces likenesses in physical descendants. Soul was in harmony with body, and animal anatomy reflected in the overall harmony of the cosmos. Most significant was his discernment of the presidency through the soul of a finality [finalité . . . *préside*] for the whole living body. His point of view lay behind the (essentialist) method of classifying particularly living things (according to genus and species), lasting until Linnæus. It was found among innumerable vulgarisers, and within Stoic philosophy (pp. 589–90). Yet for the beginnings of modern science, a form of platonism displaced the aristotelian tradition, giving the greatest value to geometry, and mathematics was presumed to be the key to science. Hence the emergence of mechanics as a paradigm of cosmic order, as if God were the cosmic clockmaker, setting up the cogwheels and giving an initial impulse to its setting in motion. The philosophy of Galileo and afterwards of Descartes left aside the special qualities of living being as appreciated by Aristotle, separating the life of the rational mind from that of the body, which was regarded only as passive. One supposed that movement took place according to a strict dependence on the will of God, as within a great machine constructed by God, and moved by an energy supplied, also by God, with a quantitative exactitude. Thus philosophers of nature sought to lay bare the nature of God's ordering. Magnetism and other not-immediately relatable causes were excluded. A paradigm was sought in geometry to which numerology was subservient (pp. 590–1). Leibniz's rehabilitation of Aristotle's substance was frustrated by the nature of his metaphysics. Scientists found no use for his monadology, and fell back on a more ancient atomism. The power of Newton's mechanistic universe prompted a

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wave of new, more sophisticated mechanistic interpretations of nature. Père Maldamé refers to the birth of a vitalist conception around 1760 (pp. 591–592). But he completely ignores the philosophies of nature as found in Kant, and particularly in Schelling, and also Hegel: we have referred to the utility of Schelling's general philosophy; his philosophies of nature had been structured without being at all mechanistic.[3]

He passes to the new biological mechanism of Lamarck, with its 'liquid fluids and electric fluids', and its sought-for reduction of living substance to chemical and physical elements. He had a sense of nature as always acting with regularity, but producing new things from a ceaseless activity (in contrast to the thought of Diderot, as also Buffon, who saw nature as moving towards death and extinction) (pp. 593–4).

It needed the optimism of Lamarck to conceive of a schema of progress for nature, contained within the notion of 'transformism', with its two key ideas of a transition from species to species without a rupture, and a progress from one level to another: not a hierarchy which only sees man as the end of a progress. It was recognised that there were many lines of development which ended outside man some of which led to impasses, and so attention was given primarily to the internal energies of nature, and to see them as behind the passage from the relatively simple to the more complex. Lamarck was led to extend the classes established by Linnæus, to leave behind any conception of linearity of progress, and to move to a tree-like pattern, corresponding to the increasing complexity of organization of living things. The tree-like pattern admitted branchings and delays in progress; in consequence of this gradualness he came to accept that the notion of species should be modified (pp. 595–6).

Because the English conception of philosophy has only occasionally a place for metaphysics, and in consequence a place for different less fundamental realms of philosophy, the conception of evolution as a philosophy of nature will probably prove unfamiliar, especially when it is inspected closely. No doubt English researchers must overcome their squeamishness and test experimentally the consequences of organizing knowledge, but the organization of well-grasped scientific domains should result in greater ease in handling their material. The contrast with their current even anti-philosophical comportment should bring to consciousness the nature of a factual philosophical orientation, which they have (even negatively) already assumed.

The original works of Lamarck, and indeed the first edition of Darwin's *Origin of Species*, did not use the word 'evolution'.

[3] cf. preceding note.

https://doi.org/10.1111/j.0028-4289.2005.00094.x Published online by Cambridge University Press

The original vocabulary had expressions like 'adaption' and 'selection'. Current work uses newer expressions like 'self[auto]-organization', 'complexity', 'realizability' [fiabilité], and 'redundance' (in the sense of being rendered superfluous, not in the sense of the Latin 'redundantia', as used by Thomas Aquinas: passing, by excess, outside of supposed limitations). Herbert Spencer used 'evolution' in his *System of Synthetic Philosophy*, which extended Darwin's theory specifically of 'evolution' to the entire field of human knowledge. It is now used for all parts of a process begun four milliard years ago, and, in consequence, must take in innumerable semantic and conceptual levels. (p. 596) The general conception, however, remains that it is both determinate and self-evident.

The terms 'adaptation' and 'selection' have been central to the original conception of evolution. They were evidently metaphorical expressions, and in the light of what is now being demanded by the present conception of science, a merely metaphorical status can no longer be tolerable. As now defined by a French specialist for technical terms (A.Lalande, in *Vocabulaire technique et critique de la philosophie* (Paris 1976[12]), 'évolution' effectively now excludes any exterior intervention, leaving it as a process which follows out the internal laws of nature. And whereas selection was considered by Lamarck to depend on nature acting from within, and by Darwin as the result of external forces, both can be brought together within a conception of 'interaction'. 'Adaptation' is understood by Lalande as referable to either a state or a process. The ambiguity is taken away by overcoming the objections to the synthetic theory, which do not explain everything by an appeal to adaptation by selection: some transformations of an organism do not derive from natural selection. The synthetic theory is open to these. (pp. 596–7)

'Self[auto]-organization' and 'complexity' [complexité] are precise, and can be used for multiple factors at different levels of complexity; for example they can be applied to evolutionary processes contained within others; they keep ever present to the researcher the need to re-integrate what has been separated out for investigation within the course of history. The supposedly objective 'species' has caused difficulties, because it can be taken as referring to an essence with constant, common characteristics, as also as a mental construction, or (by evolutionists) as a separate lineal development which has kept its own specificity, or (in biology) with an openness to 'interfecundity'.[4] Natural history therefore prefers to speak of 'population' to avoid what derives from a perennial aporetic: in itself objective,

[4] The distinction between 'genus . . . physice loquendo' and '. . . logice loquendo' was perfectly familiar to Thomas: cf. his *In Duodecim Libros Metaphysicorum Expositio* (ed. Cathala, Turin 1977[3]) 2142, and, self-evidently, a similar facility could be thought up for species.

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though agnostic concerning specific overall-ness. Père Maldamé reckons that this amounts to a formalisation of the vocabulary (though much more detailed analysis of the categorisation is necessary to make this sufficiently clear). And, he continues, progress '[has made the language of scientific thought to be] more formal, has opened the way to more extensive mathematical quantification, and the handling of more facts'. That is indeed a typical scientific prologue to its own conception of progress, which in turn is too complacent of mathematicisation, being uninformed about methodologies (like Schelling's), where mathematical scrupulosity can learn to criticize its own procedures and make them more tolerant of nature's diversity: père Maldamé at some moments wants more flexibility, at others he retreats to the normal scientific conception.

When evolution passes outside of scientific theory as such to become an historical speculation on the reality of life, it inevitably passes into the domain of philosophy (those ignorant of any philosophy and those become philosophical sceptics should note this!): in essence the foundational facts behind theory are used to explain the temporal dimension of change. In its fullest sense, evolution becomes then the basis of any presentation of biological facts, which entails the recognition of an underlying continuity. In relation to such a continuity, stages in evolution are relatable to occurring bifurcations, when another possibility was also in view; for what is understood by the word is 'a succession of break-ups in symmetry'. Père Maldamé follows the schema of A.Borguinon, with its eleven stages [paliers] (op.cit., pp. 144–9): a) in inanimate matter: 1) self[auto]-organization: atoms and molecules at the stage of becoming organized, and transformations under external constraints; 2) self[auto]-reproduction: from the stabilised properties of memory and the capacity of making copies which belong to the very simple, very unstable macro-molecule RNA [French: ARN];[5] b) in living matter; 3) individuation: a system within a semi-permeable membrane, having a cytoplasm and a genome,[6] which has all the elementary functions of life, and is capable of distinguishing between its self and its not-self, a cell without any proper movement, whose superfluous [redondant] genetic system allows the appearance of new forms; 4) forms in which the memory and genetic specificity are protected: the eukaryotes; 5) sexual reproduction: allowing the mixture of genes, and therefore the appearance of new forms; 6) cellular linkage: the first multicellular beings appeared in pre-cambrian times, attaining to a higher degree of

[5] Ribonucleic acid: a complex compound of high molecular weight that functions in cellular protein synthesis and replaces DNA (deoxyribonucleic acid) as a carrier of genetic codes in some viruses.

[6] All the genes contained in a single set of chromosomes. Each parent contributes its genome to its offspring.

https://doi.org/10.1111/j.0028-4289.2005.00094.x Published online by Cambridge University Press

complexity, here vegetables and animals separated out; 7) forms with a vertebra: the mastery of space results from a greater mobility and greater protection of the central nervous system; 8) having a constant temperature, which gives freedom from extrinsic constraints, promoting the extension and diversification of living forms; 9) protection of offspring: through gestation in a womb and lactation; 10) bipedality: the freeing of the hand from assisting movement and the reduction of the cranium in proportion to the forehead, opening the way to *hominisation*; c) living matter with the power of reflexion: this is a decisive stage in the history of the universe; language fosters further organization; culture can emerge. According to Bourguinon this results in a series of asymmetrical bifurcations at every level, with always only a minority of beings capable of following out the changes. Those which could not pass on an attained complexity were able to adapt themselves to their environment, without becoming more complex. Thus the possibilities were evolution, in the proper sense, or 'adaptative radiation' at the same level[7]. (pp. 597–9)

At this point, materialism became a philosophical option: a physico-chemical explanation, excluding any finality, therefore without the intervention of any external agent (God). Darwin had postulated a gradual, but constant progress: his was therefore an optimistic view; the synthetic theory concurs with this. Another view sees the processes without progress or harmony, that there are epochs of progress, rich in new species, interrupted by leaps and ruptures. Gould and Elredge postulate a breakdown of an equilibrium achieved followed by a proliferation of new species, of which only a very few subsist. The other major option was spiritualism, with Bergson and Teilhard de Chardin seeing evolution as a manifestation of spirit. For Bergson it was an example of an *élan vital* deriving from founding the real on spirit: an explanation neither teleological nor mechanical. Though it made evolution creative, it did not call on God, but on the fact of newness and its richness; man was not the finality of evolution, but the manifestation of all the riches of spirit in different forms of life. Teilhard de Chardin saw the process of being directed by God, but acting within nature, not from outside it. The finalisation of the process lies in the realisation of Christ, as the original alpha that will be realised finally as omega. In this process, matter is, by anticipation, already living, the biological already spiritual, in a process which draws on latent energy, and moves ever towards consciousness. (pp. 599–601)

Père Maldamé relates evolution, philosophically not scientifically considered, to 'the richness of life within the order of the world of

[7] Père Maldamé's gallicism here is virtually impenetrable: 'par diversification et ramification d'un même niveau de complexité, analogue aux variations sur un thème musical – c'est la radiation adaptive ou rayonnement adaptif'.

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living things [*Lebenswelt*]', not, as is popularly considered, as a continuation of European materialism, which followed on the success of the beginnings of physical science. With an evident uncertainty, he links the process to 'a general philosophy about becoming', which he sees as linked with the time which is interior to living creatures: the measure of the changes which they undergo; this belongs to a natural history which has freed itself from time as extrinsically measured. No doubt he would have faced a more complex collection of data, but it would have been truer of the whole of European culture if he had given a due attention to the classical German philosophers, especially to Schelling and Hegel, who gave much attention to integrating life and spirit [Geist] into a complete philosophy. Their distinction between objective and subjective time allowed *both* to be considered and inter-related. There also he would have had to take account of the German Romantic Movement, where Schelling himself, though not a romantic *tout court*, was personally linked with it. Here, with a certain brusqueness, père Maldamé passes from the question of time to the significance of creation. (p. 602)

iii) Philosophies of Evolution and a tentative discernment of the action of God within it

Père Maldamé is consistent in claiming that the philosophical options place evolution within the sphere of metaphysics, as it is understood in Europe, where 'special' metaphysics has always given a place for the debate on the relevance of God. (The Christian fundamentalism of 'Anglo-Saxon [mainly American] nineteenth century natural theology' has considered the entailments of Darwin's thought from a point of view not specifically metaphysical.) Here, the notion of finality is capital, and should it be no longer acceptable within a philosophy of nature, the wider and more fundamental orientation of traditional metaphysics will always include it. So he proposes a metaphysical path. (pp. 602–3)

His starting point is the notion of 'success for life' [la réussite de la vie']. Not that it means unqualified optimism: 'the optimism which developed in the nineteen sixties in Teilhardian milieux is no longer possible'. That also applies to the progressivist vision of the age of enlightenment, influencing later philosophers and theologians. Again he recommends the 'broken-down equilibria' postulated by Elredge and Gould, and the paramount importance they gave to an uncompromisingly conceived contingence. Metaphysics also entails the rejection of circular, repetitive processes in favour of linearity. Thus one must not refuse to recognise the production of increasingly rich and complex forms of life, despite the continuing presence of their opposites; and this must be accounted a success, in the light of which

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a degenerative evolution must be rejected. With due regard to the action of the increasing complexity [complexification] of the products of this linear movement, its being set against the supposed objectivity of astronomical time, and in consequence the conceiving of the history of life as an increasing, finally galloping, acceleration must be dropped. That will permit a metaphysics which can speak of a 'production of the better', and concentrate on the greatest riches of living forms which are produced at the end of the process, instead of a blind preoccupation with a time-scale which draws attention from this reality. Such a metaphysics also favours a reflection on the nature of man and his relation to this world. Here, 'spirit is not a stranger to nature'; and all the other elements can be incorporated into an overall orientation which will have no difficulty with the view that all that went before has been a 'preparation for the history of humanity'. (pp. 603–6)

Like any scientific theory, that of evolution has to postulate an underlying coherence. That, in turn, is based on its meaning [sens], which transcends its signs, the evidence which manifests its presence. But there are changes in the history of science about what kind of evidence should be sought, precisely what aspect it seeks in the appetite of intelligence for reality. The search for the meaning and its source are, in fact, metaphysical tasks. In the meantime science has come to interpret the meaning which it serves as the provision of information, passing beyond its previous esotericism and expressing itself in a new modality. The questions which are asked correspond to its new determining purpose: 'is life the fruit of a series of fortunate coincidences, or is there some reason which would validate [légitime] the overall intelligibility which has been accorded to the process? This question is associated with a wider question, which arises when a successful scientific explanation has emerged: why is the real intelligible?' A Cartesian scruple about accepting immediacy in intellectual knowledge surrounds père Maldamé's formulation of these questions. But he handles it boldly: 'the fact of organization in fact entails the participation of a factor at a level of reality which transcends it. . . . The scientific facts which are justified by the theory of evolution can be considered as belonging to a higher unity, in which each element can be seen as realising something bigger than itself. The mechanics of evolution provide a satisfactory explanation of what takes place in one place or at a given time, but they do not provide a sufficient explanation of the whole of the history of life . . . . For this one must envisage the presence of an intelligent purpose which comprehends the whole course of time, and in some way orders its unfolding. . . . the acceptance of a design for the whole, linking beginning and end'. Even the acknowledgement, in modern science, of an element which cannot be integrated into a whole calls upon the notion of causality, which it had once judged to be unsustainable.

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About this notion, renounced by the scepticism of Hume but accepted by Kant for the *Verstand* as *a priori*, even if synthetic, père Maldamé would understand a hesitation about its general or universal use, while insisting on its correctness for particular and 'proper' [propre] causes: 'a cause which, of its nature, produces a particular effect, a definition which excludes there being merely a chance coincidence of independent causal series'. The ordering of evolution according to intelligible norms entails an origin which possesses 'to an eminent degree the capacity to conceive and execute a purpose which is replete with [empli de] intelligence. Besides which, this proper cause cannot be reduced to its elements, but is a higher principle of unity'. He draws some analogies with computer science, but makes its clear that he is rejoining 'the classical way of metaphysics which ends with a recognition of the existence of a divine principle, having taken account of the finality which works itself out in the world'. (pp. 606–9)

This principle will be God, conceived of primarily as a transcendent cause. That claim must first be justified over against a monistic unity. Though it has its ancient antecedents, there is a materialistic post-mechanistic monism, not in the sense of matter being inert, but in regarding matter in general as a form of energy. There is another monism sees all forms of life as manifestations of the same spiritual reality (whether life, consciousness or energy), though this is hardly entertained in an English context. This would have been the place to confront the *hen kai pan* philosophies of Schelling and Hegel, in which the interplay of causalities in the *pan* was not annulled by the *hen*. In fact père Maldamé takes refuge in the double order of causality, of body and of mind, as expounded by Plato in his *Phaedo*. This leads to the conclusion that where there is a causality which affects the phenomena through facts and laws, a primary causality will remain untouched by it, and in this alone is found the explanation of the meaning and disposition of dispositive causes, including the 'production of the better'.[8] (pp. 609–610).

However, as the action of God and that of nature belong to different orders, one must look for a basis, expressed as an analogy under the notion of instrumentality,[9] working from within two co-principles. This entails that an acknowledgement of an intervention of God in nature does not deprive natural processes of their importance, because this intervention properly belongs to both, according

[8] Père Maldamé's remark may have been written innocent of an old Platonic tradition, picked up by Schelling, perhaps stemming from the *Phaedo* (cf., e.g., 99): 'God is the cause not of the good, but of the better'. [Gott sey die Ursache nicht der Guten, sondern des Besseren]. The only place I have to hand is in a MS transcript of a course of Introduction to Philosophy in the Berlin Schelling Nachlass: MS 109/1, p. 13 [sic! a notebook], beginning of lecture XXIV.

[9] A mode of causality, frequently invoked by Thomas.

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to its own modality. 'There is no sharing [of causal influence]. There is a cooperation or synergy between two different orders of action'. In this way one can postulate a source of the sense of evolution in a transcendent principle, because that transcendent principle is infinite. That would be falsified if the transcendent principle were conceived of as having a partial sphere side by side with a natural principle; the transcendent would thereby reduced to finitude.[10] (pp. 611–612)

By comparison, Teilhard de Chardin did away with the frontiers between matter and pre-life, pre-life and life, and unconscious and conscious. (p. 612)

What light does this give about whether the evolutionary process is no more than a construction of the human mind [esprit]? The continual real reference of science in a state of continually unveiling it, the necessity that while the theory may be abstract something real is postulated as an explanation, the need for the source of the sense of evolution to be different from that which *has* sense, all point to a transcendent God, who, while being cause, is the fullness of perfection. Transcendence also avoids the weakness of rudimentary nineteenth-century apologetics, because creation and providence may not be identified with an *intervention* as such: i.e. a non-transcendental action at the same niveau. (pp. 612–14)

God as principle of creation in all its aspects is real and unique. His project is also unique, and here *sense* must finally surpass non-sense. Monisms cannot explain evil. Such a consideration led Stoicism to incorporate it into both cosmology and theogony (this was true also of Schelling). In the light of all these perspectives, père Maldamé concludes that the God Who reveals Himself within evolution must be a personal God. Consequently, scientific research into evolution has a spiritual dimension: 'it proves to be one of the great spiritual adventures of our time'. Even the restriction of the researchers from going beyond the range of natural reason has a positive significance. 'An expectation [attente], taking form in the human consciousness, can be discerned in it, an aspiration for a life which time will not be able to destroy. Revelation carries out and completes this expectation, and both validates and enriches it'. (pp. 614–5)

'There is no wisdom where science is ignorant of nature!' Père Maldamé claims that his reflection on the matter in this sense is in full solidarity with the philosophical tradition of the west, though not with that of the east. 'The principle axes of wisdom evolve with and in the state of knowledge . . . The great evolutions in philosophy are correlated to scientific revolutions, while philosophical options have a great effect on the steps taken by science and its overall concepts'.

[10] One must consider seriously Hegel's critique of the notion of 'infinite': the moment it is considered as, in any sense, being 'beyond' (or, here, 'besides') the finite, it has become finite.

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(But, *pace* père Maldamé, one must accept that, in fact, the correlations are neither tidy nor exact; the distances between them act as challenges, which are met with different speeds and with different degrees of success.) He sees evolution as designating a general philosophy of life, besides being a scientific theory, with internal debates from both polarities being of interest to a theologian: 'they allow him to understand better how creation is an act of love and providence is a vigilance motivated by love, full of respect for what it directs'. (pp. 615–6)

II Père Maldamé's Second Article

Père Maldamé's second article, 'L'émergence de l'homme comme avènement de l'âme', is not so much an interpretation which speculatively places a conception of evolution within a religious framework as an analysis of various recent publications, mainly French and therefore probably unfamiliar to an English readership, classified under ten headings.[11] It has the speculative purpose of showing that the body cannot be presumed to be a complete reality in itself, to be interpreted in relation to its supposed evolution, because the soul must also be taken into account as its form. It therefore falls within the Aristotelian part of the Thomist tradition which père Maldamé has espoused with conviction.

He begins with a citation of Pope John Paul II's address to the Pontifical Academy of Sciences of 22 October, 1996, which surveyed the actual field of studies by the successors of Darwin, with their plurality of explanations arising in part from differently conceived mechanisms of evolution on the one hand, and the different philosophies to which their thought was related on the other. Science and philosophy both consider evolution, and, conscious of the crises of interpretation among the researchers themselves, the Pope pointed out the need to take account of 'a special and immediate action of God in the course of evolution for the creation of man with the dignity of being an image of God, and of being called his son'

1. Man amongst the animals

The validity of the Aristotelian conception of soul as the form of body, with the supposition that the soul as form existed with a certain freedom, was suggested by Jonas's book, mentioned above: 'Life . . . is an individuality centred on itself, a being for itself, in opposition to the rest of the world, with that essential frontier between inside and outside' (p. 38); 'The fundamental liberty of the

[11] As the places referred to are easily findable, the page referencing will be dispensed with in this section.

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organism consists, in consequence, in a certain independence of the form in relation to its proper material' (p. 41). But the separation between the mental and the material worlds must not be a divorce (p. 26). Breaking with the preoccupation with the phenomena as such (which concerns only the mental), and linking up again with the Aristotelian tradition which sees man as an animal endowed with the specific difference of reason, he finds a universal characteristic of all forms of life that it is centred on itself, and yet is in constant exchange with its environment: something present in the movements in the most primitive examples of organic life (as in their metabolism), which are 'the glimmerings of a principle of liberty, foreign to the suns, planets and atoms, present in the midst of the ceaseless extension of the physical universe' (pp. 27–8). Jonas's study shows 'the fruitfulness of the decision not to separate man from the animal world, and thus to place him in the setting provided by the theory of evolution'. It was in fact Darwin's later work, *The Descent of Man*, which contained a speculation on the derivation of man, which *The Origin of Species* did not contain. It gave criteria for distinguishing human from animal life, which have become constant features in anthropology: upright posture, the use of tools, behaviour arising from a culture and not from instincts. The second part of Jonas's book is concerned with these. The presence of many approximations to human behaviour in the actions of the larger monkeys provides another justification for the insistence on a continuity.

For this theme, père Maldamé commends the encyclopedia, *Si les lions pouvaient parler*, directed by B. Cyrulnik (Paris 1998), especially its second part. He points out the novelty of the thesis that the relations of man to animal allowed him to affirm his originality; prehistorical rupestrian art exhibits the development of a culture to which animals do not belong. He refers to the discussions between L. Ferry and J-D. Vincent on the bases of biology and philosophy in *Qu'est-ce que l'homme?* (Paris 2000), and the questioning of P. Picq (a palaeontologist), J.-P. Digard (an ethnologist specialising in domestic animals) and B. Cyrulnik (an ethologist already mentioned), by K.L. Matignon, in *La plus belle histoire des animaux* (Paris 2000). They agree that the older place for the frontier between man and animal has been moved. The specificity of man is put to the question by numerous approximations in animal behaviour.

2. Putting the Question in Perspective

The conventional synthesis, set out in a first-year university textbook: M. Cocude and M. Jouhaneau, *L'Homme biologique* (Paris 1993), presents the progress in evolution as a continual, progressive phenomenon from comparable animal forms through other

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anthropoid animals. In its naiveté it describes the whole in terms of a simple, tree-like form ('une arborescence simplifiée'). It is too simplified: it neither submits the general perspectives of evolution theory to a necessary critique, nor considers the place of man in the animal world, nor the other factors which have rendered impossible the linear conception of a humanity advancing progressively from a cruder ancestor. A similar objection can be made to a too short book of H. de Lumley, *L'Homme premier* (Paris, 1998), confined to the hominids (hominidés: cf., *infra*, n. 20) and based on his own discoveries, without taking into account all the currently available information. Taking a wider view, a progress from four-footed animals up to modern man is inferable from the discovery of the skeleton of 'Lucy' by M. Taieb and D. Johanson in 1974.[12] 'The name has become the emblem of human unity, proof of its African origin, the equivalent of Eve in the cultural myth which comes from the Bible'. Here, Y. Coppens has written *Le Singe, l'Afrique et l'homme* (Paris 1983) on the African origin of man, and *Le Genou de Lucy, l'histoire de l'homme et l'histoire de son histoire* (Paris 1999). Still holding on to the conception of a linear development of 'hominisation'[13] from 'Proconsul' as a supposed ancestor of both monkeys and men, taking into account discoveries in Africa, China and elsewhere, is a collection of articles from the periodical *Pour la Science*, entitled *Les Origines de l'homme*, prefaced by A. Langaney (Paris 1992); but the lack of an overall synthesis obscures the fact that numerous discoveries have broken up the linear theory. 'More nuanced' is 'a very remarkable [overall view]' by J. Chaline: *Un Million de générations* (Paris 2000). It brings the discoveries from palaeontology, biology, ethology,[14] ecology and the environment, and interprets them with a view to constructing a theory of evolution which particularly draws on two-footed stature, the invention of fire, migrations, the organization of life, to end with considerations of 'man's future'. It is 'a methodological reflection with information of [high] quality . . . an excellent introduction to questions posed by the emergence of man'. Here he turns to works which examine the methods used by researchers.

[12] There may be a confusion here. Lucy was discovered by D. Johanson and T Gray in November 1974, and it seems that the discovery was first definitively written up by D Johanson and M. Edey in *Lucy: the Beginnings of Humankind* (New York 1981). D. Johanson cooperated with M. Taieb in an article in *Nature* 260 (1976) pp. 233–7, and an article in C.J. Jolly (ed.) *Early Hominids in Africa* (London 1978), pp. 29–44

[13] The French expression fits the context perfectly, but the English 'humanisation' (and even the archaic, 'humanification') carries overtones of culturalisation.

[14] A modern conception of a science of *animal* behaviour, which can range from ants to *humans*.

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3. Newly Emerged Facts

Père Maldamé puts in the first place 'a page of this story written with talent and emotion . . . ' by R.Leakey, who found in north Kenya (by the eastern side of Lake Turkana), in an area rich in fossils, a complete cranium (in 1969) and a complete skeleton (in 1985), which opened the way to a better study of *homo erectus*, going far beyond drawing the immediate conclusions from fragments, and reaching even to speculation on his speech and thinking (*The Origin of Humankind*, (New York 1994), transl. by J.-P.Ricard as *L'Origine de l'humanité* (Paris 1997)).

In his *Les Origines de l'homme, L'odyssée de l'espèce* (Paris 1999), P. Picq showed how the discovery of australopithecine remains in widely different African regions entailed that there was no common human ancestor, but rather a multitude. Similarly, R. Pigeaud has shown that one can no longer define *homo erectus* as a single species (article, 'Histoire de famille chez *Homo erectus*' in *La Recherche*, 321 (June 1999), pp. 32–3). On the question of the use of definitions in these and other cases, père Maldamé commends *Aux Origines d'Homo Sapiens* (directed by J.-J. Hublin and A.-M. Tillier, Paris 1991). He adds that what he calls 'the synthetic theory' (as opposed to the linear theory) did not arise from one discipline, but from the original meeting together (and subsequent unequal development) of palaeontology, genetics and 'systematics' (the study of the diversity of organisms and their natural relationships), begun in the 1930s, and coming together into a synthesis around 1945–50.

4. A History which was shattered

On how the linear theory was shown to be untenable, père Maldamé cites a number of books, of which the first is by C.L. Gallien, *Histoire plurielle d'un genre très singulier* (Paris 1998). Its reasoned account of the discoveries is first given a metaphysical and methodological context, in which he gives an account of the main types which belong to the genus 'Homo'. After citing some ancient religious texts and the questions raised by modern science, he describes the first steps in evolution theory, and especially those of Darwin. Having given the normal criteria, he seeks a definition of man. He then proposes a history of the ancestors of modern man. Here he contrasts the 'theory of the savannah', according to which climatic change obliged the first hominids (hominidés) to leave the forest and to adapt themselves, by upright stance (which entailed a change in the legs, accompanied by the different use of the arms, and the associated development of the brain), with the orthogenetic theory of Anne Dambricourt-Malassé (a pupil of Teilhard de Chardin). According to the latter, bipedality

https://doi.org/10.1111/j.0028-4289.2005.00094.x Published online by Cambridge University Press

arose from within a history of facial-cranial modifications among the primates, derivable from universal embryonic factors common to the whole history from pre-apes to *homo sapiens*, and still in play. His book, however, is 'a reasoned history of the discoveries', of which the 3rd chapter is an exposition of the place of Darwin's works. The later chapters review the claim for an African birthplace of *homo habilis* (ch.7) with the problem of diverse families of *australopithecus* which can only provisionally be grouped together, and then the problem of the widespread dispersion of traces of *homo erectus* (ch.8) in Africa, Europe, Java and China. Here he quotes studies in *Science et avenir* 638 (April 2000): Y.Coppens, 'Sorti de nulle part?' (compiled by R.Fléaux), and R.Fléaux, 'Chine, un nouveaux berceau pour l'Homme?' After which (ch.9) Gallien shows how European Neanderthal man can no longer be viewed apart from his 'exotic cousins'; his replacement by Cro-Magnon *homo sapiens* was through a displacement of populations (ch.10). Chapter 11 considers the neolithic revolution and *homo communicans*. Père Maldamé notes how at this point the criteria pass from physical to those from human sciences. He judges that Gallien's book has shown how the older conception of a continuous, progressive evolution does not account for the leaps which have occurred.

Contrasted with this, J.Chaline's briefer *Une famille peu ordinaire, Du singe à l'homme* (Paris 1994) opts for a genetic 'mechanism' to explain the 'brutal' and brief passage to bipedality in 'one (or two) generations'. Here père Maldamé refers to an article by B.Dutrillaux and F.Richard, 'Notre nouvel arbre de famille. L'analyse des chromosomes permet de réécrire l'histoire des primates' (*La Recherche* 298 (May 1997), pp. 54–61).

5. The Notion of 'Emergence' in Evolution Theory

This section of the article is taken up with a consideration of what he considers to be an authoritative work by C.Devillers and H.Tintant: *Questions sur la théorie de l'évolution* (Paris 1996), of significance for postulating an 'emergence': 'one passes from one stage to another through genetic mutation, which entails a gradualist view of evolution, since genetic mutations are basic [élémentaire]'. A chaos in the organic world would be intolerable; an irreversible transformism must entail epistemologically *for everyone* the acceptance of an ordered system of classification.

They put forward a view which *synthesises* elements from molecular genetics, biochemistry, genetic development, systematics, ecology, ethology and botany (ch.1). They take account of the fact that, while scientific laws are universal, events are individual (ch.2). The meaning of 'natural selection' has altered since Darwin coined the expression,

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being enriched with a more global conception of the phenomena of life and the relationships between living beings (ch.3). In the organic world, events are indeed connected, but without there being some discernable necessity: there is neither absolute blind chance nor a strict determinism according to laws (ch.4). Important for the explanation of development among hominids and hominoids is the notion of 'interfecundity' (the capacity of different species to *cross*). It seems that it is possible only within certain environmental conditions (ch.5). 'Individual', 'population' and 'species' are necessary conceptions, but are prone to be taken as referring only to (universal) essences or (with the universalism of) words (ch.5). The consideration of the formation of new species must take into account that the speeds of change are unequal (ch.6). The *emergence of man* must be considered in relation to 'continuity, gradualism and discontinuity'; changes are sometimes unforeseeable: 'the interest of heterochronies[15] is in the capacity to realise from a sometimes minimal impulse (there being a restriction to what is passed on [économie d'information]), [and] to produce effects in the ensemble of wide-ranging apparent, not generic, characteristics [phénotypiques], which, nevertheless, bear not on the totality of the organism, but only on properties [caractères]' (ch.8). Species have been related as forming a tree or pyramid [buisson]; the idea of an orderly continuous line is now untenable. Genetics presents other possibilities: perhaps bipedality derives from some 'brusque, precocious innovation', subsequently validated by modifications to the environment (ch.9). Finally, causality with this range is not simple, but a combination of interacting causalities, especially in relationship to a supervening culture. The conclusion is that evolution theory has ceased to be modelled on physical sciences, which were so confident in their axioms and reasoning that they appeared to be predictive. Instead, it has taken on the scope of explaining (a part of) the history of life, no longer having the appearance of classical physics, with its projections derived from basic axioms through strictly logical laws (what is currently described as 'reductionism'). The postulation of uncertainty does not exclude the possibility of constraints, which will give a direction to a combination of contingent facts. So the book ends with an ontological consideration on the status of a living being.

On this, père Maldamé comments that, despite this critique of the 'laws' of nature, the appearance of man cannot be considered as a break with them, and evolution theory is the competent sphere to describe and explain it; in consequence the notion of *emergence* becomes very pertinent. Evolution theory is properly concerned with his emergence at the end of a long journey, which palaeontology and genetics seek to trace. It can no longer be said with any

[15] For a strict definition of 'heterochrony', v. next note.

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plausibility that man is descended from the ape, though it appears that he belongs nearby [voisinage]. 'Emergence' best describes his relationship to the 'family' which makes up his neighbours, and this seems to embrace a conception in which there is a continuous progress among separate species within this family. 'Emergence' corresponds to a truly historical way of thinking, where a diversified assortment of events can be defined in relation to one major event, even though each one is inseparable from its particular causes and effects. That emergence is indirectly shown by the intelligent use of tools, and by the evidence of social ordering. In addition to the study of fossilised remains, biological research on actual populations, the genetic and molecular evidence about distances (temporal and spatial), the comparative embryology of men and animals, can all now produce relevant evidence; to which he adds 'juvenescence [juvénilisation] or neoteny'.[16]

Having given a standing to the theory of evolution by accepting its capacity to judge, from its own domain, the data provided from other acknowledged sciences, it takes on the nature of an anthropology: not scientific in the reductionist sense but by weighing 'field-work' against hypotheses, and not in relationship to presuppositions; its principles are so derived that it can even put some anthropological utterances to the test.

6. The foundation of a realist anthropology: the notion of body

The following are some of the principles for the construction of a theory of evolution which takes account of the most recent findings and speculations:

a) humanity cannot be separated from the animal world; as the emergence of man appears as a progressive process, the resemblances between man and some animal populations had seemed to be explained by descent from a common ancestor. But,
b) their differences also have to be explained. The laws, rules and mechanisms, which were valid for all living beings, are applicable in a special way to the ancestors of present-day man. It is accepted that man's separate and diverse development had cut him off from communication with the other primates. 'The mechanisms of

[16] An American dictionary definition of 'neoteny' shows the ambiguity (evident from the more scientific French and German literature): '1. Retention of juvenile characteristics in the adults of a species, as among certain amphibians. 2. The attainment of sexual maturity by an organism still in its larval stage'. Both sides (regression and anticipation) are contained in the notion of 'heterochrony': 'The dissociation, during development, of factors of shape, size, and maturity, so that organisms mature in these respects at earlier or later growth stages' (Oxford *Dictionary of Earth Sciences*).

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selection and adaption, associated with geographical and climate changes, played an essential role'.

c) The examination of fossil remains establishes the presence of a life of the spirit; tools, together with evidence of funeral and other rites, reveal its quality. The interpretation of wall paintings is a delicate matter, but it testifies to the transcendence of the spirit.

d) Embryology and education draw attention to neoteny as specific to man: he is born prematurely, which presupposes that he will be particularly dependent on a human group. Once received into a human community, he is 'capable of everything'; his nature is not to be adapted, nor is it in itself specialised, but is capable of being cultivated. The study of the final stages of development takes social and cultural dimensions into account. 'Man forges his own destiny'.

With a French preoccupation with Descartes, père Maldamé thinks it necessary to exclude any reference back to a supposed dualism of soul and body; to see man as contained within a long chain of beings, makes it clear that he is not a machine. He insists that progress in biology has finally rendered it unacceptable to suppose that bodily masses are merely passive to movements in space and time; awareness of the body discerns that it is itself a principle of action. The unity in an organic complex is the centre of its activity. At a higher level, thought is the master of the body's different parts. Less in quantitative terms than other factors, the capacity of the human hand, the human face and human sexuality in particular show that thought is preeminent for the structuring of the body. 'Man is human through the actualization of his genetic, biological and ecological potentiality'; his body is not merely the *passive* instrument of an immaterial soul. It reveals the greatness of man, who, in consequence, cannot be placed on the same level as other animals. Nineteenth century thought (though not everywhere in England) had rejected the Cartesian dualistic inheritance in developing a conception of an organism (as a unity with other interests besides Aristotle's hylomorphism, one could add); the body establishes 'a relationship with the world, a presence to other people, but also a relationship to oneself'.

7. The rediscovery of soul

Inevitably science interprets the facts of the past philosophically, and with metascientific criteria. Only the concept of soul, irreducible to animality, can be the basis of an anthropology which accounts for the emergence of man, and for his specific nature. Here père Maldamé refers again to the work of H.Jonas for whom liberty of thought

https://doi.org/10.1111/j.0028-4289.2005.00094.x Published online by Cambridge University Press

is self-determining, along with that of A.Bourguignon for whom a thermodynamic system with openness to the outside world, effects its unity (both of whom were mentioned in the first part of this article). He then quotes from I.Tattersall, *Becoming Human, Evolution and Human Uniqueness* (New York 1983; French translation, *L'émergence de l'homme, Essai sur l'évolution et l'unicité humaine*, by M.Blanc (Paris 1999)), who is more demanding in his criteria for the difference between man and animals. He admired the 'creative explosion' of Cro-Magnon burial and wall art, pointing out the difference implicit in their symbolic representations. In a chapter on 'Brain and Intelligence' he points out that, on close examination, chimpanzees and baboons have a social way of organizing their hunting, and that chimpanzees use simple tools, which entails a linkage of means and ends. Of itself, cerebral structure will not account for the difference: only language as an instrument of abstraction shows the gulf which separates apes from men. Père Maldamé maintains that, rather than make the definition of man depend on some objective material criterion, the difference must be expressed in the concept of soul, which synthesises all the elements in the unity of the human being, for it is the principle of man's 'individuality and singularity'.[17]

Here he shows how seriously he is opposed to any lineal theory: there are identical comportments for the *different branches* of hominoids, and no one today could posit a continuity of *homo habilis* > *erectus* > *sapiens*.[18] It is necessary to refer to a notion of soul, which will gather together observations on all the zoological groupings, taking into account the unity of the whole world of living beings, because animals also have souls. (But not immaterial intellectual souls: that was the opinion of Aristotle in his *de Anima*.) The soul, not the corporeal organs, should be compared. It is a unique centre, upon which the judgement may be safely made that (in man) there is 'a specificity which is not reducible to whatever preceded him'. This alone determines the humanity of man, whose intellectual knowledge and love have a character not to be found in other animal species. If this is accepted it is possible to have an anthropology based on specific human activities, or what our present knowledge accepts as such. 'The emergence of man appears to be an appearance of soul [avènement de l'âme] in all its richness, not limited to spiritual experience'.

[17] 'Individuality' refers to his unique being; 'particularity' to his being an instance of the species, 'man': men are identical in their particularity.

[18] This seems to be the reason why he gives little attention to the theory of Anne Dambricourt-Malassé, with her succession of six periods from pre-apes to *homo sapiens*.

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8. Has finality been rediscovered?

The newer findings of palaeontology entail that the frontier between animal and man cannot be represented on a regularly increasing curve, but rather as a line with breaks.[19] 'Creationists', who think of man as a special creation, have taken over this view. They have drawn on M.Denton's *Evolution, A Theory in Crisis* (London 1985; French translation, *L'Evolution, Une théorie en crise*, by N. Balbo (Paris 1992)) without seeing that the debate begun by this book was in fact sited within an extension of the synthetic theory. For this conception of 'punctuated equilibria' he quotes the thought of N. Elredge and S. Gould, whom he had quoted in his earlier article; he lists here seven works by the latter. He postulated a fundamental permanence to safeguard the unchanging nature of the species, and explained novelties by a kind of catastrophe: 'an error of duplication leads to the appearance of aberrant forms, which are eliminated except for those who have received, by chance, some advantage thereby. A novelty is therefore a better being arising only by chance'. Therefore the notion of a progressive evolution (a product of the nineteenth century mentality with which Darwin himself was caught up) would not be allowable: mutations are *aleatory*; this theory offers nothing to creationists. Evidently 'chance' expressed as 'hazard' produces an impreciseness which arises from the latter's delicate but popularized meaning. Here père Maldamé distinguishes between hazard as 'fortuitous' [fortuit] (the homograph of 'chance' is much used 'in Anglo-Saxon literature' in this sense and opposed to 'malchance'), hazard as 'aleatory' [aléatoire] (the French and the English are agreed on the meaning: a dependence an uncertain contingency, with an unforeseeable consequence), and *hazard* as contingent (which, in scientific theory, means that an event is not deducible from within a theory).

Where Darwin had seen no divine intention but only natural mechanisms, natural theology (as in Denton's book) had proposed a way of bringing the two together under a conception of a providential *adaptation* for the characteristics retained through natural selection. This is distinguished from *aptation*, a mutation leading to the appearance of a characteristic useful to the organism, and *exaptation*, a characteristic arising in one concrete context which

[19] He adds: 'What mathematicians call a singularity'. But this seems imprecise. If 'singularity theory lies at the crossroads of the paths connecting the most important areas of applications of mathematics with its most abstract parts', this would impose on an otherwise empirically derived evolution theory a too abstract element, But père Maldamé has been contesting the relevance of a strictly logical element – unless he means singularity to be no more than a depotentialised metaphor. A similar disproportion is to be found in A. Dambricourt-Malassé's use of 'attractors', which should not give rise to the impression that she has introduced (strict) mathematical theory.

https://doi.org/10.1111/j.0028-4289.2005.00094.x Published online by Cambridge University Press

later appears as advantageous in another. The criteria used to characterise man in the past have been found to be non-characteristic. All the hominoids and hominids [hominidés][20] have characteristics which are found in modern man, but these are not significant. An exaptation (e.g. bipedality, the use of tools, the form of the brain) may be latent, and will only develop when the conditions of life and for survival have changed. 'Without there being a leap, there is the actuation of a possibility already present'.[21] Here père Maldamé mentions such concrete events as the separation or union of continental tectonic masses, climatic changes due to vulcanicity, the fall of a meteorite, glaciation, a change in sea level. There is in consequence the meeting (by chance as *hasard*: Aristotle's opinion) of two independent causal series. Tattersall has pointed to such factors preventing the tracing of a progression involving diverse species. This also renders impossible the realisation of the aim of French and German researchers to impose a rigid schema related to a final state of complexity, or of spirituality, or of 'man himself'. But none of these can be the end of evolution, which has none. Such theorists have posited a linear development which confuses technical with biological evolution. Here he quotes P.Picq (cf., *supra: Les origines*, p. 152)).

At this point père Maldamé finds it incumbent to make a choice, already adumbrated in the first article though the polarity has been rather obscured in the narrative (and this represents his personal conclusion (p. 97)), for the synthetic view over against the theory of leaps, on the grounds of the mounting palaeontological evidence, and the bio-medical comparison between man and his animal neighbours. He quotes J.Arnold's observation (*Dieu, le singe et le 'big bang*', Paris 2000), when examining the confrontation between the Christian faith and science, that science is constructed without reference to finality. That absence is an invitation to take into consideration the *theological* demands mentioned in the Pope's discourse.

9. A Special Action of God

This recently increased complexity of the question of the appearance of man provides a means for acknowledging his dignity. With all natural agents working within the infinitude of God, one cannot distinguish between a part of the activity attributable to God and

[20] The French 'hominidés' seems more specific than the English: 'the family of mammiferous biped primates'. 'Hominoids' include hyloblatids (gibbons) and pongids, as well as hominids.

[21] Once again we see the wisdom of Schelling's appreciation of the presence of possibilities, whose realisation depended on the way in which the basic potencies adjusted themselves to each other.

https://doi.org/10.1111/j.0028-4289.2005.00094.x Published online by Cambridge University Press

another part to the agent: 'everything is from God and everything is from nature', and this is an *effect* of His omnipotence (he quotes St. Thomas's *Contra Gentiles* III, 70). 'In consequence it is not necessary to break from the gradualism of the theory of evolution'. While God is unvaryingly transcendent, the world contains, from its point of view, contingence, fortune and chance (hasard). It was the double mistake of transposing scientific observation directly into a theological universe, and finding an opposition between the action of God and contingence, which have disfigured both the theological and the scientific scene and led to the confrontation of non-confrontables. The cause was not only the arrogance of the scientists but the neglect of essentials by theologians, who were led to abandon a sure and higher ground, and to confront the scientists on their ground with what seemed to be diminished and unconvincing resources. Yet there is an inequality here: the scientist cannot reduce theology to his terms, but the theologian must take full account of the scientists' findings and accept their validity for a scientific domain, but at the same time composing a theological figure which does not confine itself to divine transcendence, because 'God operates in every agent'. Here we interpret père Maldamé's position, because his exposition at this point (p. 99) seems to be groping.

He is correct in saying that concepts from theology must be used 'with an awareness of their specificity', but to confine finality to philosophy and theology, while supposing that 'science' is in fact concerned with formal causality (where theology is concerned with a formality in the highest Exemplar-exemplars!) in the sense of being related to the 'unity of the living being' would seem to collapse the exemplar into the exemplared. The expression that there could be 'in contingent events the progressive realisation of a plan which belongs to another order of causality' is certainly sure and safe but, one hopes, only provisional and incomplete. Certainly it is necessary 'to place oneself at a theological view-point which does not arbitrarily speculate on what God could have done, but on what has occurred'; and here père Maldamé justly finds a *theological* locus in the detailed working out of Providence, in the way in which God has a complete knowledge of individual things, and works on even the least of beings through intermediaries (he quotes *Contra Gentiles* III, 77).

Here, joining the thought of John Paul II, he insists that in this detailed working-out and knowledge of creatures, God creates the human soul directly, without any intermediaries, in the human body, which was derived from living matter, which preceded it. This has a crucial importance for the full understanding of the emergence of man as *homo sapiens*.

Because man is distinguished from similar animals, it is necessary to pass beyond the physical aspect of his being, such as bipedality, his posture in sexual relations, his deliberated use of fire, the making of

https://doi.org/10.1111/j.0028-4289.2005.00094.x Published online by Cambridge University Press

tools. That wholeness which makes up a man includes moral experience and an interior life. Man reflects in an activity of his spirit, which returns upon itself. So it is not sufficient to make an inventory of the functions inferable from palaeontological findings, but to look at man in his existence. And père Maldamé affirms that it is possible for science to investigate what makes man different from other living beings and yet retain its methodological reductionism. Science then passes from the study of phenomena to ontology (but, *pace* père Maldamé, surely not to ontology as a separate science. but to a scientific orientation which is simultaneously concerned with the ontological dimension to what it investigates strictly as a science). He argues that if this passage from 'scientific phenomenology' to 'ontology' is conceivable and acceptable, it should be possible to pass even higher to a theological viewpoint, with an understanding of a 'creative action' and of what is specific to the creation of man, remembering that the creative act is the basis for the order of nature. The insertion of the creation into the process of time entails that man emerged in an aleatory course: 'not as the necessary fruit produced by the process which was put in place at the beginning, according to the Cartesian image of an initial flick of the fingers [chiquenaude[22]]', or even by the projection of a universe in gestation, as is claimed in the naive finality of the promoters of the 'cosmic anthropic principle'. (It would have been better not to introduce that principle here, without the possibility of substantiating this interpretation, and without considering whether this principle entails a linear development, which he has denied to evolution theory.) 'Man is the fruit of a history where turning points [bifurcations] are neither necessarily produced, nor potentially present in an earlier stage'. God is not an 'interventionist' in the sense understood by Newton, but acts in a way which does not constrain nature: he does not 'constrain' nature [at least within the framework of nature itself; another conception is necessary for his omnipotence], but his 'action . . . arouses [suscite] and positions [oriente] a coming to be [devenir]'. As can be postulated for the emergence of man: a special action of God through which man

[22] Père Maldamé refers to Pascal's *Pensées* (Brunschricg.77 Lafuma 1001) with its criticism of Descartes: 'Je ne puis pardonner à Descartes; il aurait bien voulu dans sa philosophie, se pouvoir passer de Dieu; mais il n'a pu s'empêcher de lui faire donner une chiquenaude, pour mettre le monde en mouvement; après cela, il n'a plus que faire de Dieu.' ('Chiquenaude' is a flick of the fingers, with an impact and sound of the third finger on the upper thumb (rightly translated by the archaic 'fillip'). The word passed into philosophical circulation in France: 'En effet, en dépit des contorsions métaphysiques de Descartes, sa conception mécaniste du monde ne sera que l'anticipation de ce que les athées du XVIIIème siècle, comme Voltaire, appelleront la chiquenaude originelle de l'horloger qui est à l'origine du mouvement, de la vie mécanique du monde' (Roger Garaudy, *L'Avenir: mode d'emploi* (Paris 1998), Annexe II, 2e Secession b) ' . . . de Descartes à l'ordinanthrope. (De la philosophie française)'. To be found on the web under at least two addresses).

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comes to be, but through the conditions and possibilities which that supposes.

10. A Critique of the Notion of Emergence

Irrespective of the impossibility of tracing all the stages through which the living species have passed, the notion of 'emergence', with its entailment of continuity, is in agreement with what is today called 'a species'. The modern notion is more supple than the absolute conceptions found in Linnæus, Buffon, Lamarck and Darwin. A philosophy does not have to be materialist to accept the notion. Emergence as currently conceived posits a *threshold* [seuil], whose passage is irreversible, with a before and an after. Modern man does not reduce back to a hominoid ancestor; the conception excludes any reversion to a previous condition. The specific diversity of modern man from any other condition found among the primates must be insisted on. That has its bearing on the present condition of man as he has emerged: the specificity attributed to him excludes any conception that 'the spirit has emerged from the forces of living matter, or its epiphenomenon', as Pope John Paul has said. Such a conception would belong to a materialist philosophy, without being strictly scientific, which would 'not exclude any reference to a causality of another order in the advent of a soul'. There is also ambiguity about the notion of continuity: even when one accepts some underlying continuity between man and animal, and one holds that there is a chain linking the phenomena of evolution, one may still recognise a break between them, because two contexts [cadres] of thought are involved. Therefore one may not say that it is impossible to recognise any radical difference between man and his close parentage on the grounds of a continuity in their constitution, because that does not recognise the originality found in man, and the importance for him of culture and a life of the spirit. Even positing the form of a tree for the primates supposes the acknowledgement of a difference for the family of man. As Pope John Paul said, while the exact moment of the passage to the spiritual is not observable, there are signs, which can be picked up by careful observation, which are very valuable in establishing the specificity of the human being. Many of these concern his soul, which should be seen as the form of his body, and recognised as different from the souls of other animals. By it he is made in the image of God. The acceptance of a continuity with the primates arises in the context of scientific method, but the evident truth of the discontinuity entailed in the appearance of a spiritual dimension allows a better judgement to be made on the appearance of man and his place among other living beings. Continuity and transcendence can therefore be accepted together – without entailing

https://doi.org/10.1111/j.0028-4289.2005.00094.x Published online by Cambridge University Press

the positing of leaps, which fall outside observation and are based on lacunae in palaeontological documentation.

By distinguishing carefully between scientific reductionism and non-reductionistic emergence produces a liberty for the researcher, in which he can better recognise the action of God, which works to the perfecting of the order of nature. And if the soul is regarded as form of the body, then the grandeur of man can be understood through the body better than by ignoring it. The term 'event', says père Maldamé, embraces both the underlying continuity and the appearance of something new, not reducible to its antecedents.

In concluding, he says, in criticism of theology of the past, that it had been influenced into echoing the style of classical science with which it was in controversy, and taking on a determinist paradigm. In relationship to the more friendly notions of *becoming* and *emergence*, the rigidities of the older paradigm can be shed, especially by giving more attention to theological categories taken from Scripture, which is more concerned with the historical dimension of God's action; a paradigm from this source will be able to bring together the laws of living beings and the singularity of God's creating a spiritual nature for man. The conception, and the intrinsic infusion, of a soul should be more acceptable for scientists than the supposed extrinsic action of God. This intrinsicism opens out many possibilities whose statement could produce an echo from them, where, previously, there has been an unremitting confrontation. It will give a correct attention to a Christian philosophy of nature, which regards living beings as tending towards the optimal realisation of their potentialities. And this is the movement in which God acted to bring about the appearance of man. Not far removed from the field of evolution is the research of doctors and biologists on the human embryo. It is a natural complement to the historical distension of evolution theory.

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https://doi.org/10.1111/j.0028-4289.2005.00094.x Published online by Cambridge University Press