Nature and Natural Kinds

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Abstract

The paper examines the character and historical source of the mystifications of the notions of Nature and Natural Kinds in the misguided attempt to turn Nature into a secular substitute for the role played by God in the previous theological framework of thought in order to turn it into a secular one in the period of the rise of science and scientific understanding. The role and function nature was given in this would-be replacement framework turned it into a quasi-deity governing the world from outside and generated the mechanical world-view in which humans were mere cogs.

Against this is set Aristotle's conception of Nature and the Natural as simply 'what happens by and large and for the most part'—a description and not an explanation.

> By their fruits ye shall know them. Do men gather figs of thistles or grapes of thorns? (Matthew 7. 16)

The notions both of nature and of natural kinds have in modern times been mystified and made impenetrable almost beyond recall. The phrase 'natural kinds' calls up a picture of a classification that stands independent of all human forms of life and practices, a classification that confronts humanity from outside and can only be accepted or ignored. Though there is a huge overlap there is hardly an identity among the systems of classification employed by the vastly different cultures around the world. They have different interests and different practices and therefore notice and give names to different sets of things in the world around them. To suggest that there is only one classification that can be called 'natural' is to suggest that all the others have got it wrong. And since those other classifications reflect differences in forms of life, projects and skills developed by those different cultures there is implicitly the further suggestion that those cultures themselves have somehow got it wrong and there is only one correct way of life from which they have deviated.

One can describe some kind systems as more 'valid' than others but that does not mean that the others are invalid, only that their role is less firmly based on the relevant practice or that the practice itself is more open to change or replacement. Of course the categories and classifications associated with the sciences are regarded as deeper and more valid in our science oriented culture—but that judgment

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may represent a general respect for the sciences rather than the role of those classifications in our practical life.

This suggestion that some classifications are 'natural' while others are not does not stand up to a minute's careful inspection. For example, we are told that the Inuit distinguish 27 kinds of snow—which is something well beyond me or the Amazonian Indians who have no place for those distinctions. Perhaps a snowboarder or professional skier might recognize some of them as relevant to their activities and would teach newcomers the ability to distinguish them. In fact, learning to make distinctions not made by the general public is a common feature of learning various professions.

The result of all this is that in a strict sense we have no strict meaning or use for the phrase 'natural kinds'. The trouble starts with the character and role that have been given to the concept of nature itself in the modern era, in making it a would-be secular substitute for God in a new framework of thought that aimed at being secular—though it imposed tasks on the concept of nature that gave it the character of a deity by offering it as something separate from the material world (therefore immaterial) yet able to move, shape and control the material things of that world as God had in the old framework. The new framework of thought constructed around this concept of nature was not a genuinely secular one but actually offered a new theology of nature.

Our task will be to bring the whole concept of nature down to earth and root it in human practices where it can be useful and illuminating instead of generating false and impossible problems by being set outside the material world where it could only be contemplated by humans and seen in the same way by all.

Yet it is obvious that the concepts of nature and natural kinds are useful and even important notions that need somehow to be rescued from that darkness into which they have been allowed to slip or even have been thrust. This sense is evidenced by the repeated attempts from Locke's time to our own to give some kind of account of both notions. Unfortunately, the accounts that have been given of them have generally only deepened the mystery.

For example, David Lewis has brought on the notion of 'intrinsic' to characterize the naturalness of natural kinds. They are supposed to be somehow 'intrinsically' natural. But this hardly helps. Quite the contrary. If we are told that a natural kind is one that is somehow 'intrinsic', we would have to ask 'Intrinsic to what?' The seemingly natural answer would be 'nature'. But that answer would only drive us deeper into the forest, because the notion of nature has itself

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been so mystified in modern times by being made into a secular substitute for God, and has been given so much ideological work to do that it is no longer able to give support and give clarity to any other notion. It rather needs all the help it can get to clear away the confusion and fog that has been thrown up around it by the quasi-theological role that has been thrust on the unfortunate notion in trying to make it into a secular stand-in for God.

But beyond this, making natural kinds somehow 'intrinsic' to nature itself leaves us with something that looks suspiciously like a doctrine of special creation with 'nature' simply written in for 'God'.

The two notions of nature and natural kinds have, in our time, become obscured and mystified in different ways and for different reasons, and if we are to be able to untie the knots and clear away the fog, we are going to have to go back to see how they were brought to their present state. To provide a contrast with the role and function that has been laid on those notions, roles they couldn't support, we are going to have to go back to look at the role and function of the concept of nature within the Aristotelian system. Its function there was something so different that it is not at all easy to understand from our modern perspective. The roles that we have tried to give those notions in the modern era keep getting in the way and preventing us from seeing the kind of work that Aristotle was giving them to do.

Still, if we are to get a better understanding of, and ability to assess, the philosophic tasks we have set ourselves in our times, it will be very helpful indeed to go back to look at that old functioning of those notions and the conception of the philosophic task in which it was embedded. If we are willing to put in the work and the care in looking at these two notions it may tell us much. This will help to give us a perspective on our own history that may enable us to transcend it and to find our way out of the various boxes that we have found ourselves in through making assumptions and taking on projects that now need to be re-examined.

Let's start with the notion of nature itself because it is that notion that was subjected to the most intense efforts at transformation to a new role and was the notion most mystified by the tasks it was given to perform in that period in which the modern era was being born out of the feudal. Most significantly, there was the determined, even heroic effort by Descartes in particular, to detach it from its Aristotelian sense and use, and to prepare it for a transcendental role as something standing over and above and outside of the world as guide and overseer, shaping and determining the behaviour of things in the world.

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We see this especially in that passage in *Meditations III* which always mystifies us, the passage in which he tells us that his life is divided into an infinity of independent segments and that he needs some external power to keep him in existence from moment to moment. The point of this mystifying and unconvincing passage is to attack and undermine the Aristotelian conception of nature as something internal to each thing that is the 'principle' of its behaviour and development as well as its identity. Descartes' aim was to displace this notion and to counterpose something that was external to each thing in the world, something that was responsible for the continuities and regularities that we find. This ultimately became a conception of Nature as something transcendental and external, a Nature with 'laws' that govern and determine the events of the world. Apart from the determinism with which this conception saddles its proponents, the notion is riddled with incoherences that become apparent as soon as one tries to take it out of its poetic and visionary wraps and treat it as a serious and literal description of anything.

Nothing could have been further from the Aristotelian sense and use of the term 'nature', as we will have to try to make out. One way to begin to get a sense of this utter opposition is to notice and keep in mind the fact that for Aristotle the fundamental contrast was between the natural and the violent as two opposing types of change or development. A change that would be described as 'violent' would have a source of change that lay outside the thing that changed, (a rock fell on the snail and smashed it) whereas a 'natural' change had no such external source. The snail grows 'naturally' and 'of itself', it does not smash 'of itself', that is, naturally. The latter, violent change has to have an external source, something that interrupts and 'violates' the normal course of the thing's development.

Aristotle sometimes puts this in a way that can mislead us seriously, coming as we do from a perspective so very different from his. That is, he describes a 'natural' change as having a 'source internal to the thing' and goes on to describe nature as 'an internal principle of movement or change'. In our time the word 'principle' (*arche* in the Greek) can easily mislead us. Just as the word 'cause' has a radically different sense for us from the sense it has for him because of the central importance we give to manipulation and control, so, in the same way and for the same reasons, the word 'principle' tends to have for us, as it did not for Aristotle, the sense of something separate that guides or motivates or brings about a certain behaviour.

Perhaps we should briefly note here a point that is of large importance, too large to take up properly just now, though it still needs to be

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kept in mind. It is a fundamental difference in aim between Aristotle's system of ideas, which was roughly to give order and consistency to our ways of talking, and the aim which has dominated what we call 'science' and scientific knowledge in the modern era, (the era of the scientific revolution) an aim of manipulation and control. This latter project sets us looking for things that are separate from that which we wish to bring about or control. We look for something separate that may be in our power to bring about and which will in its turn bring about the desired result. And it is this that has given us our modern sense of 'cause' in which the 'cause' must be something separate from the 'effect'. Nothing else would suit the modern project.

Aristotle's project is not that of manipulation and control but rather that of forging a perspicuous and consistent vocabulary that will make the things we say clearer to us so that we may avoid confusion and nonsense. The result of this is that his notion of cause bears no relation to the modern. People are sometimes misled by a term of his that is usually translated as the 'efficient cause' (out of his list of 'four causes': efficient, final, formal and material) and come to the idea that it (alone of the four) corresponds to the modern conception of cause. It does not, but that is not easy for us to see from our modern perspective.

Aristotle's project involves him in drawing out what is internal to our ways of speaking and our ways of identifying those things about which we speak. And this is no less true about his notion of 'efficient' or 'moving' cause. It is part of our way of identifying certain things that we call them 'artifacts', and this involves our identifying them as the creations of an agent capable of purposive and directed action. It is important to notice that there is forged here what can be called a 'dialectical' link between what are called the 'efficient' and the 'final' cause. The 'efficient' and the 'final' cause are two sides of the same transaction and are indissolubly linked. The Aristotelian 'efficient' cause is not a blind force of nature. It is the initiaing action of an agent. And the initiating action of an agent is distinguished from a random tic or involuntary movement by its being directed to an end or its having a point. So one could say that there could be no efficient cause without a final. And that is what is meant by describing the two notions as 'dialectically linked'. The 'material' and the 'formal' causes are another such dialectically linked pair.

And the 'accidental' is not comprehended in the sense of 'efficient cause'. The accidental, in the Aristotelian system, is what has no cause, no explanation and no understanding. The accidental is what

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gets no explanation because it is neither natural, that is: what can be expected or counted on; nor is it artificial, that is: the result of deliberate contrivance. This usage of his has caused much difficulty in our time because of the radical difference in the notion of cause with which we work and because of the dominance of what has been called 'the mechanical world-view' that pictures the natural world as a vast mechanism in which every movement or change will have its explanation in terms of what people are pleased to call 'the laws of nature'. It is sometimes thought that in this picture there is no room for the accidental and the unexplained. No matter that this picture represents an ideal vision that can be shown to be impossible of achievement, the important thing here is that the events and occurrences that are supposed to be swept up in that picture are not the ones that Aristotle is talking about under the heading 'accidents'. These events are invisible to the 'mechanical world-view'.

Aristotelian 'accidents' are things that simply happen together without there being any formal or intentional link that brings them together. My meeting someone who owes me money when I have gone to the market on some other errand, is his example. There will no doubt be as good an explanation of his being there as there is of mine. It might even be the same explanation: we both came to buy tomatoes. But neither of those explanations covers the meeting. They don't combine to form a single explanation of that single event. They remain two separate explanations that each explain only the separate parts, not their combining. I might even have gone to the market in the hope of meeting him and collecting my money. But my hope does not explain its fulfillment. That remains a piece of luck. Bad luck if he wasn't there. Worse luck if I met someone to whom I owed money.

The notion of luck (good and bad) operates in the sphere of the accidental, namely, that which cannot be contrived nor is to be expected. If I knew that he invariably came to the market at five o'clock when the fishermen were selling off their day's catch, then the meeting would be a matter of contrivance not accident, and no longer a piece of good luck. It relied on his habit (what the scholastics called second nature).

Slightly more difficult to fit into the Aristotelian schema would be my meeting him as the result of knowledge that he planned to be there today at three. It would be contrivance to be sure and not accident, but a problem is thrown up by the fact that it is his specific plan and not a general pattern of his behaviour that I am relying on. The notion of artifice is tied to the recognition of and use of regularities in the contriving of things. An artisan is precisely one who has a

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knowledge and appreciation of the properties of materials and can as a result work with them.

We could get out of this difficulty, although slightly artificially, by saying that I am relying on a general fact about my debtor, namely, that he sticks to plans that he has made. However that may be, the problem is not one that calls into question the general usefulness of the scheme of notions in describing and analyzing the ordinary events of our lives. We can see the usefulness of the natural/violent distinction and the classification of origins into natural, artificial and accidental.

None of this vocabulary and analysis even intersects with the mechanical world-view, much less contradicts or is contradicted by it. We have two different vocabularies here, forged for different purposes and operating in different spheres. They have only an unfortunate and deceptive appearance of trying to cover the same ground and to refer to the same things. That deceptive appearance comes from the fact that it was the Aristotelian vocabulary that was seized on and given entirely new work to do in a radically different project from Aristotle's own. We are trying to understand the new project better by recapturing the old. What is most important to see is that the two projects and their associated usages are perfectly compatible. There is no contradiction and no argument lying between them, and in particular there is no real sense of 'cause' that we may discover and defend, showing that one or the other is false or defective.

What we have here is pretty well exactly what Wittgenstein had in mind in talking about 'different games'. It is rather as though I were to make up an entirely different game involving chess pieces and a chess board, assigning different moves and different values to the pieces. (Perhaps the game would end when all the pawns on one side were captured.) Chess enthusiasts who did not know of my new game would be baffled and maybe outraged by the play they witnessed. They might think that they were dealing with a couple of ignoramuses. Still, my game would be as legitimate as theirs. If it were to be criticized, it would have to be on other grounds: that it was crude or boring or inconclusive, lacking strategy and drama. It would, however, be just as much a game as chess and neither right or wrong.

Saying all this may give a false impression of tolerance and that I take the 'mechanical world-view' and its associated vocabulary as without fault and just as good as the Aristotelian. That is very far from the case. On the contrary, I take that vocabulary and picture as embodying and generating many confusions and incoherences.

Particularly severe are the incoherences that are generated by the attempted transformation of the Aristotelian notion of nature as

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something internal to the thing. The transformation required by this new picture tears nature loose from its moorings in the individual thing and makes it into something that not only lies outside of individual things but is external to the world itself, something that one would have to call 'transcendent'. (It is here that the analogies to the idea of God begin to show themselves.) This picture of nature as something 'over and above' the world is, I want to make out and emphasize, a poetic and not a scientific picture. It expresses an attitude and a way of looking rather than some ascertainable fact that a scientist might investigate. It has no actual function or place within the sciences themselves and any attempt to give it one would be laughed to scorn.

Imagine if I were to try to take this picture of nature and its 'laws' seriously and literally rather than as a poetical description that expressed an attitude, say of awe. Say I took it as a genuine explanation of the regularities that we find and with which we work. As something that is pictured as outside and external to the world, my first question would have to be: 'How does it come to effect things within the world?' If this externalized nature and its 'laws' are supposed to be something actual that serve to explain the regularities and are not just a poetical and metaphorical way of looking and of organizing what we see, this question would be a legitimate and a necessary question and field for research. The fact that no one would for a minute entertain such a project and set about looking for the forces by which the 'laws' were enforced shows us that we are dealing with a metaphor and a picture only.

But now let's criticize it as a picture. Even as a picture, we have to say that it is not a helpful one. It generates problems that at some level, everyone recognizes are pseudo-problems. These are the would-be problems of determinism and its counter-problem, the problem of the uniformity of nature. These are only problems for philosophers, problems generated by the picture and by its bewitchment. Philosophers have taken the picture seriously enough to generate problems out of it, but not seriously enough to see that it is only a picture and not a reality with which they are wrestling. One is reminded of Lichtenberg's remark: 'His theories are only good for arguing about.'

These are harsh words. Let us see if they are justified, starting with my remark that at some level everyone knows that the spectre of determinism and the problem of 'the uniformity of nature' are only pseudo-problems that they only represent kinks in our thought and not real worries. To see the justice of that, ask what it would be for someone to take the problem of the uniformity of nature as a

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genuine one? Like the sceptic, who is called up to put the philosophic frighteners on students and other impressionable people, that person would be an unrealizable figment of the philosophic imagination. Or rather, anyone who genuinely felt that they had to check each day to see if the sun had risen or that sugar was still sweet or otherwise showed a real worry that the 'course of nature' might be interrupted or might run in some new direction, such a person would not be long in finding themselves in the company of the 'white coats'.

In any case, the phrase 'a change in the course of nature' which is used to characterize the problem and call up the supposed worry, is a phrase only, a phrase to which no concrete sense can be given. To see this we need to do what Descartes enjoins us to do in that famously mystifying passage in which he tries to persuade us that each of us, and everything else in the world needs some outside power to keep us in being from instant to instant. He tells us there that the force of his argument will be plain to anyone who 'considers carefully the nature of time'. I think in fact that a serious and careful consideration of the nature and role of time will lead us in the opposite direction, to a conclusion that the conception of nature as such an external force required to keep the world running smoothly is an empty one.

If the smooth running of the world and the continued existence of things from instant to instant really required such an external force then it would be merely providential that it operated and continued to operate. It is the externality of this posited power that raises both the problem of uniformity and of determinism. This picture of an external power that keeps everything in being and keeps things running smoothly lands us with an unattractive choice: either everything can be counted on and happens necessarily (determinism), or nothing can be counted on, because 'the course of nature' may be interrupted at any moment.

However, neither of these spectres can be fleshed out, and the phrases purporting to describe them remain as phrases only, phrases made by sticking words together somehow.

Let's try to take seriously and give concrete sense to the idea of 'the course of nature changing' or 'being interrupted' or anything of that sort. The first thing to notice is that this 'alteration' would have to take place at some particular time or over some period during which there was a gradual alteration in, for example, some 'constant of nature', say the gravitational constant, or Young's modulus, or Avogadro's constant. The first reaction of the scientists would be to doubt whatever was being offered as evidence for such a change. (I think that it best to avoid the outlandish examples that can draw us into a never-never land in which stones speak and and frogs turn

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into princes and our grip on reality is loosened. We are, after all, trying to see what reality there may be in these phrases.)

We should perhaps follow Descartes' advice and ask some serious questions about time and its measurement in these supposed 'alterations' and to look at the reaction of the scientific community to whatever measurements and occurrences there may have been that seemed to be evidence of a change in one or other of the 'constants'. There would, of course, be very serious and determined resistance to the conclusion that some 'constant' had changed and any purported evidence for a change would automatically be suspect and get rejected. The supposition we are trying to make sense of has posed the question from a standpoint of omniscience rather than from the concrete situation of practicing scientists. That standpoint simply posits, without fear of contradiction, that an alteration has occurred. But no one working in the sciences is in such a position, nor is any human being struggling to make sense of the world, in that position. (And there is also a question whether there is any such position of omniscience for anyone to be in.)

In trying to make sense of some unexpected results, (which is all they would have) the scientific community might finally, in desperation almost, move to the view that some constant has changed. But in fact and in practice, that move would only occur in the scientific community when there was some hope and some promise of an understanding of that change. That is, there would be some hope among them of finding something else with which the 'constant' was varying. They would, in fact work hard at putting other interpretations on their 'difficult' results and observations until they saw some possibility of folding the 'alteration' that we, God-like, have thrust upon them, into some new uniformity.

These are the concrete realities. But to satisfy Descartes and others operating in an abstract realm, who may be looking for some sort of transcendental or metaphysical argument that soars above the practical working life of the scientists and other ordinary humans, we need perhaps to return to that 'careful consideration of the nature of time.'

Change requires time, and time requires change. That is, change requires a 'before' and 'after', and those in turn need some change to register them and measure them by. And that change that we use to measure time will itself involve some physical process. Different physical processes may be favored at different times as our theories show up the defects of one and the advantages of another. Nevertheless, there is always some physical process or other which is the basis of our measurement of time. Time measurement and dating is the measurement of one change or physical process by

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some other that has been designated at that period as canonical and the measure. If all else fails, those who are faced with finding some other thing whose variation can be correlated with the variation in the 'course of nature' or some part of it can appeal to the physical process that is being used in the measurement of time. This might result in a crude and inelegant correlation, but something could still be done.

Let's continue hounding this problem of uniformity for a moment because the emptiness of it as a problem can help us to see the emptiness of the notion of nature as a separate entity that we have been saddled with in modern times. That notion of nature as something separate from and outside of the world is implicated in this would-be problem and is the source of a majority of the insoluble problems that have been generated by the framework of thought founded on that conception.

After all, the world and the things in it change and are constantly changing. Species change and develop and evolve. Animals emerge from the sea to breathe air. And some mammals leave the land to adopt an aquatic life, changing their limbs by degrees into flukes or flippers. Species increase in size or diminish in size, grow feathers and wings and take to the air. Or they may give up flying and take to the water, developing their wings to new functions accordingly. Plants have developed flowers and sexual reproduction and animals have developed bones and backbones, and complex digestive, reproductive and neurological systems. Even the elements we have now were not simply given from the beginning, but have developed and continue to develop in the interior of stars by processes of fusion or fission.

None of these colossal and momentous changes are taken to be 'changes in the course of nature' within the supposed meaning of that phrase. The splendidly abstract and detached 'nature' that is conjured up by this picture is one that is supposed to be able to encompass all these transformations (or, if we turn the picture the other way up—to dictate these huge transformations) and to sail on serenely.

Can we then imagine, and describe concretely in human terms what catastrophic changes would amount to such an 'interruption of the course of Nature'? (We have to put in that requirement of concrete description in human terms because otherwise someone would try to get away with saying simply that 'the course of nature was interrupted yesterday between four and six', or something equally empty.) Our problem is precisely whether any sense can be given to that phrase.

I am trying to make out that we cannot and that no sense can be given to the phrase, and, in addition to make out that this tells something about the concept of nature as something abstract and separated

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that is used to pose that problem, as well as the would-be problem of determinism.

Perhaps we can get some help from the nineteenth century formulations of the 'problem of uniformity'. Mill and others tried to formulate a 'principle of uniformity' that was supposed to underlie, and be a universal first premise of, all our projections from the past to the future and of all our inductive reasonings. Of course that 'principle' or premise is as impossible to formulate concretely as it is impossible to describe concretely that which it was meant to be excluding. Still it can give us some help here because of the suggestion that without such a premise, our inductions and our projections would be uncertain and even valueless. The suggestion is that it is providential, or if you like, a matter of the goodness of God, that the world is such that we can count on the continuities on which our life is based.

It is tempting to ask: "Could it be otherwise?' And in a sense that is our question. But we have to be careful here because the continuities on which human life is based are not available everywhere. Some of the things we count on are not to be found on Venus or Saturn, and human life is not possible there. We have to reformulate the question and ask whether there could be a world or conditions such that no regularities could be found no matter what forms of analysis were used, even where such sophisticated techniques such as stochastics or catastrophe theory could be put to work? The answer is that no universe can be conceived in which it would not be possible to find regularities. We do not have to explain the fact that we can find regularities—it could not be otherwise. All the effort put into trying to find or construct an explanation for the existence of those regularities has been a waste of time.

But now we have been driven to outrageous levels of abstraction and have nearly lost any touch with reality. And this reflects the abstraction and unreality of the notions which we are trying to undermine. It would of course be better to abandon the style of philosophizing that gave them birth and the philosophic projects in which they are embedded. But trying to dispel the attractiveness of that style and those projects would involve an investigation of quite a different sort because the reasons why the projects were undertaken that have generated these pictures were historical rather than philosophic.

I have tried to tell something of that story elsewhere and have hinted at it above in saying that in the great age of secularization that, among other things, aimed at undermining the secular power of the Church in Europe, a secular equivalent of God was required, and Nature was seized on to do the job. And, of course it had to be

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transformed from the Aristotelian sense in which nature is something embedded in things and part of their identification and made into a transcendent entity in order to fill that function in presenting the new scientific forms of understanding as a substitute for the theological and as the basis of a whole new world-view. The net effect of this effort was a theologized conception of nature rather than a secularized substitute for God, and I hope I have brought out something of the intractability of the problems and the unreality of the conceptions that have been generated by that half-imagined, and no more than metaphorical picture of nature as something transcendent and standing outside the world. The problems generated by that picture are precisely those generated by Plato's transcendental 'forms', namely, that of describing the relations between the trancendentalized 'nature' and the daily world that it is meant to describe or control.

Now I think it is time to return to the Aristotelian notion of nature, which is the polar opposite of this externalized notion and is located not only within the world but in the individual things of it—though only in so far as those individual things are members of some class, species or sort. Perhaps we should turn this around and say that those individual things are only members of the same class through their exhibiting the same behaviour or form and therefore describable as having the same nature. It is a polar opposite in another way too, and in a way that we are going to have to keep a firm grip on if we are to get any understanding of it and of its role. What we have to see and to keep aware of is that his notion of nature is not intended to give us either an explanation of or a cause of anything in the modern sense of those words. The Aristotelian *physis* is not something that is even distinguishable from the thing of which it is the nature, and much less something that is separable that might stand in a causal relation to the thing, its character and its behaviour.

That is how Popper misrepresented Aristotle badly in describing the Aristotelian notion of essence as 'something inside the thing that causes it to be what it is.' It would be one thing for Aristotle to say that the essence causes the thing to be what it is and the nature causes it to behave and develop as it does. But it is quite another matter for Popper to say it because Popper is no doubt using the word 'cause' in his own way and not in Aristotle's. For Aristotle, the 'causes' of a thing are part of its identification and description and not something separate or separable. But Popper is almost certainly using the word 'cause' in the modern sense in which the cause of a thing is something that brings it about, something separate and separately identifiable.

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To conceive of either essence or nature in this way within the Aristotelian system would be to invite a ridiculous regress. If either were taken to be a separately identifiable thing, whether inside or outside that of which they were taken to be the essence or the nature (a kind of internal governor or master of ceremonies that brought it about that the thing was of this kind or behaved in this way) we would certainly be justified in asking a second question about the nature or essence of this 'essence' or 'nature' conceived as a separate thing. How does the essence or the nature contained in the thing bring it about that the thing is a such-and-such and behaves in this way rather than some other? What is the nature of this nature, and the essence of this essence? And how do they work on the thing to cause it to be what it is or do what it does? We would, in fact, be falling into the same incoherences that I have been trying to bring out of the conception of nature as something separate from the world.

We would also be falling back into the confusions of the alchemists who thought of the 'essence' of something as some material stuff that could be extracted and refined or synthesized so that it could 'cause' some other sort of material or thing to be or turn into gold or some other such favored substance. That was the idea of the 'quintessence' which they sought. That 'quintessence' would be able to turn five times its own bulk of some other stuff (gross matter) into some more desirable material (best of all, gold).

Though they borrowed the words, the alchemists had lost any understanding of the notions that had originally given life to them. They were perhaps the first to frog-march that old vocabulary into the new project of manipulation and control, a project for which it was neither designed nor fitted.

For Aristotle all three notions, form, essence and nature have a totally different function. They are part of an analysis of our ways of identifying things as things of this or that kind and of our ways of telling when something has ceased to be the sort of thing it was and has become something different. When the snail grows, it changes form to some extent, and size certainly, but these changes do not break the bounds of its essential nature. And to say that is to say no more than that it is still a snail and those normal changes to do with growth and behaviour. What it feeds on, how it moves, how it forms its shell, what it avoids, all are comprised under the heading *physis* or nature. The notion of form comprises not only its three dimensional articulation, but, so to speak, its four dimensional articulation as well. Those behaviours and normal and expected changes which are part of our way of identifying the snail, or anything

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else, are also part of the form and of the essence of the thing which allow us to identify it despite the changes it has undergone. It is even because of the normality of these changes and the behaviours that we have associated with snails that we have folded them into our ways of identifying snails.

There are two things to notice here. One is the dynamic and diachronic aspect of that element of form that Aristotle calls 'nature'. The other is the continual intrusion of the phrase 'our ways of identifying' into my explication of the notions both of essence and that of nature. If we abandon all pretensions to divinity and stop trying to step out of our human skins to view the world from some divine perspective, we can make perfect sense of the notion of natural kinds by relating it to human projects and human forms of life.

Our main work has been that of clearing away barriers to understanding the Aristotelian notions and the notion of natural kinds in particular. But there still remain others to face, barriers that are part of an interwoven web of concepts, projects and styles of philosophizing. The only way that I have been able to see of trying to break through that web has been to identify some of the problems that at a certain historical period seemed critical and needing solutions from the philosophers. There is a particular barrier that arises here where I am trying to emphasize the human participation in the sorting of things into species and kinds. That barrier has its origins in the philosophers' reaction to and theorizing of the new individual freedoms that were arising with the breakup of the feudal constraints on occupation and movement (of the lower classes, anyhow). The break-up of those social forms and constraints took on the aspect of a potentially complete break-up of social organization itself, and the fragmentation of Christendom by the Reformation looked to some as the fragmentation of civil society itself. The political philosophers theorized this by imagining and positing an original social chaos so that they could see how social organization could arise out of the chaos toward which things seemed to be headed. At the same time they were assisting at the birth of a new set of social forms and helping those forces that were destroying the feudal forms. I have tried to tell this story elsewhere.

It is, of course, not immediately obvious how all this bears on our problem of giving a role in determining classes and species and types of things to human beings, grouped into tribes, nations and societies sharing a common form of life. The trouble comes because the philosophers were seeking answers to the non-existent problem of founding societies out of that imagined primal chaos of humanity. The problem is a non-existent one because there could be no such

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primal asocial chaos, and no way out of it if, *per impossible*, it were to exist. The imaginary 'Social Contract' provides no way out. On the contrary, it assumes a prior social organization in which contracts are made and kept. A rather sophisticated social organization at that.

But unreal problems generate unreal solutions. In this case the unreal problem was that of finding some source and basis for human communication and language that would be prior to social organization and would therefore be available for all that contracting and agreeing to found a social system. (By now the problem has left reality well behind and taken its stand in a never-never land where we hardly know the rules.) Hobbes dodges the problem by appealing to the Bible and having God teach language to Adam, who then presumably passed it down to the rest of us. But then we have to attribute the diversity of languages to God also and take on board the Tower of Babel story as our explanation of that diversity.

Those who actually tried to solve this problem of finding a pre-social origin of language, if they were not going to call on God to solve their problem for them, were left with locating the source within the individuals that make up humanity, each, severally and individually. But then they were in a bind, because the community of capacities among individuals that would explain the ability of any of them to find common words and expressions, to communicate and to share a common language, that community of capacities would not at the same time be able to explain the diversity of languages. That diversity is not a matter just of giving different names to the same things (the sort of thing we might expect after the Tower of Babel incident) but is a matter also of the different languages distinguishing different things to give names to and classifying things in very different ways.

If we leave off chasing these unreal problems and come back to ordinary reality where we know perfectly well that language is social in origin as well as in transmission, we can find a perfectly natural home for, and explanation of the notion of natural kinds. It was only mystified because of the perception that an adequate explanation of it had to be trans-social or asocial.

The natural is for Aristotle 'what happens by and large and for the most part'. Those regularities of growth and behaviour, change and development that are noted in a particular culture become the basis of its classifications in a much more fundamental way than the regularities of appearance and constitution. We have to rely on the momentary appearance and constitution very much in making our identifications, but it is behaviour and capacities that

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we are really interested in because of their bearing on our projects and expectations. And it is those behaviours that may upset our identifications that have been made initially on appearance and constitution. If what we took to be a pear tree puts out apples, we think again. And thus nature as that regularity of development, change and capacity enters deeply into our identifications and the kinds we pick out are for the most part those which show that constancy of behaviour which we can count on and work with.

And it is for that reason they can be called 'natural' kinds. They are kinds that we have isolated because of their regularities of behaviour and development. There need be no more mystery to it than that. The mystery was only generated by the transformation of the notion of nature, its extraction from the individual things and being set above all and everything and by seeing natural kinds as being part of some universal 'kind system' that stood, similarly, over and above and outside of all the various and diverse forms of human life and human language, a 'kind system' toward which all individual languages must converge. That convergence would presumably drag with it into uniformity the diverse forms of life that have hitherto supported the great diversity of 'kind systems' that are embedded in the languages of the world.

This picture, like many we have been dealing with, inverts reality. If there is to be any convergence of languages and kind systems, it will be driven by a convergence of forms of life, most likely through the globalization of the capitalist system, which has already shown itself very efficient in the destruction of many tribal and agrarian ways of life, recruiting their members to be producers for its markets. There is a clear and obvious effect of this on the languages of those peoples too.

Those many diverse languages and their systems of kinds will probably never coincide entirely, but as the forms of life of the peoples of the world converge under the pressure of the dominant form of life of the developed West and are penetrated by its social forms generated by the market rationality and market relations, the languages of those peoples will inevitably converge and their diversity diminish.

That convergence will, however, not be evidence of some higher truth lying beyond the human world and exercising a mysterious influence on human consciousness. That convergence will be the result of a very concrete and everywhere visible dominance of one form of life that has shown an ability to penetrate everywhere and to turn everything to its own account through its very concrete economic and military power.

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As I have said, the main part of our work has been that of clearing away barriers to understanding the essentially simple Aristotelian notions. Those barriers have consisted in misleading pictures and false projects. These made it look as though the notion of natural kinds either was or ought to be connected with a kind system that stood outside of and in no way reflected human interests, projects and ways of life. I have tried to bring out both the quasi-thological impulse behind that conception and its part in a historical project of providing a secular rival to the world-view of Christianity. The legacy of that project has been incoherence and mystification.

In the case of this offspring of that project, the idea of a kind system that is unrelated to and independent of human interests or projects there is a question of what evidence we are supposed to have for the existence of such a kind system, and we have good reason to suppose that there could be no such for the reason that the notion is itself incoherent and in that way incapable of realization. It is not possible to make a separation between a classification or kind system and the notion of purpose. A classification without purpose or function, a kind system of the sort we are being asked to contemplate, would necessarily be a mere random or arbitrary assemblage, not a system nor a kind system.

We have been battling against that most difficult type of opponent, ghosts. One of the ghosts has been a projected image of an actual historical convergence of languages and kind systems that is in fact the result of very concrete and powerful historical forces that have, ranged on their side, science, technology, developed and efficient productive systems as well as military and economic power to enforce a particular order on the world. It is the resulting changes in the way of life, goals, projects, needs, skills and occupation that bring with them changes and convergences of perception and vocabulary. A ghostly image has been constructed and given the role of explaining that convergence, turning our eyes away from those earthly forces.

Another of the ghosts has been that transcendentalized 'Nature' that has been given the job of explaining earthly regularities and uniformities. We have seen that it cannot do that and that wheeling it on gratuitously creates the pseudo-problems of determinism and of the 'uniformity of nature'. The uniformity that it is supposed to explain is rather the product of the ways of working of the scientists and ordinary humans in trying to understand the world and work in it. We sift uniformities out of the chaos through our activity of classifying and the practices of theorizing. In doing this we make use of and

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at the same time criticize and develop the accumulated past results and distinctions embodied in the language, skills and practices that have been passed on to us in our culture and our particular occupation or skill group, whether as scientist, fisherman or bond trader. The uniformities we come up with are shaped by the evolving standards and tests of adequacy that we apply. Those uniformities are a product, not a ghostly premiss or pre-condition of scientific activity or any of the other practices.

Natural kinds are no more than those kinds that are recognized in a language and culture because of regularities of behaviour, growth and development, what Aristotle called 'nature'. Something that I would want to go on to emphasize, something which is not in Aristotle, though I see nothing there to forbid it, is that there will be differences in the natural kinds recognized in different cultures and even among different skill and occupational groups within a single culture. Skiiers will have their own classification of snow which reflect different concerns about its behavior and their typology will differ from the classifications made by those whose business it is to predict avalanches or those who are faced with clearing it off highways and city streets. Though there will be worlds of difference between the kinds recognized by the few remaining neolithic peoples of the Amazon or Papua New Guinea and those recognized by the pastoral peoples of central Asia or Africa and those that guide the lives of urbanized members of the developed countries, they all of them can claim status as 'natural' kinds. All that is required is that the central concern of the classifications is the 'principle of change and development' of the things of that type and those principles and developments have a useful role to play in the culture making those classifications.

Perhaps we need to emphasize yet again that the search for explanations for the regularities we find and our ability to find them not only leads us into a wilderness of mystification but it is a completely unnecessary undertaking because of the fundamental fact we need to start from and return to, the fact that no universe is conceivable in which it would not be possible to find regularities.

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