

**PAUL RASTALL: *A LINGUISTIC PHILOSOPHY OF LANGUAGE*,
LAMPETER – LEWISTON, 2000^[*]**

review article by Jan W. F. Mulder (University of St. Andrews, UK)

Introductory note by Aleš Bičan

In 2006 I happened to have a short e-mail conversation with Jan Mulder. I asked him for off-prints of his articles, as some of them were rather hard to find. He was so generous to send me, by regular post, a huge packet of them. It took me some time to realize that some of the included writings had never been published. One of them was a manuscript (type-script) of a discussion of a book by Paul Rastall, a former student of his, which was published in 2000 by The Edwin Press. I naturally contacted Paul Rastall and asked him about the article. He was not aware of it but supported my idea of having it published in *Linguistica* ONLINE. He consequently spoke to Mulder who welcomed the idea and granted the permission. The article below is thus published for the first time. It should be noted, however, that Jan Mulder has not seen its final form.

The text is reproduced here as it appears in the manuscript. I have only corrected a few typographical errors here and there. The only significant change is the inclusion of a list of references. Mulder refers to a number of works, but bibliographical information is not provided. I have tried to list all that are mentioned in the article.

Having read Mulder's review, Paul Rastall decided to clarify some points Mulder discussed. He took the opportunity and wrote a response which has also been published in *Linguistica* ONLINE:

<http://www.phil.muni.cz/linguistica/art/rastall/ras-003.pdf>

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^[*] Previously unpublished. [Editor's note]

The present publication is not a book on Linguistic Philosophy, but rather one presenting a brand-new Philosophy of Language. The emphasis is not exclusively on epistemology, but has a much wider range. It even deals with some relevant matters concerning the neuro-physiology of the brain. Linguistic Philosophy, on the other hand, is a type of logical analysis based on so-called Ordinary Language, popular in the nineteen fifties, and still to some extent in the early nineteen sixties, especially in Oxford. The Oxford philosopher Gilbert Ryle (1900–1976) more or less adhered to that school as is very noticeable in his for this review important book *The Concept of Mind* (1949). But when I had the pleasure of attending some of his lectures and evening talks during the nineteen sixties he seemed already to have taken some distance, not from his book, but from the school. I remember him most as a sympathetic person and as a critic of category mistakes, which he was already when he wrote the above mentioned work. Unfortunately the “ordinary language” movement dealt in its heydays almost exclusively with English, the language, which made it of course *a priori* invalid as a *universal* method of logical analysis, as Rastall has pointed out (p. 1 and 65).

Rastall's Philosophy of Language is nevertheless not a Philosophy of Science of the ordinary kind, which latter tends to have only one level of construct, i.e. a level of *description* in which some *theory* is mixed in, a sort of a hybrid. There is, of course, in the ordinary type also an applicational level, i.e. a level of phenomena, which belongs exclusively to “the real world”. For linguistics one needs, however, two levels of construct (pp. 196–197), i.e. a level of *theory* and a separate level of *description*. In addition there is here too an applicational level, *mutatis mutandis* comparable to the level of phenomena in the natural sciences. The two levels of construct are necessary because linguistic description deals with an indefinite number of parallel Universes, all of them of the same nature, e.g. English, Hottentot, Dutch, etc., and each of which being a possible candidate for description. Most major Continental European Linguistic theories are of this kind¹. In the Sciences the situation is, however, different. There is only one physical universe. Sciences such as Physics, therefore, can afford to mix description and theory into one system, although personally I believe that this is also in Science for ontological reasons not a healthy situation. Another feature in which linguistics seems, in this case by material necessity, to differ from the natural sciences is the latter's emphasis on “cause and effect” situations (pp. 195–198), and also the fact that scientific phenomena tend to be directly accessible, or at least measurable. They are so-called “sense data”. As the type of “linguistics” Paul Rastall describes in his book is based on arriving at descriptions of speech phenomena as *communicational* strategies, and because, in his opinion, theories which are explicitly geared to this are mainly of the Saussure/Hjelmslev/Martinet/Mulder type, the phenomena to be described are purely functional in the Troubetzkoy Prague School sense, as continued by

¹ Rastall refers to “the early Mulder”, who in the beginning had, according to him, a one level approach. I have indeed given that false impression on page 5 of *Sets and Relations in Phonology* (1968). The scheme there, or at least its interpretation, is however incorrect, though I was, probably just as Saussure and Martinet before me, not aware that typical for Continental European Linguistics was that implicitly we had a two levels of construct approach. My mistake was refuted by myself already on page 10, where the set-up of the theory was clearly “axiomatic”, i.e. *a priori*. In December 1968, just before the book came out I gave a talk to the St Andrews linguistics society, which was published in 1975 in *La Linguistique* under the title “Linguistic theory, linguistic descriptions and the speech-phenomena”. It was reprinted in 1980 in *The Strategy of Linguistics*.

Martinet. But the phenomena in that sense do not possess *reality* in the way inductivists understand this term. They are only indirectly accessible, i.e. via an arbitrary, albeit descriptively appropriate, theory (p. 25). They cannot be “seen” or “heard” but only actually been perceived by “logical thinking”, without *direct* interference of the senses as such. Therefore they cannot be subjects of “realist” type theories. The way in which we may perceive our descriptive data is by hypothesis and then looking if they are commensurate with their definitions in the theory. All this and much more is meticulously explained in the present work, especially in Chapters 2, 5, and 8. Rastall, of course, just as nowadays also most philosophers of science, accepts that even for inductivists and other types of realist there cannot exist any unbiased “observation”. There are always “thought processes” and “expectations” involved, which contribute to the perception.

The fact that there is such a great distinction between theoretically based linguistics and linguistics ostensibly based on “sense” data, rather than on logical reasoning in the first place, is rather unfortunate, because even the purely linguistic part of Rastall’s book may be difficult to understand by those who are, descriptively speaking, dogmatically realist, not to mention transformationalist. It is, therefore, a good thing that he has published this work as a book, not as a set of articles. This anchors the publication firmly in Poppers “World 3” (see my comments below, and the indexed pages of Rastall’s book). As Rastall says: “The dominating publishing force of linguistics in English in the last forty years has undoubtedly been that of transformational and universal grammar of a broadly Chomskyan sort” (p. 48). I should like to add, however, that in my experience inductivism or dogmatic realism is also still a force to be reckoned with. In judging articles for publication, also *their* verdicts are often based upon whether they do, or do not agree with what has been written. This is extremely unfortunate, as the scientific value of a publication, provided it is both relevant and logically consistent, stands in inverse ratio to its present day popularity. To sabotage this may cause severe arrest or damage to scientific progress. And besides, why should one waste one’s time on writing something with which most people agree already? Rastall’s strength is his originality.

Much of all the above implicitly or explicitly is part and parcel of the mental outfit of philosophically minded functionalists, but it has never been presented as completely and well organized as in this book. This alone makes it almost a major handbook of functionalism, together with its underlying philosophy. The philosophical thoughts rest largely, but not completely so, on Popper’s “Three Worlds” approach, and on his theory of “Conjecture and Refutation”, the so-called hypothetical deductive method. I come to Popper’s “three worlds” later. The choice of Popper, especially his “Conjecture and Refutation” approach, is generally speaking in my opinion a good one, but I have some criticisms with regard to his handling the three worlds. This is especially relevant here.

Because of the difficulty of the “neuro-physiological” parts, when Rastall, quoting Eccles, deals with functions of the mind, some readers may wish to take some books by Popper and Eccles out of the library to have a look themselves. I should therefore like to make some critical comments with regard to these authors. I have to say in advance, however, that Rastall seems only on one or two points to have become aversely influenced by Eccles in conjunction with Popper. Rastall may, of course, disagree with me on this. A majority of functionalists may even agree with his more Cartesian dualistic point of view, than with my stricter adherence to Ryle’s view on category mistakes. First I like to say something

about Popper's notion *conjecture*. For Popper it is actually the definition of "hypothesis". But it is at the same time a euphemism for "speculation". Now, most sciences are in their early stages almost always speculative. There is nothing wrong with this. It is rather a practical necessity. It means, or at least it should mean, however, that it is in that case based on strong *plausibility*. This is the least one should accept from a primitive statement in a scientific context. That is, the lowest level of acceptable statement in science is that it be plausible, which in its turn implies that no "hocus pocus" should be involved. Popper states as a requirement for hypotheses, i.e. scientific conjectures, that those in principle should be open to refutation. If attempted refutation is unsuccessful, the hypothesis is said to be corroborated, and it is thereby for the time being accepted. But he further admits that the accepted statement is in its turn hypothetical again. It is again refutable, and this process goes on, probably at infinitum, with infinite regress. This actually makes it a tautology, but he softens this by declaring that every new hypothesis in these respects achieves greater *verisimilitude*, i.e. it gets nearer to the truth. Quite apart from that this is overoptimistic (not all changes that have been made in linguistic (or any other) theories have brought us nearer to the truth), the whole procedure is tangled up by the fact that he constantly speaks about "the *truth of theories*". The latter is, of course, anathema for functionalists, who, at least implicitly, recognize two levels of construct, rather than one. Only *descriptive* statements can be true, but even this is relative to a particular theory.

Because this situation, which has its origin in Popper, who just as other philosophers of science does not distinguish between *theory* and *description*, can easily be saved on the basis of our two level approach, I wrote in October 1984, on invitation, for a book by Rom Harre & Roy Harris (eds.), which was published nine years later in 1993 as *Linguistics and Philosophy, The controversial interface* (Oxford, Pergamon Press), an article called "Negativism as an effective methodology in linguistic description". Of other articles I wrote on the topic, the most comprehensive was "Methodology and description" (1996), published in *La Linguistique*.² This is the method Rastall refers to as leading to such assertions as "x is a phoneme of English", or more generally "...is an x" (p. 226). Such assertions are always based on definitions in the theory, in this case the definitions of "phoneme" which are 1) "Self-contained bundle of one or more distinctive features as its immediate, and at the same time ultimate, constituents", and 2) "Minimum syntagmatic entity in phonology". Definitions of that kind are constructed in such a way that they are indirectly equivalent. If the one is appropriate, the other is appropriate as well. The hypotheses based on these definitions must, in my view always be stated in the negative, e.g. "x is *not* a phoneme". This is presented for possible *refutation*. If, and only if, refuted, it is automatically asserted that *x is actually* a phoneme and, if we try it on English, it is actually a phoneme of English, etc. As one sees, one does not need here *verisimilitude*. One can preserve the latter mainly for hypotheses which are exclusively based on considerations of *plausibility*.

The "x is not..." procedure is the first stage of the descriptive process. It allows us to make inventories and classifications on the basis of which things are the same or different, and in which way they are the same or different. It should be understood that at this point we have arrived at stage two, i.e. at the description of a *particular* language, and we have to say farewell to the *direct* application of the theory. The theory does not have definitions

² This article was submitted for the first time on 27-9-1989, but the manuscript got lost on two occasions and was refused by another journal on another occasion.

for items that only occur in *specific* languages. The rest is rather based on logical thinking and on the skill to present everything as much as possible in complete balance between economy and exhaustiveness of presentation. An example is the 25, or if Scottish and Irish variants are included, 26 phonemes of English, which under an axiomatic functionalist point of view account for *all* oppositions between those phonemes. Another of the many other examples is the description of the English verbal system as portrayed in Mulder, *La Linguistique*, 2/1996, "An unorthodox view of the English verbal system". See also Rastall's *A Functional View of English Grammar* (1995), in which there are plenty of further examples.

In the following I should like to refer to the cooperation between Popper and the neurophysiologist Sir John C. Eccles. As the basis of his discussion of relevant things that go on in the human mind Rastall has chosen Eccles's book *The Human Mystery* (1979). Of course much of the understanding of this topic remains conjectural, but most of it has a high degree of plausibility and even certainty. Unfortunately, certainty itself has in most cases been achieved by callous vivisection, and an ingenious cruelty in experiments, especially on such "inferior" creatures as primates and cats who had to lend and sacrifice their brains for this. Eccles refers to such "wonderful" (his words) experiments in some detail, but uses also clinical reports on human patients. Before writing this book, which contains for Rastall's requirements more than enough of real *scientific* value, and apart from that there are some remarks on evolution theory, Popper and Eccles have together produced another, in my opinion generally more instructive, book, not referred to by Rastall, i.e. *The Self and Its Brain*. This work consists of three parts, i.e. 1) A part written by Popper, 2) A part written by Eccles, and 3) A discussion between the two authors. Popper can be described as an agnostic, Eccles as a believer in God and the supernatural. Though they are remarkably in agreement on most points and settle for a kind of Cartesian dualism, which they have called "Interactionist Dualism", they came, of course, at the end at slightly different conclusions. That of Eccles was understandably a belief in "a supernatural origin" of his "unique self-conscious mind and selfhood", whereas for Popper his "self-conscious mind" was to be regarded as "his way of thinking in a position of superiority over the brain in World I" (more or less the intersubjective "real world", but in this case, of course, his own brain). Eccles's book "*The Human Mystery*" can be seen as a synthesis of the above joint publication. It is a very scholarly work and full of fine descriptions of the brain and its supposed workings. It is, however, as it clearly states, not meant to be a scientific work in the first place, but a treatise on *Natural Theology*. Natural theology is a pseudo-science which tries to make theological truths derivable from scientific truths. Nevertheless, as I said, the work also contains a great deal of real science. The word "pseudo-science" is here not used in its usual pejorative sense, but rather as "*near-science*". It is almost scientific, except for the conclusions. *The Human Mystery* admits, especially towards the end, modes of reasoning which are appropriate for theology, but not for science, even under Popper's weaker (than my own) requirement that "nothing belongs to *Science* if it is not in principle refutable". A hypothesis about the "interfering existence of a Divine Providence", or the existence of "a soul which is largely independent from the human body" can neither be refuted in principle, and nor can the *negation* of such a hypothesis be refuted. The latter includes the extra requirement as stated in my ideas called "negativism" (see above). I have to add here again that Rastall has used as his scientific arguments mainly the scientifically

relevant parts of this book, though he also seems to show some sympathy for Eccles's stance.

Popper, in an earlier book *Objective Knowledge* (1972: 154), says that in his pluralistic philosophy the world consists of at least three ontologically different sub-worlds: 1) The physical world or the world of physical states; 2) The mental world or the world of mental states; and 3) The world of intelligibles, or of *ideas in the objective sense* (his italics). This latter is the world of possible objects of thought, i.e. the world of theories in themselves, and their logical relations; of arguments in themselves; or of problem situations in themselves. Simplifying one might say that the three worlds of Popper are 1) the physical world, 2) the world of the mind, and 3) the objective, *autonomous* World 3, containing cultural goods such as scientific publications and collections, but also, I think it should include the separate languages as cultural institutions, or anything else for which one must have a genetically determined *adaptability*, but which have to be *learned* from others.³ The above may seem an interesting collection, and it is convenient if one uses it informally, with the objective of merely ordering one's thoughts. Clearly, in ordinary life one does behave in respect of things that occupy space, and something that is seemingly only in the mind (World 1 and World 2) differently, and one does have a different attitude yet to libraries, museums, or other institutions that are typical exponents of World 3), to which some people may even have no attitude at all, and more homely environmental things about which one is bound to talk or think (World 1 and World 2). As long as one regards the above, as I said, as an informal classification, rather than as things to actually philosophize about, there is no danger, not even perhaps of committing grave category mistakes. Even to remain constantly aware of the above as noticeable categories may be very useful. But let us look as to how loose a collection this **actually** is! I shall try to simplify everything to the extreme.

To begin with we can regard the three worlds together as the whole of *the real world* in an objective sense. In that sense we look at it as an outsider, as an onlooker. Then we can distinguish between Worlds 1 and 2 on the one hand and World 3 on the other. Worlds 1 and 2 are inseparably linked together. World 1 is potentially an active world, but World 2 is an activity, i.e. not a world of entities at all⁴. It is not independently active. World 3 is even, in spite of what Popper says, completely passive. Individuals and groups of individuals can be active in that world, i.e. part of that world can become activated within their own minds, but it cannot act by itself. Popper maintains on page 155: "The three worlds are so related that the first two can *interact* (my italics), and that the last two can *interact*" In *The Self and Its Brain* (p. 563) he says about World 3: "It really exists; and not only does it exist, but it is active; it acts upon us (only, of course, by *interaction*)". In many places he even comes very close to regarding it as part of the mind. But interaction implies that both sides are capable of acting. That what Popper here says amounts to making category mistakes. As to the distinction between Worlds 1 and 2, this can only be a completely artificial distinction. Or rather one should say that, as to World 1 in relation to World 2, there are a number of overlapping classes involved. First there is the class of purely material objects which roughly can be contrasted with that of life entities. One could say that it ultimately

³ Popper and Eccles have probably not noticed that also for chimpanzees, and some other animals there exists a World III, albeit a rudimentary one.

⁴ For Popper and Eccles World 2 is, however, also a world of entities.

merely consists of atoms or molecules and (skipping the details) we can contrast it with the class of entities that ultimately consist of *life* cells. These are *biological* entities rather than ordinary material entities. The little trick of creating a distinction of this kind, thereby ignoring some in-between stages, such as *carbon* chemistry and *biochemistry*, saves us from having to call *monists* “materialists”, as *dualists*, including Popper, tend to do. The next step would have to be a distinction between human beings and others, as only in respect of human beings one can distinguish between Worlds 1 and 2, or can one? *Monists* such as Ryle would say one cannot. The opposition between *body* and *mind* is not one between components, let alone between independent entities, which are then usually called “body and “soul”, but at best one between two aspects of one and the same entity, something like “expression” and “content” being aspects, not “parts”, of the linguistic sign. We have also to realize that Worlds 2, of which there are exactly as many as there are thinking members of World 1, only exist as a knowable entity for only one human member of World 1. Nobody knows another person's thought processes and therefore their minds, though we *believe* (no more than that) that everybody else has also a to others unknowable mind. Of course, Popper and Eccles do not have the above difficulties, but this is because they do not seem to be aware of the fact that making category mistakes amounts to invalid reasoning. Ryle has called the belief in a separate mind and body “Descartes's Myth”, or “the Doctrine of the Ghost in the Machine”. Though Popper and especially Eccles's, as well as Descartes's approach can easily be shown to be non-scientific – i.e. it can neither be refuted, nor can its negation – Ryle has chosen to expose its acceptance not as non-scientific, but rather as a category mistake. Ryle's book *The Concept of Mind* can be regarded as an *antipole* of Eccles's and Popper's publications, although it was written in the first place as a critique of Descartes's stand. Ryle's main point is that there is a polar opposition between matter and mind, the first occupying space, the latter essentially being void. “What happens to one body in one part of space is mechanically connected with what happens to other bodies in other parts of space. But mental happenings occur in insulated fields, known as ‘minds’, and there is, apart maybe from telepathy, no direct causal connection between what happens in one mind and what happens in another. Only through the medium of the public physical world can the mind of one person make a difference to the mind of another” (Ryle: p. 13). To this we can add that what Dobzhansky (*The Biology of Ultimate Concern*, 1967: 26), has said: “Unless one chooses to believe in some peculiar form of Leibnizian psychophysical parallelism, the immaterial must sooner or later be brought down to the physiological and hence the material level.” I do not like Dobzhansky's term “material” here. One should distinguish between “material” and “biological” or “physiological”, even though “material” is a *hyperonym* of the latter two. In ordinary language it is, however, not used in that way. In my opinion, thinking, i.e. any thought, let alone pain, or feeling oneself under the weather, is not disconnected from biological activity inside the brain and/or some other part of the body. In fact, “thinking” is an aspect of “life” itself. It presupposes life. “Sensing” is another. On page 12, in the same chapter, called “On Gods of the gaps”, Dobzhansky says: “Probably most teachers of biology have found a minority of their students perplexed by having what they believe to be “mysteries” of nature explained and clarified... To them, there must be gaps between natural events to accommodate God's interventions.” However, he says a bit further down: “The historical odds are all against “the God of the gaps” being able to retain these shelters

in perpetuity". He means that "scientific explanations" in the course of history have already closed one gap after another. On page 66, Dobzhansky expresses himself very clearly: "The body makes the mind, but the mind is not a product made by the body as gastric juice is made by the stomach. It is body in action, a peculiar pattern of action of a special kind of bodily apparatus, just as walking is another pattern of action of a different kind of apparatus." The anthropologist Dürkheim (1915, p. 52), in a book called *The Elementary Forms of Religious Life*, said already: "All known religious beliefs, whether simple or complex, present one common characteristic: They presuppose a classification of all things, real and ideal, of which men think, into two classes or opposed groups... profane and sacred.". It is the function of the "sacred" ones to fill-in the gaps. Malinowsky (1931) has pointed out that "as soon as man developed the mastery of environment by the use of implements, as soon as language came into being, there must also have existed primitive knowledge of an essentially scientific character. No culture could survive if its arts and crafts, its weapons and economic pursuits, were based on mystical, non-empirical conceptions and doctrines."

If we look at the history of the Universe there are still enough things to be amazed about, things that leave perhaps big questions also to scientists. To begin with *The big bang*, if there was an explosion there must have been something that did explode, some matter, but what caused the explosion of this highly compressed matter is still a mystery. No scientific hypothesis about it that does not lead to infinite regress has been made. All this happened five to ten billion years ago. The earth is probably about four and a half billion years old. Life on earth is probably about two billion years old. Ideas about what happened in the mean time are laid down in hypotheses which have a great deal of plausibility. Also the time span of the three to five billion years enhances the general plausibility. That is, in a long time almost anything can happen. The hypotheses about the creation of the different chemical types of matter have even been made more plausible by experiments. But life itself is an absolute wonder to say the least. Theologians are not to be blamed if they called this an act of God – that is what they are theologians for – but as a conjecture, saying such a thing is unscientific. It can *a priori* not be refuted, and nor can the existence of God. There is a logical reason why an irrefutable hypothesis is unacceptable in science. This is because it means the same as its contrary or any other irrefutable hypothesis that could be launched in its place, and therefore it means exactly nothing. Dobzhansky called the emergence of life a *Transcendence*. "The universe transcended itself". The next transcendence was perhaps about two million years ago. This was when *Man* appeared. We may as well say that this transcendence was when *Language* appeared, as without language man would be no more than a very intelligent animal, i.e. an animal with qua intelligence an aptitude for developing a jargon, and learning to speak it – a jargon which ultimately could come to possess a double articulation – but who had not started to do something about it yet, or who was perhaps merely enlarging his vocabulary a bit. How long it has taken fully to develop this jargon, or these jargons, and how it, or they, developed we do not know. It even seems that we do not have any plausible hypothesis about it. It is still "a gap" in our knowledge. One could actually define "humanity" as "linguistic animality".

As I have said, this development has marked another "transcendence". With this began in fact a new development of "man" as a species, rather than as a bunch of individuals. It was from then onward no longer a mere biological evolution, but also a cultural one. This

was centuries later further enhanced when writing systems evolved, and more evolved in their tail, and things accelerated again when means of large scale reproduction, such as printing, evolved, and with it a distinction between spoken and written language, not always understood by linguists. I shall leave the evolvement of wireless, television and computer out of consideration. The latter may bring cultural developments, the greatness of which cannot yet be foreseen. But it may also bring destruction or set-backs like Chomskyanism and Universalism have brought to the linguistic world.

The development of language must have meant an enormous acceleration of almost anything social. One thing which it has also brought us was probably "self-awareness" and its bitter fruit "death awareness". The latter brought "religion" in many forms, usually ultimately comforting, but also conservative and quarrelsome, in Western societies frequently the temporary enemy of proper science. Popper and Eccles do not seem to have contemplated that "death awareness was merely a logical consequence of acquiring "language". This enabled people to speak about things that had not happened yet, and other things outside their direct environment. It also brought the curious notion of the self-conscious mind on which Eccles and Popper put great emphasis when they want to stress the superiority of men over animals. This self-conscious mind is according to Popper independent of the brain in World 2.⁵ Saying this is unscientific under Popper's own requirement, because it is *a priori* irrefutable. The acquisition of language is not so much a biological development, but the aptitude for using symbols was a particular evolutionary development in some primates. Also in some primates, including pro-consul and early man, the absence of the so-called "simian shelf" and the outward sloping of the "symphyisial region", both in the jaw, gave greater freedom to the movement of the tongue, and there were other biological advantages in man's erect posture and other features which made it easier to use his eating-and-drinking and respiratory organs for speaking as well.. There is no reason here for recognizing "gaps". There is, however, at last a good reason for granting Popper's World 3 the great status it really deserves in the cultural evolution of man, not in his mental evolution, which can in my opinion not be separated from his biological evolution, just as it cannot be separated from the evolutions of animals in general. Popper's in discussion switching to-and-fro from third world to second, and from second to first, and from the evolution of individuals to that of the species, and most of all his not distinguishing between cultural and biological evolution has perhaps created the greatest string of category-mistakes ever produced by a great philosopher.

As to Eccles, who is not a philosopher of science, it is quite understandable that he accepted Popper's World 3 as the basis of his "self-conscious mind", though Popper already earlier did believe in "self-consciousness", a from the brain independent property of the human mind (*The Self and Its Brain*, p. 15). Popper has linked also this to World 3.

Looking past the most monumental marvels of evolution itself, Eccles has found a set of "gaps" to be filled. He deals with it under the heading "The mind-brain problem. Experimental evidence and hypothesis." The latter is his, or Popper's and his, *Dualist-*

⁵ Another curious notion is their notion "liason brain". It denotes all those areas of cerebral cortex that potentially are capable of being in direct liaison with the self-conscious mind, which, one should remember this, is independent of the brain. The question to ask here is then: are these areas of cerebral cortex then also independent of the brain? The notion "independent self-conscious mind" is reminiscent of the smile of the Cheshire cat, which was independent of the cat itself and perhaps also self-conscious.

interactionist hypothesis. This depends on his “self-conscious mind hypothesis”, which is, as I have said, also by hypothesis, “independent” of the brain. Also the hypothetical “liaison brain” plays here an important role. The reasoning is all beautifully teleological, as is to be expected within Natural Theology. It is all hypotheses built upon other hypotheses, and so reading it becomes for a scientific traveler an Alice in Wonderland journey, with Cheshire cat and all, through a field of hypotheses to the umpteenth power. This still does not, however, lead to an acceptable conclusion. There still remain gaps that have to be closed. They are gaps in “Visual, Auditory and Olfactory *perception*”. He also briefly mentions “pain”, of which he says that it has no material counterpart. In that case there is nothing to say about it, is there? I shall leave olfactory perception out, but not because I think it has no “material” (but I rather call it “biological”) counterpart.

That what Rastall says about it on page 93 and 94 on this matter is interesting and perhaps to the point. He uses as his example the act of seeing, and he says similar things, *mutatis mutandis*, as I had learned as a student in phonetics classes with regard to the act of hearing, where everything that takes place, up to and including the cochlea, seemed quite normal, but there did not seem to be much relation between what probably happened in the brain, and the unified sound-picture one observed. Strangely enough (this was at least 48 years ago when television had just arrived), I also found, like Rastall, a possible comparison in television. But my guess was that the traces and flashes on the screen, just as the synaptic connections in the brain, were so fast that they had to come over in a sort of holistic, and therefore unified fashion. Rastall deals with it in a different manner. He says: “The mental image is greater than the physical data or processes. A television picture similarly is greater than the physical data or processes. (A picture on the screen is more than the sum of the particles striking the screen and reacting with it. It has order and spatial relations, contrasts and forms, which are interpreted as representing some scene. The purpose of the apparatus is, of course, to create the image on the screen)”. He regards our ability to arrive at a unified picture as a product of *conscious experience*. If I may, I hope correctly, paraphrase his long explanations, I would say that he sees it as being based upon knowledge and expectation, and perhaps even on the experience of a life time, as to what we should observe. With putting it this way, I not only can go along, but it is also in accord with the sophisticated functionalist's stance that we cannot directly observe the phenomena, but have to approach them indirectly via a sort of theory. Furthermore, what he says is also the basis of a proper hypothesis. To start off one's guess with “supernatural intervention”, as Eccles does (see below), is, however, irrefutable and therefore not permissible.

Eccles, who, even in his multiple-hypothetical fashion, did, as I said, not reach a satisfactory outcome, has in his book *The Human Mystery* made the supernatural filling in of these gaps the final conclusion of his work on Natural Theology. He says, pointing to the seeming discrepancy between what we know of what seems to go on in the brain and the unified picture we actually receive (p. 228): “As an answer to this question it is proposed (sic) that the self-conscious mind plays through the whole liaison brain in a selective and unifying manner. An analogy is provided by a searchlight. Perhaps a better analogy would be some multiple scanning and probing device that reads out from and selects from the immense and diverse patterns of activity in the cerebral cortex and integrates these selected

components, so organizing them into the unity of conscious experience.”⁶ On page 234 (Conclusions) he writes: “It is a measure of our ignorance that in the neo-cortex no special structural and neo-physical properties have been identified that distinguish sharply a human brain from the brain of an anthropoid ape. The tremendous difference in performance can hardly be attributable to a mere threefold increase in modules. We have no knowledge of any qualitative development that would account for the supreme performance of the human brain.”

In my opinion, if this is correct, it must be the availability of *language*, not some imagined spirit, such as, for instance an “independent self-conscious mind”, that could plausibly make the difference.”⁷

The *term conscious experience* Rastall uses is the term that also Eccles has used in another much smaller book, and he also portrays a similar picture as Rastall does about what may actually go on in the brain, except that he does this in greater detail. Many of those details are, however, of a hypothetical nature and mixed with quotations from authors of a similar persuasion as Eccles himself. In this booklet, called: *The Brain and the Unity of Conscious Experience* (1965) Eccles comes to very different conclusions from Rastall's. Hiding himself somewhat behind others, he first quotes Jennings (p. 40) who says: “To work this” (i.e. “conscious experience” and “the uniqueness of self”) “out in detail, one would apparently have to hold that the human self is an entity existing independently of genes and gene combinations...” Via a reasoning by Jennings which is peculiar, to say the least, Eccles comes to the conclusion that Jennings must have appreciated “the fallacy (p. 40) of attempting to derive the uniqueness of the self from the experiential history of an individual,...” Continuing his peculiar mode of reasoning, Jennings finds (this I have all from quotations in *The Brain and the unity of conscious experience*) that biology itself furnishes no positive doctrine of the relation of selves to gene combinations, and he finds that it is therefore fair to ask: “Does biological science make the holding of that doctrine impossible”? (p. 41). I do not understand what kind of reasoning this is, i.e. what conclusion could be drawn from it. It sounds a bit like the fallacy of *affirming the consequent*. Eccles says, taking note of Jennings's arguments (p. 42): If we follow Jennings, as I do, in his arguments and inferences, we come to the religious concept of the soul and its special creation by God. “I believe that there is a fundamental mystery in my existence, transcending any biological account of the development of my body (including my brain with its genetic inheritance and its evolutionary origin;...)” For a final statement of his belief Eccles quotes (p. 43) from an earlier Eddington lecture⁸ by Thorpe (1961): “I see science as a supremely religious activity, but clearly incomplete in itself. I see also the absolute necessity for belief in a spiritual world which is interpenetrating with and yet transcending what we see as the material world. Similarly I believe that anyone who denies the validity of the scientific approach within its sphere is denying the great revelation of God to this day and age. To my

⁶ And all this is done completely automatically, it seems, by the self-conscious mind without any help from the brain.

⁷ Eccles has perhaps not realized that also animals have unified perception of a kind, otherwise they would not be able to function. It is not only humans who are thus favoured.

⁸ The booklet by Eccles I am quoting from is also a series of Eddington Memorial Lectures. Their aim of these lectures is to further Sir Arthur Eddington's concern for relating the scientific, philosophical and religious methods of seeking truth.

mind, then, any rational system of believe involves the conviction that the creative and sustaining spirit of God may be everywhere present and active; indeed I believe that all aspects of the universe, all kinds of experience, may be sacramental in the true meaning of the term.”

But Eccles, before he could go along with the present conclusion, had still to clear one outstanding problem, lest one might think that God favours animals as much as He favours men. For this Eccles had to put the procedure of logical inference upside down. The problem is that of trying to discover if an animal's cerebral activity gives rise to conscious experiences. He points to Sperry (1965), who has argued (p. 32) that the presence of conscienceness in a hemisphere would not be demonstrable in the absence of some appropriate linguistic mode of expression and therefore that the minor hemisphere may be in fact responsible for conscious states which cannot be indicated to the observer because of failure of symbolic communication in language. “In the absence of present report”, he says, “*it might be concluded* that there were not such experiences!”. This, of course leaves one big unanswered question, i.e.: How is it then that animals can function at all, if they were not to have *unified perception*. As Rastall does not refer to the above work by Eccles, he probably did not know of its existence. At any rate he does not refer to it. I have, however, dealt with parts of it, because it may clarify certain things Eccles has said in his book *The human mystery*, which Rastall did use.

In Chapter 5, Rastall deals with the different types of linguistic entity. There are entities which from the philosopher's, and Popper says (p. 81) also from the commonsense empiricist's, point of view might well be rejected as fictions. Popper must have meant non-linguist empiricists, because practically no linguists, empiricists or not, would to my knowledge maintain that fictions cannot be denoted. When empiricists, i.e. inductivist realists, talk in a pejorative manner about “fictions”, they do not mean these, but they mean notions set up in the theory by theory-based linguists, such as the notion “phoneme” of functionalists. “Real” from a linguistic point of view does not generally mean the same as, to use Popper's classification, “real” from regarding it as a “belonging to World F” point of view. Everything that can be denoted, i.e. all *denotables* are real from a linguistic point of view. Confusing the two points of view is also a category mistake. On the same page (p. 81) Husserl, the well-known phenomenologist, here quoted by Rastall, says it all: “Therefore this world is not there for me as a mere *world of facts and affairs*, but, with the same immediacy, as a *world of values, a world of goods, a practical world*”.

In the same chapter, and also in Chapters 6 and 7, Rastall deals extensively with *messages*. As he has not given a definition, I shall take it in the sense of its dictionary meaning, which seems to come close to what he probably means, i.e. (Collins English Dictionary): “A communication, usually brief, from one person or group to another.”. What Rastall has to say about messages is very interesting, but I have to disagree on one point. On page 120 he has written: “All messages are intangible, they belong to the mind, not the brain”. The *content* of messages is indeed intangible. But are messages, i.e. expression **and** content, themselves intangible? It depends on what we precisely understand by what is “the message”, the whole thing or only the content. If it is only the content, then the message is not a thing, only an aspect, a function. But a function of what? A function of the message, i.e. of itself? This would be absurd. The same goes for speech and a lot of other denotables. After all, most messages are materially a kind of speech, in which I include here for rea-

sons of simplicity also writing. An exception is “phatic communion” which is not a message, and nor is talk between, rather than directed at, others. Other exceptions are making notes, or writing an article, though the latter may be of such a kind that it could be called a message. One can have messages merely consisting of photographs, drawings or silent films, and other non-linguistic things. These we may ignore. If we look at types of language, one can have spoken language, written language, and mental (i.e. “thought”) language. Within messages one does not have the latter, unless one believes in telepathy, which is, however, not a scientific notion. For the rest everything one can say about speech applies to messages as well. The reverse is, however, not true, and what Rastall has written in these chapters is important food for thought. Many sentences he has written in these chapters are themselves messages.

Coming back to Rastall's statement about the mind, however, I have to maintain that the mind is not an entity - we are here not talking of the mind as a denotable, but rather as a type of abstraction, as a mere notion. It stands for “activities”, mainly “thought activities” originating and taking place in thinking subjects. This holds as much for ordinary speech, as for speech that consists of messages. Besides, how could messages belong to the mind, as there can be more than one person involved in a message. Messages can even be rather impersonal, e.g. Rastall's example of an announcement at the airport (p. 136). Every person is for ever linked to his own mind. This mind is not a component of that person – it would be committing a category mistake to say this – but it can be called one of its *aspects*, one of its *properties*. But aspects are not things, not even virtual things, in spite of informally being referred to by using a rather ordinary “noun” i.e. “mind”. But the only thing the latter usage implies is that “mind” in that sense is considered as a denotable. As I have said, activities can at best be aspects, or properties of things. Materially speaking they are void. They cannot be in combination with a thing and thus constitute a more *complex* thing. But even less can they stand on their own. Any hypothesis about the existence or non-existence of an independent mind remains irrefutable. It would be correct to say that “mind” is an *aspect* of a particular brain. A brain is a component, a *part* of a particular head, and a particular head is a part of a particular body. The intersection of all these particulars is “being a particular thinking person”. A message, being, according to Rastall a virtual entity, could in that case only be part of another *virtual* entity. But the mind is not even a virtual entity. It is not an entity at all. It is, as I have said, ultimately an aspect of a person. As the mind cannot be a component or part of anything, it cannot (category-wise) have components or parts itself, not even messages.

Let us now look at what people on the whole mean by “a message”. We can here stick close to the dictionary meaning. Under that simple viewpoint messages can come in great varieties and shapes. They have, however, one thing in common. They presuppose at least one sender and at least one potential receiver. I shall call them *A* and *B*, and I shall talk about them in the singular. *A* has a thought, and this thought includes that he wishes *B* to share in this thought. People who believe in the independence of mind may think here that there may be direct contact between the minds of *A* and *B*. But this would be telepathy. Whether this exists or not is here irrelevant, as with “messages” we do not mean “telepathy”, not even as a possibility. But do we regard the thoughts of *A* and *B* as being part of the message? I do not think so. Even if we did, it would not affect the final outcome of the discussion. It would only make it unnecessarily more complex. But there is something *be-*

tween *A* and *B*. Something that we can call “*linguistic activity*”. Perhaps we might be inclined to define “a message” as a “unidirectional linguistic activity from *A* to *B*”, but this would also make swearing at someone sending a message. The latter can, of course be an indirect message, though it need not be. The question is now: is this “linguistic activity” by itself the message, or does the latter include *A* and *B*, or perhaps *A* alone, or *B* alone, or none of them? We can easily see that the thoughts of *A*, even his intention to send the message, is independent of whether the message is actually sent. Strangely enough, the thoughts of *B* are partly affected by the message as sent. But this can easily be seen as a mere potential effect of the message. It could even have been that he had had these thoughts even if he had not received this message, or the message might not have changed his thoughts at all. Therefore the thoughts of *B* too have to be regarded as being independent of the message itself.

Still sending a message by *A* normally aims at changing or influencing the thoughts⁹ of *B*. What is left then is to regard the message only as that what is *between A and B*. And we now have to analyze different types of message qua substance and form on the one hand and qua content on the other. Messages have then become entities like linguistic signs. In fact, those that correspond to sentences, *are* linguistic signs. But messages are in the first place entities (they are “entities”, not “intangibles”, as they have both “expression” **and** “content”). Take, for instance, an ordinary, verbal message, such as “I see you to-morrow at nine in Amsterdam”. The form of its expression can be described as “a disturbance in air-pressure (caused by *A*, but this is irrelevant), potentially arriving at the cochlea of someone (preferentially *B*, but also this is irrelevant), and carrying a particular meaning. Once the message is enacted it is independent of both *A* and *B*. The content can be more or less described as “the denotative function” that this form has. Of course the expression does not have to include sound. The form of the expression may be letters painted on a roof, or it may have been sent by telephone, by letter, or by telegram, or by anything else one can think of. All these are *a priori* different *indices*, different signs, i.e. different messages.

Simple as all this may seem it is very important. It is therefore imperative to read what Rastall has to say about all this. It deals with the essence and the very importance of language. My only disagreement with Rastall on these points is the status of the mind and of the message itself, and his dualist conceptions in general.. For the rest this chapter, and also the previous one give us an insight not just in the function, but especially in the *functioning* of language that I have nowhere seen better described.

Many people have difficulty in recognizing the difference between an aspect of something or a component of something. I thought, when I saw a footnote on page 156 (fn. 1), for a moment that Rastall dealt here in this confusion as well. The footnote reads: “On the other hand, the combination of a content and an expression is necessary in the definition of signum as a theoretical construct. Nothing is a signum which does not have both expression and content.” But then I thought that his use of the term “combination” must have been a mere slip of the pen, which was confirmed when I read on page 243: “The sign is *une entité à deux faces*, as Saussure puts it, and the two aspects of the sign cannot be dissociated without arriving at entities which are not signs, expressions or contents.” There is

⁹ I regard it as dangerous to write here “mind” rather than “thought”, though this would be equally correct. It may, however, be difficult for some to see “mind” as an “activity”, rather than as an “entity”.

here, however, another, albeit very minor slip of the pen. *Expressions and contents are not entities*. Rastall knows this, of course, very well, but because some readers may still become confused, I shall try to clarify some points. Better would it perhaps be to say: "A linguistic sign *is* both expression and content". Expression and content are not in *combination*, but only in *relation* as aspects. They are not entities of any kind. Their very identities depend on each other. There is no "expression" without a "content", and *vice versa*. We can even say that any particular expression implies a *particular* content, because an expression is not a mere phonological form, but a phonological form in *its capacity of* being the phonological form of a particular content, and *vice versa*. The part "in its capacity of" belongs to the definitions mentioning their identity.

Understanding the difference between aspect and component could also solve the dispute between dualism and monism. It is a pity that Ryle did not seem to have realized this. It would, however, not help in the dispute whether a soul or mind could exist *independently* of a human body. Another problem is that also animals seem to have a soul or mind. I have noticed my cats doing good thinking on many occasions, albeit not thinking in language. It is unlikely that animals can think otherwise than by imagination and memory, something that humans can also do. There is, however, no unbiased reason to think that they cannot think at all. But to say that animals cannot have conscious experience, and therefore presumably no pain, is dangerous nonsense.

Two of the most interesting chapters, apart from the already mentioned Chapters 6 and 7 of the book, are in my opinion Chapters 9 and 10, "Linguistics and the Philosophy of Science", and "The loop of language". As these are clearly written, there is not much to say about them, except that they summarize in a somewhat different way many of the ideas already dealt with throughout the work.

Of course there are, as is always the case, things written by the author with which a reviewer disagrees in practice. I shall mention here one. Actually, I do perhaps not so much disagree, as that I have a different solution. In 1971 I have published an article in *La Linguistique*, 7, called: "Linguistic sign, word and grammateme" in which it was argued that presenting "linguistic signs" in a spread-out fashion, e.g. "is working" as "is...ing → work", or in "concord" fashion, e.g. "is → working" are equivalent. I have called representations such as "is...ing" *grammatemes*. This type of presentation I hardly use anymore. Secondly, I always stick to a rule that in analysis one should work with *immediate* constituents. They are the only entities between which there can, logically speaking, be *direct* syntactic relations. This is for me, but perhaps not for Rastall, an *obligatory* rule. Another thing is that I distinguish between "grammatical entities" and "linguistic signs", a distinction which Rastall does not seem to make either. Grammatical entities are only "moneme, plereme, syntagm, and sentence". Only the latter are formally defined. "Grammatical entities" is a mere cover term for these four. Syntagms can be simple, or they can be complex. Grammatical entities usually, but not always, coincide with linguistic signs, but their contextual meaning is in addition tainted by their grammatical function, and by the grammatical function of their immediate constituents. Linguistic signs are for me rather lexical than grammatical items. Signs are relations between an expression and a content. "Sign" is defined as "signum with wholly fixed conventional information value". An alternative, but equivalent, definition is: "index possessing the property of denotation". Now Rastall usually works exclusively with linguistic signs, and he likes to represent these as grammateme-

mes rather than as ordinary words, for instance “greater...than” (e.g. p. 199), and he claims that it is “wrong” to regard “than” as functional. Now I would not immediately say that the contrary is wrong, but I nevertheless prefer to write it as (more → fortunate) ← (than ← Fred). On the other hand, “more....than” can easily be regarded as an item of the lexicon, though it is difficult to stick a denotation onto it. But as syntactic entities these are two. I also believe that they both coincide with linguistic signs. I do not say that the form “more than” cannot also occur as an unanalyzable linguistic sign. It is the latter probably in “more than big”. The main reason why I differ in opinion from Rastall is that I have difficulty not to see both “than Fred” and “more fortunate” rather than “more than” and “fortunate” as the syntactic entities. And where does in that case “Fred” go to? Would it be “((More... than) → fortunate) → Fred”? For me it means, “compared to Fred, more fortunate”, i.e. (than ← Fred) → (more → fortunate), which is the same as (more → fortunate) ← (than ← Fred). And besides one can, for instance, also have “I hate him more than ever”. Would this then be ((More...than) → ever) → (I → hate ← him), or rather my preferred ((than ← ever) → more) → (I → hate ← him)?

I did find, however, also what looked at first sight a definite mistake in the book. But perhaps this too may have been an oversight or a slip of the pen, or perhaps it is just misleading. I have settled for the latter, because of his mentioning “*past, non-past, present perfect, etc.*”, which seems to me a rather heterogeneous bunch. Rastall writes on page 79: “Similarly, the main verb in English must be in construction with some tense – *past, non-past, present perfect, etc.*”. As I said, I first took it to be a mistake. I thought that he really meant that the main verb (rather than by preference one of the auxiliaries in the preferred order: “modal”, “tense auxiliary “to have””, “aspect auxiliary”, and only after that “the main verb”) is marked for tense. It seems to me that in “he might have been working” the modal “might” is marked for “simple past” (which I regard as the only real tense, though it could be in other cases a “subjunctive”), the “present perfect” (not a real tense, but like the by others so-called “future tense”, it can be said to be a function of an “auxiliary”) marks “to be”, and the aspectual “to be” (also an auxiliary, the so-called “progressive”), marks the main verb. I am certain that Rastall does not regard *non-past*, i.e. the so-called “present”, also as a tense. This is rather “zero” tense. It is possible that he means that anything that happens to the auxiliaries ultimately affects the meaning (qua time of action, etc.) of the entity which is directly determined by them, i.e. the main verb, but it is certainly misleading. It would make *tense* something **semantic**, rather than grammatical, which is perhaps more consistent with working with signs than with grammatical entities. In English, and also in German and Dutch grammar the so-called “finite verb form” (German: “finite Form”, “verbum finitum”, or “Personalform”; Dutch: “persoonsvorm”) is the form marked for person, number, **and tense**. This is usually one of the auxiliaries, if any, in the order of preference as stated.

There is one more thing that I should like to mention. This is not, strictly speaking, a criticism of Rastall, but of the philosopher (Popper) who has given Rastall those ideas. One should here not be too harsh on Rastall, because he is, at least if one looks at the different views on this matter listed in *The Oxford Companion to the Mind* (1987: pp. 490–491), R. L. Gregory (ed.)¹⁰, in good company. *Moreover*, his view is, one of the first things that come to an unbiased mind if one thinks about it. It is a standard common-sense view. As,

¹⁰ See also *ibid.* pp. 487–489 “Mind and Body”.

however, I have very strong feelings about this matter, I shall try to influence Rastall's views, and even try to change his mind. As I have argued before, I am of the opinion that Popper's views are based on a number of significant category mistakes. My own views should be clear by now. They come closest to what in the above publication is called "*at-tribute* or *dual attribute* theories of the mind-body relationship". This type of theories is one of the twenty or so types mentioned, and probably the only one that, apart from Ryle's, can be kept free of category mistakes. They can also be, like my own views, free from "materialism" in the coarse sense of the term, but rather "life" orientated. That is, such a theory can refer to natural attributes of animal bodies, the latter considered as *life* organisms.

Rastall says on page 257: "Such speculation (he refers to Carrol 1986, but this is here not important) fails to account for the change from non-material thought to physical speech activity, and *vice versa*, and fails to explain, in particular, how a non-material idea or thought can "cause" the physical activities of speech execution, or how physical activities in the brain can lead to a non-material world of thought. In fact, non-material entities, "thoughts" or "ideas" are treated as if they were purely material entities." I do not know if Carroll really meant to say that those thoughts are purely material entities. There is no evidence of it in the quotation. It is clear, however, that Rastall more or less accepts Popper and Eccles's "interactionist dualism". As most dualists, P & E seem to think, and often P says so, that monists are materialists. I am a monist on the basis of Ryle's argument that "dualism" in which body and mind are two entities (whether one believes that the mind is, or can become, independent of the body, or not) amounts to a category mistake. If a monist really calls himself, or rather if he really is, a materialist, P & E have perhaps a point. Even here one has, however, to be careful with a judgement, as "material" and especially "physical" can easily be a slip of the tongue, especially because there is such a thing as biochemistry, and this may play a role in biological processes. Even in the act of "thinking" it may occur. It has been said that, especially in some types of short memory, chemical processes, rather than a kind of electrical transmission takes place. Still in any mental processes it is always in the first place biological, i.e. a property of "life", which may, as I have said, involve certain chemical processes. The latter stands, however, in living animals or persons never on its own. As I have said, I am a monist, but my type of monism should be called "biological monism", or perhaps even better "biological unitarism", to avoid misunderstanding. There is basically nothing more mysterious in "being able to think" than there is in "being alive".

If one adheres to a form of "dualism" as the above, e.g. "interactionist dualism", one **has** almost to appoint a "god of the gaps", this time carrying the name "independent self-conscious mind". It is extraordinary that so many people seem to be reluctant to accept that it is evolution which could have led to the possibility of conscious thinking, and look for something that is much more implausible. That Man probably can think better than an ape should not be too difficult to understand, if one realizes the potentialities of him, or rather his species, to use "language". Which is not to say that language belongs to the mind. It rather belongs with all other forms of languages to World 3. Rather than picking one's mind, one's mind picks World 3, and then probably also "memory" becomes involved. Further we may consider that most apes are better thinkers than cats, or if one (arrogantly) objects to using the term thinking, apes are more intelligent. Could it not be that cats are qua intelligence closer to apes than they are to fishes or to slugs, which latter are perhaps

even worse thinkers? And perhaps cats and apes are qua intelligence, and also in other respects, nearer to humans than to slugs. Let us start our discussion then at the emergence of life. The emergence of life is perhaps the most unlikely event that one can imagine. It was, of course not an "event", but the process may have taken millions, or even a billion of years. What an event it was, when ultimately the first cell that divided appeared in an unfriendly world of volcanic gasses and hard crystalline stone formations. The appearance of life cells in such an environment is in many respects more unbelievable than the following "evolution", with after a very long time the emergence of dinosaurs and still later, independently of those dinosaurs, man. After life had occurred, almost by spontaneous generation, a happening in which time and chaos probably have been the most important actors, anything did become possible, and we should not need any "god of the gaps" anymore.

Most of the critical remarks in this review have been directed at Popper and Eccles, but this was necessary, because these authors play an important background role in some of Rastall's discussions, which does, however, not mean that Rastall always agreed with them. I too, have ever since I read Popper's (1959, 1965) *The Logic of Scientific Discovery* and his (1963, 1965) *Conjectures and Refutations* regarded myself as a Popperian. Writing this review, however, I have learned that Popper, whose accounts on "the three worlds" in his 1972, 1979, *Objective Knowledge – An Evolutionary Approach*, and his (1974, 1976) *Unended Quest – An Intellectual Autobiography* had still impressed me, got carried away with this at first sight splendid idea, when in his and Eccles's 1977, *The Self and Its Brain*, he committed, in complete agreement with Eccles, category mistake after category mistake.

The few criticisms I had in my pen for Paul Rastall himself are, however, nothing compared with the praise this work deserves. He has, if people only want to read it, and understand it, put functionalism, and hopefully the rest of sophisticated linguistics, on a new foundation. There is enough in the book that should be of interest also to non-functional linguists and indeed to philosophers of science. The work is seminal to the extreme. Especially the philosophical part, with its neuro-physiological connections, in which there is obviously still a lot of groping and even speculation, is daring, and invites debate, a strong debate which in linguistics has hardly taken place in any conspicuous form since the first half of the last century. There was, of course, transformationalism and other types of universalism, but those have only brought decline in scientifically based "descriptive linguistics".

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