

"L'autonomie de l'homme" est une expression ambiguë tout comme celle de "l'amour de soi-même". Il y a, en effet, un amour de soi-même — celui dont parle Aristote *Ethiq. IX*, c. 8, et St. Thomas, *II II*, q. 25 — qui est aussi nécessaire que louable, et qui le fondement de l'amitié la plus noble; de cette manière l'homme de bien a un amour de soi-même beaucoup plus grand que celui de l'égoïste. "Ne se connaissant pas ~~réellement~~ exactement eux-mêmes, les méchants ne s'aiment pas vraiment, mais seulement ce qu'ils prennent pour eux-mêmes. Au contraire, les vertueux, se connaissant vraiment, s'aiment vraiment eux-mêmes." a. 7, c.

Quant à l'autonomie — de *αυτονομία* —, qui se fait sa règle à soi-même —, on la dit d'un peuple qui détient le droit de se gouverner par ses propres lois; mais l'homme de bien aussi est autonome, puisque sa vertu est la mesure de sa conduite, tandis que le méchant est esclave de l'homme extérieur. — Le mot de "liberté" est d'une semblable ambiguïté. ~~Il est facile à exploiter~~

Le fait qu'un même mot ^{puisse} servir à signifier les choses les plus contraires, fait la porte d'entrée au paradis de la sophistique. "La raison d'entrée au paradis de la sophistique. "La raison la plus naturelle, dit Aristote, et la plus véritable, pour laquelle les sophistes ne font ni des raisonnements ni des élucubrations, est celle qui tient aux noms donnés aux choses.

Quelle est au juste cette différence entre l'être raisonnable et la créature irraisonnable. Cette dernière, disons-nous, est déterminée ad unum. Qu'est-ce ? Dans la nature, les contraires Mais dans la raison la raison domine les opposés. Ici le 'possible' qui se ~~rapporte~~ rapporte à une puissance active ; ~~une potencia~~ et qui s'appelle, lui-même, une potencia simul contradictionis. C'est le possible essentiel à la liberté. Sans cette faculté qui domine les opposés, il ne pourrait y avoir, dans la créature, la participation à la loi éternelle, qui s'appelle loi naturelle. Celle-ci est "une proposition universelle", une norme générale de conduite, dans l'intelligence pratique : faire le bien, éviter le mal.

La loi naturelle est une participation ~~de la loi~~ de la ratio gubernantis de Dieu, en vertu de laquelle ~~la créature raisonnable se gouverne elle-même~~ ~~participe~~ la créature raisonnable ~~se gouverne elle-même~~ participe ~~à~~ à la divine Providence (p. 8), en pourvoyant à son propre bien au même temps qu'à celui des autres. ~~Cette participation à la loi naturelle~~ ^{participation à la loi} ~~se réalise~~ ^{se réalise} par la vertu de prudence. L'homme ne peut agir d'une manière autonome que dans la mesure où il régle sa conduite sur la loi naturelle, ~~et sur les lois particulières qui en découlent~~ ^{et sur les lois particulières qui en découlent} et sur celles que nous devons instituer afin de mieux observer la loi naturelle.

qui exprime la limitation naturelle de notre autonomie.

Providentiae nostrae incertae sunt.

1. une autre genre de possible, Ex. de Pocr. qui s'assoit, et tombe.
2. d'incertitude de nos projets.
Qui épouse une femme qui par la suite ne lui va pas.
La mauvaise fortune.

La "liberté chérie" ~~est~~ réclame le droit de
~~de vivre~~ vivre sans scrupule selon la
constante de la concupiscence déréglée. Constante économique.

Et ceux qui abusent du
droit de propriété - les
peccateurs in laque; et ceux
qui veulent l'abolir.

C'est Eve qui a posé d'abord le probl. de l'
autonomie sous sa forme moderne. Quest. de soumission à Dieu. L'Écrit. nous
apprend à loi fournir.

Conn. du bien et du mal.

Tentatives de contourner la loi naturelle.

Justice originelle, quid. 2^e Cor. Paul II 7/2
Pourquoi de venir chair Ibid. 7/2a.

Soumission de l'homme à Dieu
de la chair à l'esprit

La dépendance du prochain.

"L'autonomie sous la 'lex fornicis'" ...

Nos premiers parents avaient perdu leur autonomie par leur
insoumission à Dieu, et se sont assujettis à la
loi de la concupiscence. - Nous cherchons l'autonomie
sous cette loi. Nous la proclamons activement en loi
de liberté, mais, en réalité, d'esclavage. Nous réclamons
le droit d'être esclaves de la concupiscence, jusqu'à
la haine de notre chair. Ephes. 1. 2, p. 72a.

La concupisc. déréglée n'est alors considérée comme une cause
par se de progrès moral. Or, en réalité, Dieu peut
ordonner Mais ce n'est alors pas parce qu'il rend
bien le mal. (Compar. avec le sage gouver. qui, ~~parfois~~ à l'occasion
~~parfois~~ de certains abus, fait accepter une loi à l'avantage...)

Toutes sortes de limites - mais toutes peuvent être surmontées.

Le ~~principe~~^{don} de justice originelle consistait dans

- la soumission de l'homme à Dieu;
- " " de la chair à l'esprit.

L'insoumission à Dieu eut pour conséquence l'insoumission de la chair à l'esprit - donnant ainsi lieu à une loi nouvelle : la lex fornicis, loi de la concupiscence déréglée. C'est par là que le péché originel atteint l'homme dans ce qu'il y a en lui de plus naturel : dans ce qu'il a en commun avec les autres animaux : la nutrition et la génération ; la tempérance a pour objet la modération des plaisirs du toucher, qui se rattache à ces deux fonctions.

Notons deux : le droit naturel le plus fondamental :

- la conservation de l'individu ;
- la propagation de l'espèce.

Car c'est l'appétit ^{sensitif} qui a été affecté par le péché originel. La loi de la concupiscence déréglée porte sur les mêmes choses : l'excès des plaisirs du toucher. Et une constante de la conduite du grand nombre, de "malum ut in pluribus", elle permet de prédire le ^{comportement} ~~comportement~~ de la multitude. Mais, l'individu peut résister.

C'est cette constante qui fera la base de l'économie ; et c'est elle dont se serviront les nouvelles phil. sociales, pour atteindre à un idéal d'autonomie strictement et purement humaine.

Le "malum ut in pluribus..." est la raison de la sujétion de l'homme à l'homme, sujétion qui limite singulièrement notre autonomie. Non pas l'autorité, la soumission à un chef humain comme le père, ou le prince ; mais, plus généralement le prochain. Voici comment.

SPaul I 99 : infirm. ad ques. bona, unde.
bono animalis, puto 241

lex mundi 96

bona 97

nova 105

forniti 103

de Ver. 9. 10, a. 11
ad 3

Ecce filius.
Jesu declaration
de matrem
spirituelle.

Science and Conduct

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"The Scribes and the Pharisees have sat on the chair of Moses. All things, therefore, that they command you, observe and do. But do not act according to their works; for they

talk and do nothing. And they bind together heavy and oppressive burdens, and lay them on men's shoulders; but not with one finger of their own do they choose to move them.

Matth. 23. 2-5.

"... nonne eamus em, cur homo episcopus vite actus boni fiant." Pius XII.

"[Etenim eorum] qui non operantur opera virtutis, sed conspuendo ad rationandum de virtutibus aestimant se fieri bonos philosophando." Eth. II, l. 4, 228.

Good phil., good moralist, good man.
Good scientist & good man.

Specul. & practical Truth. - Incommunicability of practical Truth.
appetite

Difficulty of right action in the singular.

Diffic. of knowledge relative as to perfection.

Impossib. of complete knowledge
Infinity of circumst.

Diffic. of efficaciously willing good the difficulty.

(a) Example of erroneous conscience.

(b) " " intemperat & incontinent.

Temptation of knowledge of good and evil:

To be able to decide from knowledge alone
what is good and what is evil for one to do
here and now and to do it in virtue of
that knowledge alone.

To foreknow what good and what evil will befall us.

2x rationality: $\begin{cases} \text{in se} \\ \text{in p.o.} \end{cases}$

Wis. alone embraces conting. circumst.
Causa per se vs. per accid.

Knowledge alone not solution. Example - Fall of Angels.

Truth that is to liberate man here, not spec. alone, but
practical as well. So the good and bad just think about it.

~~RECORDED~~ TAPED LECTURE ON "SCIENCE AND CONDUCT" BY CHARLES DE KONINCK
ST THOMAS COLLEGE, ST PAUL. 1957

I am going to talk to you on science and conduct tonight, to point out that good conduct is not a matter of knowledge alone. Pius XII pointed this out only a few years ago, that is, in 1950, in his address to the cardinals and bishops of the world; he said that right conduct is not a question of knowledge alone in the sense that if you knew enough you would always behave in the right way. I want to show to you that the first principles of our conduct, the knowledge of them, does not make us to be as we ~~we~~ should be. Nor do the particular precepts of the natural law make us to be as we should be, nor does moral knowledge, such as ethics or even moral theology, make us act as we ought. Human conduct, the conduct of all rational creatures in general, as long as they have to make their choices and so long as they have liberty of contrariety, will always be difficult, and the difficulty will never be quite overcome by knowledge alone.

Now we all know that it belongs to the scientific climate of our time that if people do not behave as they ought, it is because they still do not have enough knowledge. B Russell is one of these; he used to say "the trouble with the world is that people do not behave reasonably". All they have to do is behave reasonably and all their problems would be settled, as if we would know what it is to behave reasonably from scientific knowledge alone. He thinks that scientific knowledge had by the human community would inevitably make us to be as we should be. So let us go through all these various types of knowledge to show where they fall short, however necessary they may be. Let us consider first of all the natural law, and let us consider it in its most ^{universal} ~~necessary~~ precept, the one which everyone who can be held responsible for his actions knows and must know, namely that we should do good and avoid evil. Everyone knows this if he can be held responsible for his actions. It comes to us from the very perception, the practical perception, of the good. It follows immediately from the perception of the good, as St Thomas explains.

Now this principle is absolutely universal. It holds in all possible cases. There are no exceptions to this. We can never ~~we~~ do wrong. We are never permitted to do wrong. It's a universal principle. Now I am calling your attention to this because there has been developed in recent times a new kind of moral theology or philosophy, what is called "La Morale de Circonstance" ("Situation Ethics"? RJB SJ), which precisely errs in this, that it rejects the absolute universality of certain precepts of the natural law and makes them all relative. ^{It} There are less universal precepts of the natural law, but which still remain universal in their own domain. For instance, we must always be just. It is never permitted to be unjust. You can't imagine a particular case in which you would be allowed to act unjustly. You may, in a particular case, be allowed to take something that does not belong to you, and thus offend a certain person, but you must do this out of justice. For instance, if you are in great need, or your children are in great need, you may have to take the good of someone else without his permission, in order to be just towards your own. But the universal precept that we must be just, -- that remains.

There are precepts that are still more particular. Take one that is related ~~is~~ still to justice, namely: that we must pay our debts. Now this principle is no longer universal absolutely. As St Thomas would say, this is a kind of precept of natural law that holds good only ut in pluribus. He gives the following example: "Thus it is right and true that all should act according to reason and from this principle it follows as a quasi-proper conclusion that goods entrusted to another should be restored to their owner. Now this is true for the majority of cases. Hoc est verum ut in pluribus. But it may happen in a particular case that it would be injurious and therefore unreasonable to restore goods held in trust; for instance,

instance, if they are claimed for the purpose of fighting against one's country. And this principle will be found to fail the more, according as we descend further toward the particular. E.g. if one were to say that goods held in trust ~~should~~ be restored with such and such a guarantee or in such and such a way; because ~~the greater the~~ ^{the greater the} number of conditions added, the greater the number of ways in which the principle may fail so that it be not right to restore or not to restore, that is, as the ~~law becomes the~~ ^{precepts of the natural law} become more and more particular they become less and less certain in application. However, one thing that we must observe about all the precepts of the natural law is that the knowledge of these laws does not tell us what is right and what is wrong under these particular ~~ex~~ circumstances. There is only one virtue which will tell us what is right and what is wrong here and now, and this virtue is one that is not knowledge alone, as we shall see later on.

And so you see how unjust is Reinhold Niebuhr a protestant theologian whom you've all heard about, when he says that according to the Catholic, and particularly the Thomistic, ~~interpretation~~ ^{conception} of the natural law anyone who knows the natural law can infer from it particular conclusions, right down to the last judgement which will tell us what to do here and now. That is not true. The natural law, no matter how determinate the precepts that we know, never, or by itself automatically, tells us what to do here and now. We must be just here and now. But what must I do to be just here and now? Must I pay my debts to this man, who, I have been informed, is going to use this money to pay someone to plant a bomb in an air-plane so that the plane will explode, so that he can collect the insurance. If I pay my debt then, I am unjust. Now according to Niebuhr such cases do not exist for us. We have a kind of general catalog of index cards telling us how to behave in all possible circumstances of life. If you think that I am exaggerating, here is the passage from his Gifford Lectures, given a few years ago. "The difficulty" he says "with this impressive structure of Catholic ethics, finely elaborated into a detailed casuistic application of general moral standards to every conceivable particular situation, is that it constantly insinuates religious absolutes into highly contingent and historical moral judgments." And so he speaks of "the mistake of Catholic moral casuistry is to derive relative moral judgments too simply from the presuppositions of its natural law." Perhaps we should add that this same author considers Thomistic ethics to be an instance of this same type of rationalization. According to Niebuhr, "if Catholics knew all the precepts of the natural law, they would by that very knowledge know how to behave here and now". And we say there is no such thing. That is to "bruler les étapes", -- to (in English) put the cart before the horse? (Here a lengthy apology for the ~~author's~~ speaker's deficiencies in English, with reasons why the audience should be warned of this).

All this knowledge as to what we should do here and now is had only in the prudential judgement. And prudence is not something of reason alone, as we shall point out in further detail later on in this talk.

Now what, to St Thomas, is the natural law? Of course we all know that it is "a participation in the eternal law". But what is it in us? The natural law is not our nature; it is in no sense our nature. Of course it is because of our nature that we need a natural law, to guide ourselves in our conduct. But the natural law is a universal proposition (judgement) in the practical intellect, whose most universal precept is gathered (derived) from the ^{very} notion of good, seen as practical (i.e. good must be done) as I have said before. But "lex naturalis est quaedam propositio universalis in ~~ratione~~ ^{ratione} / practica, ordinata ad actionem." But it remains universal; and in the order of action whatever is universal is ~~inadequate~~ ^{inadequate}. It is adequate as a universal proposition, but that proposition will never be able to tell us what to do here and now, because our actions are in the singular, and to know how to act here and now we must know the singular circumstances of our action.

We cannot know them all; that's impossible; but we must know what happens ut in pluribus, when we do such and such a thing. As, say, when we want to cross a street, it is good to look in both directions, even if it is ^aone-way street, especially in Quebec, at least; I don't know how it is in St Paul. You have to look in both directions if you want to be prudent. Now you can't take into account all possibilities, for instance, that some gas explosion may happen in the house across the street just as you get there. You can't take all that into account; that's impossible and it would be unreasonable to try to do so. As a matter of fact, if you had to take into account all possible circumstances you could never cross the street. ^{You couldn't stand reasonably at the curb} Even while you are standing at the curb something might happen there too. You ^{because} could neither move nor not-move, reasonably.

These general precepts never tell us what to do here and now. As a matter of fact they are in the practical reason; they are not in the appetite, altho of course our appetite by its nature inclines us to the good, especially in regard to the general proposition that we must do the good. We can all agree upon this. Very few people say "I shall commit evil as often as I can." ~~But~~ On the whole we all feel inclined to do the good. But the general knowledge that we must do good or must be just or temperate is not sufficient to make us do good or be just or temperate, altho this knowledge is an essential condition of acting properly.

In brief, neither the most general, nor even the most particular, precepts of the natural law, which are all universal propositions in the practical right reason, tell us what to do in the contingent circumstances of life. They tell us to be always good, no matter what the circumstances. But here I am, at this particular moment, under these particular circumstances, very hungry, and there is this and that and the other to eat. What am I to do here and now? I must do good; I must be temperate; that's all right. I know that. But what is it to be temperate here and now? That's the particular difficulty. And that difficulty is not solved by the general proposition. It is not mere knowledge of the natural law that makes us just, courageous, and temperate. ~~That~~ That would be too easy.

Yet all that I have said thus far may be considered extremely banal or trite, and something that everyone knows. But it has not always been known to the philosophers, especially not to the modern philosophers, who have all attempted to establish some kind of system of knowledge such that, if we have this ~~system~~ ^{system} in our minds, we will automatically and inevitably behave as we ought to behave. This was true of Hobbes, Locke, Spinoza, -- then we have new systems that we shall go into later on. I just want to mention this. ~~this fact is that~~ And you have perhaps been unaware of the fact that most scholastic textbooks of ethics, of moral philosophy, -- and one example would be Father Gredt, -- proceed in moral science as if it were a speculative science. Father Gredt knows very well that the knowledge of moral philosophy will not make a man to be good. But he proceeds in an ~~an~~ analytical fashion in his Ethics. Which is a very profound corruption, a confusion between speculative science and practical science, as we shall see later on.

We have mentioned the moral law, or rather the natural law. What do we mean by practical science of a moral kind? since it is these authors that I have mentioned who would try to present us with a system that would inevitably lead to right behavior in the one who possesses that system. Moral science differs from the natural law in this: the natural law furnishes us with universal, with common principles, which in their community (universality) are always true, tho the more particular ones suffer exceptions, as in the case of "you must pay your debts". Moral science is something quite different, as moral science. The aim of moral science is to know how one achieves action as one should act, the proper kind of action. Or, more briefly, how does one acquire virtue; for it is only when we act according to virtue that we observe the natural law. How does one go about becoming

temperate? How does one go about becoming just and courageous? That is what Moral Science tries to teach us. Moral science does not try to teach us the Natural Law except incidentally, except inasmuch as some particular precepts of the natural law are especially studied by the moral philosopher. But the precepts will never be precepts of moral philosophy inasmuch as they belong to the natural law. Moral philosophy may help us to see certain things in the natural law that were obscure before we applied ourselves to this but ^{actually principle} when a precept belongs to the natural law it has a kind of generality and a kind of certainty that you cannot find in the particular precepts of moral philosophy. We try in moral philosophy, in ethics, -- let us keep ethics in mind; it is the part of moral philosophy that is best known; ~~politics~~ politics is more obscure, and it is better to go from what is more known to us than to start with what is not so well known to us, -- . Moral science, ^{such as} ~~in~~ ethics, tries to establish means of observing natural law, that is, the things we should do to acquire virtue. Where do we find this knowledge; where do we find these rules/?

The answer of Aristotle, and of St Thomas, is a little astonishing. The only way to learn how to practice virtue, even before you possess it, is to listen to the men who have experience of life, the elderly men, "Senes" -- and those who are considered, and especially have been considered, to be prudent. They are the ones who furnish us with the proper principles of moral science, and it is by behaving as they do that we will know how we ourselves should behave in our actions. You see that we are very far removed from Reinhold Niebuhr's ~~concept~~ description of our conception of ethics of moral action. He thinks that we, like the philosophers of Natural Law of a few centuries ago, think that it is enough to scrutinise human nature in the abstract, in an analytical fashion, by defining human nature, by dividing, and so on, that by considering human nature, ^{as to} ~~its~~ ^{quod} ~~structure~~ ^{erat} ~~esse~~ and its "esse" (?), that ^{from} ~~by~~ this we can derive all the laws of human behavior, and that it would be enough to know all these laws, to know exactly what to do here and now; just as, say, in the experimental sciences; with, perhaps, a little more certitude; because ^{the} experimental scientist ~~is~~ is a bit more modest in this, when he applies his knowledge to the fabrication of some machine. Do you see my point? Reinhold Niebuhr believes that ^{our} knowledge of the natural law is obtained in an analytical fashion, that is, by way of demonstrating from human nature, just as the geometer obtains knowledge that the sum of the internal ~~right~~ angles of any plane triangle is equal to two right angles, and he obtains this from the very definition of a triangle. So many of our critics believe that this is exactly how we proceed in moral philosophy, ^{and in moral theology} we consider the nature of man, and from the knowledge of the nature of man, as a rational animal, we infer exactly how he is to behave in all possible circumstances of his life. But the moral law is not derived in that fashion, if what I have said so far is true. And moral philosophy does not proceed in this fashion either. Moral philosophy, the proper principles of ethics, are ^{is} derived from observation of human behavior, and not from observation made by just anyone, but from observation by people whom we consider qualified to do so, those who have experience, those who have a certain age, especially the ~~firm~~ elderly people, those whose passions are now more or less dormant, -- ut in pluribus, not in all cases; ut in pluribus, at a certain age you are no longer subject to violent passions. And then finally, the men who are considered prudent, the good men, they are norms of conduct used in ethics, and most of Aristotle's ethics is derived from observation of this nature. Nowhere does he tell us how to become just by defining the virtue of justice; no, the business of the moral philosopher is not to divide and to define; that is to proceed in analytical fashion. The business of the moral philosopher is to give us a composite knowledge which will allow us to see what to do in order to attain such an end; not such an end as in the case of the arts; but an end of human behavior, that is, how to become a good man. This is derived from observation, and that is why, because it is a kind of knowledge derived from observation, that

both Aristotle, and St Thomas repeatedly, -not only in his commentary on Aristotle's Ethics, but also in his own Summa, in the I-II, and also in II-II, will say repeatedly, that the proper principles of moral science are uncertain, and have no more than probability; and by this he means that, when you consider them in their universality, it is not enough to apply this universality to every possible instance, but that there are instances where this universality is insufficient, where what we say is true only for the most part.

At this juncture, I think that we must note the difference between the case of the arts, and the case of the virtues, that is, the moral virtues. This has been so clearly pointed out by Aristotle in his ethics, that you ought to allow me to read the passage; and this passage is very relevant, because, on the one hand, some modern philosophers have tried to proceed in a speculative ^{and demonstrative} fashion in matters of conduct, on the other hand we have a whole school which tries to solve the problems of human behavior in terms of art. Here is what Aristotle says in the Ethics, Book II chapter 3: "The case of the arts and that of the virtues," ~~xxx~~ and by virtues he means the virtues of conduct, "are not similar, for the products of the arts have their goodness in themselves." This, say, ~~we don't care who made it.~~ ^{is a good house,} the man who built it knew how to build a house. He may be a very bad man. He may have cheated you while building the house. But the house is a good one. And he may be a drunkard. He may be all kinds of things. The important thing in the arts is the good of the work. The good of the worker is not concerned. A bad man may be a good artisan. (Of course if he drinks too much he will always be asleep and never be able to make anything.) For the products of the arts have their goodness in themselves, so that it is enough if they have a certain character. ~~But if the acts that are in accordance with the virtues have themselves a certain character it does not follow that they are done justly or temperately. The agent must also be in a certain condition when he does them. I mean the agent in the case of moral actions. In the first place he must have knowledge. Secondly he must choose the acts, and choose them for their own sakes. He should try to act justly for the sake of being just. to act temperately for the sake of being temperate; and choose them for their own sakes. And thirdly, the action must proceed from a firm and unchangeable character, that is, must proceed from an "habitus", that from a stable disposition of the subject. These are not reckoned in as conditions of the possession of the arts. That's the difference, except the bare knowledge. If a man knows how to build a house, that's enough. If you know how to act that's not enough. You still have to act. The surgeon does not become a bad surgeon in ratione surgicali (?), as a surgeon, just because he is too lazy today to do this, altho he knows that if he did ~~he~~ it he would do it properly. That makes him a bad man. It does not make him a bad surgeon. But in the case of action, if you do not do what you ought to do, then you do not have virtue, and your action is not virtuous. But as a condition of the possession of the virtues, knowledge has little or no weight, and this St Thomas repeats several times, especially in the Question de Virtutibus in Communi, where he says: "Scientia practica (practical science) parum confert ad virtutem," contributes little to virtue. He does not mean by this that practical science is negligible. He means only this, that when we do have practical science, then we still have the most difficult step to make, namely to act properly, to act in accordance with truth. But as a condition of the possession of virtue knowledge has little or no weight. But the other conditions count ~~for a little but for everything, i.e. the very conditions which result from often doing just and temperate acts. That is the only way one may acquire virtue, by repeating proper actions, by repeating temperate actions, by repeating just actions. Or if, say, one cannot drink properly, by ceasing to drink altogether and repeating the refusal to drink. There is no other way out, ut in pluribus. Actions, then are called just and temperate when they are such as the just or~~~~

(Bk. II)

temperate man would do. You see how dependent we are here upon the just ~~man~~ and the temperate man. And how relatively contingent remain the principles of ethics. And how we cannot derive the principles of ~~human nature~~ ethics from a mere inspection of human nature, as to what it is. That's not enough. Human nature must be observed in action. And so we choose for our principles the observation of people who are supposed to know because they have experience, who are of a certain age, and who are considered generally to be prudent men. "Such as the just and temperate man would do. But it is not the man who does these who is just and temperate, but the man who also does them as the just and temperate man would do them." For a man will not be just merely because he observes the laws of the country in which he lives. If he observes them merely because he is afraid of the police, his acts of justice are not proceeding from virtue, and they are not quite as they ought to be, altho he is more tolerable than the fellow who deliberately acts as he ~~should~~ should not act, who deliberately offends against the laws of the country in which he lives. But the man who does just and temperate acts ~~in~~ as the just and temperate man would do them, i.e. for the sake of being just and for the sake of being temperate, ~~it is~~ it is this man who is good. "It is well said then that it is by doing just acts that the ~~just~~ just man is produced, and by doing temperate acts the temperate man is produced." Without doing these, no one would have even a prospect of becoming good. This, of course, is very contrary to what we often think of ourselves, viz. that we were sort of established in the state of perfect virtue from the beginning, and that everybody ought to behave as we do. "But most people do not do these but take refuge in theory." And here we run into our modern philosophers. That is, they do not apply themselves to performing the acts of justice and of temperance. They have their difficulties, and to solve these difficulties they take refuge in theory and think they are being philosophers and will become good in this way, behaving somewhat like patients who listen attentively to their doctor but do none of the things they are ordered to do. They understand; it is very reasonable: I have high blood pressure, I must lose some ~~weight~~ weight, -- that is very fine; I must eat less; and he goes on eating twice as much as before. It is not enough to understand that he ought to do this rather than that; he still has to do it. There is our difficulty; that no philosophy will ever solve. "As the latter will not be made well in body by such a course of treatment, the former will not be made well in soul by such a course of philosophy." As St Thomas says in his commentary: "Nobody becomes good just by philosophizing ~~about~~ about what he ought to do." Yet today people are trying to discover a philosophy that would do just that. But we will come to them later. Note then that the rule of behavior which we seek in moral science, -- and I am thinking mainly of ethics now, -- that the rules of behavior are derived from the ~~expert~~ ~~(22222)~~ experti, et senes, et prudentes. This is very important, and so much recognized by the Church, as you can see in the canonizations. Through the canonizations, -- because a man is canonized because of the ~~life~~ ^{or} ~~life~~ ~~he led after his conversion~~ ~~which he began sometime after his conversion~~ which he began sometime after his conversion, -- that is set forth to us as a rule. The Church does not canonize saints to send them into heaven. Some people believe that a saint enters heaven when the Holy Father canonizes him. In some Protestant literature this seems to be what we believe. No; it is that we recognize that he is there. But why should it be so important that we recognize that he is there? Of course there is always the question of praying to him that he may intercede for us. But there is always the extremely important question that here we have a kind of rule of behavior. We should act as the saints did; that is giving emphasis, -- a kind of supernatural recognition, -- to the principle of Aristotle in establishing ethics. And you can also see why, in general, the Protestants do not recognize this. They do not recognize canonizations. They don't need the saints, where you have that each individual is, as it were, the ultimate norm of his own conduct.

which he derives somehow by inspiration, or which his faith alone gives him sufficiently. Now we have recourse to the saints to know how we should behave. Their life becomes a rule for our life. And we have so many different kinds of saints, who behaved in so many different kinds of ways, that there is always one whom it is better for you to imitate than another. We can't all imitate St John the Baptist. If you want to imitate him, go ahead. But I won't. Because he came here neque bibens, neque manducans, and still they said that he had a devil; just as Our Lord came, and he ate and drank, and of him too they said he was possessed by the devil. So what can you do? At least we have two good examples right here. Apropos of Our Lord, it is interesting to note that St Thomas, in book IV Contra Gentiles Chapter 54, where he gives various motives for the Incarnation; amongst them he gives one that is relevant to our subject this evening; he said that it was fitting that God Himself should come amongst us so that He might give us a perfect example of conduct, because no saint is perfect enough to be a perfect rule of human conduct. I'll read the passage to you: "Et quia nullus homo sufficienter perfectus est sed semper habet aliquem ~~maxime~~ defectum, ideo oportebat quod ipse Deus,..." etc., that God should come amongst us, and be a rule of conduct so perfect that no restriction whatsoever has to be made. Of course we can add the same for the Blessed Virgin, that we can never show the slightest fault in her conduct, and all her actions, -- those that we can imitate somehow, -- are really imitable. She is a perfect rule of conduct in her order as Christ is in His Own order. But that is owing to Christ, because he made her that good. But all the other saints may show some defect. Think of St Jerome; he got too sore at St Augustine. Think of, -- well, anyone may have some slight excess; if you read a scientific life of a ~~the~~ saints, one that is not too scientific, but some good life of a saint, you will always detect some fault here or there, that was carried on to the end. While it did not carry him into sin, still he certainly did some things that we do not have to imitate to be as we should be.

So that the ultimate solution of the real difficulty in human action is to be found ^{in action} not just in thinking and not just in knowing, ~~but~~ nor even in knowing what one ought to do in order to become what one ought to be, -- that is not enough; we have to do it here and now; that's sufficient (?).

Now it seems that there is an apparent circularity in all this. Remember that Aristotle says that we should act like the ^{virtuous} ~~just~~ man acts, namely that, if we do not have the virtue of justice, we should ~~nevertheless~~ nevertheless perform the works that the just man performs, and on the other hand he says that the right action proceeds from virtue. But we do not have the virtue as yet! How do we acquire it? It seems that the action is supposed to proceed from virtue, and in order to have the virtue we must acquire it, and in order to acquire it we must perform acts that do not yet proceed from virtue! ^{Well} ~~this~~ this merely ~~shows~~ shows that the first principles of our action in the order of ethics are extrinsic to us, extrinsic to our behavior. We must begin by behaving as the just man behaves. And eventually we must attain the virtue from which he behaves, -- that is acquire the virtue which makes us act as we ought to act for the sake of acting rightly. First we do it for the sake of acquiring a virtue, and we ^(observe?) ~~inspect~~ him, as it were, and of course it must be presupposed that we have the ^{right} ~~will~~ will to do so. But gradually, through repetition, we acquire it. In other words, we must perform the act of virtue before we have the virtue. Then the rule of our action is extrinsic to us. But eventually this rule becomes intrinsic to us, ~~when we have the virtue~~ when we have the virtue, and that is why Aristotle can say that the virtuous man is his own rule of conduct. The virtuous man is the one that has the virtue, and the virtue becomes the norm of his conduct, as it were; and St Paul carries this farther, even into the supernatural order, when he says that "the free man is a law unto himself", that the good man is a law unto himself, that is that the right principle of his action has become part and parcel of himself. Then it is intrinsic. But in the beginning it is extrinsic.

Q. 4 This, as Aristotle points out in this same book II of the Ethics, shows how important is the early education of our children. We say "the world is in a mess" etc etc., but the last thing we think of is the importance of instilling into children the right habits, before they have the age of reason. ~~xxxxxxx~~ We think that it becomes important to teach children to like the right things and to dislike the wrong things when they have attained the age of reason. But actually then it is too late. We must not forget that the first principles of right conduct in this order, that is, the proper principles of ethics, which apply ut in pluribus, the nature of ethical science, teaches us that the first principles of our action, ~~xxxxxxx~~ the first proper and proximate principles of our action (here and now?) are, in the beginning, extrinsic principles. And it is only later, when we actually have the virtue, have some virtue, that they become intrinsic. This applies to education. There are principles of action extrinsic to the child, extrinsic to his reason because he does not as yet have the use of his reason, which must already be applied, so that he gradually learns by the repetition of action, the things that are right and the things that are wrong, even if he himself cannot judge that they are right or that they are wrong. The parent judges in his stead, and it is only by this kind of repetition that the child will be capable normally, of acquiring virtue later on; which puts us all in an awful state; if we did not get the right education, where are we? As Aristotle says: This is why the activities we exhibit (perform?) -- because he has been insisting on the importance of repeating good action, ~~xx~~ and of repeatedly refusing the wrong, -- must be of a certain kind; it is because ~~xx~~ the states of character correspond to the differences between these; "it makes no small difference then, whether we form habits of one kind or of another from our very childhood; it makes a very great difference for the acquisition of virtue, and for the life of happiness thereafter; it makes a very great difference, or, rather, all the difference." And St Thomas in his commentary uses the following expression: Quia potius totum ex hoc dependet; that is, in a sense everything depends on the education we got in our family or in school before we were held responsible for our actions, before the age of reason; that is so important. It is so important that the people who refuse this teaching usually ~~xx~~ refuse it because they have been so confused by the improper education that they received that they cannot see the point. So far then; the most, -- now since I am speaking before a Catholic audience here tonight, I think I can point out an example that is very striking. Look how much importance the Church attaches to giving little children a Catholic education right from the beginning and having our own private schools, the grammar schools, and giving them a complete Catholic education right from the beginning, starting from kindergarten. Why? because the things that we hear often repeated, even if they are not clear, if they are not self-evident at all, we will receive as first principles, and they will be carried on for the rest of our lives. That's why Catholic education right ~~from the~~ from the beginning is so important. It is more important in grade school than in high school, in high school than in college, and in college than in the university. I'm sticking out my neck, but I don't mind.

Q. 5 Well all this gives us at least a vague idea of the difficulty of human action. The problem can be solved only by action, and by doing here and now what we should do. You know that the matter is not so simple. I know it too. Look at the way people behave. As St Thomas says, after (following?) Aristotle:--- St Thomas was a good disciple of Aristotle, and in many respects revelation merely confirms him (Aristotle?) in this---that human beings, for the most part, follow ~~the~~ the inclination of the senses, over and against the good of reason,-- malum ut in pluribus in specie humana,--and in such a humanity we must act, and acquire virtue, and do as we ought. But that's not so easy, because that "malum ut in pluribus" comprises the majority of parents! Do you see what I mean? There is what we call the "lex fomitis", which is sometimes translated by "the law of unruly concupiscence", meaning that people, for the most part will follow the inclination of the senses against the good of reason. Now

practically all advertising is based on this law, -- publicity, I mean. For instance, if you want cigarettes to sell you have to associate something with the cigarette that does not just appeal to the sense of taste but to other things as well. You have to associate it with, say, someone who is almost completely stripped; even ice-boxes are sold on the basis of sex-appeal, -- next to the ice-box you have some woman standing there elegantly dressed, and looking into the void, -- you know what she's after, -- this is all to get you to buy an ice-box. What a detour! No one seems to protest; everyone catches on, and in this everyone is recognising lex fomitis. As a matter of fact, the lex fomitis is so rigorous that, since the majority of people follow primarily the inclination of the ~~xxx~~ senses over and against the good of reason, -- I say the majority, -- altho every individual of this majority could, if he wanted to, resist, since he is a free being; but, as a matter of fact, the behavior of the masses in this regard will be predictable. And this is something that has been exploited by socialism in general and by Karl Marx in particular, by communism in particular. Thanks to the lex fomitis we have a social constant which allows us to predict the behavior of the multitude. We know that if the multitude is placed in such and such circumstances, this is how it is going to behave. So that the lex fomitis has, from the viewpoint of social science, a kind of scientific character inasmuch as it allows prediction. Philosophers, of course, will try to uproot the lex fomitis by the various systems which they devise, and whose mere knowledge or whose mechanical application would make men to be as they ought to be. All these philosophies are attempts to sidestep the real difficulty of action, which is to act here and now as we ought. Let us consider some of these attempts.

We will have to go through them rather briefly. First of all there is the analytical attempt to sidestep the difficulty of human action. We find it is Hobbes' "Moral Philosophy More Arithmetico Demonstrata". He is going to construct an Ethics just as we proceed in arithmetic. Now there is no science more rigorous than arithmetic. But the whole point is that, according to him, if we could acquire this science and get our ideas clarified sufficiently, then just as Bertrand Russell thinks, we would behave as we ought, we would behave reasonably. Locke, who came a little later, did something along the same line, or at least attempted it. But the ideal of this attempt is certainly to be found in a very classical treatise of Spinoza, namely in his Ethica Ordine Geometrico Demonstrata. Now you all have some idea of the Ethics of Spinoza. He proceeds by way of division and definition, as we do in geometry. And he thinks that he can establish the rules of conduct in this fashion, analytically, as we do in a speculative science. He doesn't turn to the men of experience, or to the aged, or to the prudent man. He wants to derive all this knowledge a priori, -- per demonstrationem a priori, -- not in the Kantian sense of "a priori", but in the Aristotelian sense of "a priori", something that Aristotle fortunately never attempted when he entered into the field of human behavior. Now Spinoza says very explicitly that his aim is to clarify our ideas concerning human action in such a fashion that, in virtue of this clarification, we shall become happy, which means that we shall act as we ought to act and take things as we ought to take them. Now wouldn't that be easy? All you would have to do would be to study this Ethics and then you would be as you ought to be. That would be the end of it, -- philosophando fieri bonus, as St Thomas says; some people think we can become good by philosophising.

P -- We have something comparable to this in our own time. But, instead of proceeding in moral knowledge analytically, as Spinoza did, they proceed on the basis of experimental science alone, and try to tell us what the natural law is by observing what human beings do for the most part. There is a confusion here between the natural law, the laws of nature, and the law of unruly concupiscence. We distinguish between a "law of nature" (physical law?) and "natural law" (moral law?); altho we could, if we wanted to, providing we explained the use of our terms, we could say that the laws of nature are natural laws, and that natural law is a law of nature. We could do that, But actually they are very different. The laws of nature are revealed in what happens for the most part

in natural beings. For instance it is a law that after a certain number of years an animal should die. An animal develops from the beginning according to an orderly pattern, and we call this a lawful process. That's all right. And we observe that we can get at these laws, -- of course in a confused fashion, -- by observing the regularities of nature. Then we explain them by a theory. But the basis of the theory is always the observation of some regularity in nature. Now in the human order when we consider human beings merely as animals the same thing applies. But when we step into the order of behavior we have something very different. Whereas nature proceeds as it ought for the most part, human beings do not act as they ought for the most part, -- it's just the reverse. We have a regularity there, but the regularity is not the norm of conduct. Yet, as you know, some scientists, anthropologists ~~for~~ among others, would like us to establish the rules of ^{human} behavior according to what human beings do for the most part. We say that of course in establishing rules, we ought to realize what people do for the most part. But what they do for the most part is not a norm of conduct. Thus the late Professor Kinsey wanted marriage abolished simply because adultery is so frequent. Here you have a kind of constant in human behavior. He gave a certain percentage of adultery, -- I don't know what it was; it was pretty high, ~~it~~ maybe a little too high; I don't know, ~~it~~ but it was fairly high -- but he said: "now this, according to our present laws, is unfitting conduct, and punishable by law. But ~~if~~ if we abolished the law and permitted it, seeing that people behave in this way for the most part, it must be a law of nature. And so our marriage laws are contrary to the law of nature." ~~A~~ Why? Because people behave for the most part in such and such a fashion. That ~~would~~ would make things very easy, wouldn't it? Do you see what I mean? the importance ~~between~~ of distinguishing between the law of nature, ~~and~~ the natural law, and the lex fomitis. We have our lex fomitis; we are faced with our lex fomitis, and the only way we can overcome that is in singulari, not by, say, general reforms, such as those undertaken by Luther, or undertaken by Karl Marx, etc. But we will come to this later.

That is what I would call the strictly scientific attempt to overcome or sidestep the difficulties of human action.

Then we have an attempt made by the liberal arts. And I think Hegel is characteristic of this. Hegel wanted to reconcile things as they are with things as they ought to be, by asserting that things as they are cannot be otherwise than they are, so that whatever we believe they ought to be, since they cannot be otherwise than they are, being as they are, they are as they ought to be. So he just stopped there. And withdraws in the order of representation, and his ultimate view on reality is a kind of view of the general cursedness of things that we meet when we see a tragedy in the theater. There we can enjoy the most awful things, so much so that we pay high prices just to see them. But I'm sorry I cannot do justice to Hegel here tonight. I merely wanted to point out and name the various domains in which an escape has been sought from the various difficulties of human action.

Then we have the mechanical arts, which are offered as a means of side-stepping the difficulties of human action, and this is exemplified by Marxism. In Marxism it is the practice of the mechanical arts, in which we transform matter for the benefit of man, in making, say, bread, en (?) le blé, in using the hammer and the sickle, say, the extensions of machinery, etc., in transforming matter by our own mechanical operations, man is ultimately to become as he ought to be. So we have two attempts made in the field of art in order to overcome the difficulty of human existence, of human action, which is the highest form of existence, by the way, *according to Marx*.

Finally, -- you can question me on these various points later on, -- we have existentialism, which has, in some instances, resulted in a kind of ethics or moral philosophy, which I have named in the beginning of this talk "La Morale de Circonstance". I don't know how you translate it in English ("situation ethics"?) but I am sure all those in their field of moral philosophy

Le graveur Delhez expose à l'Atelier

M. Victor Delhez, de l'Université de Cuyo, à Mendoza, Argentine, est un des graveurs les plus éminents de notre temps. Très connu dans toute l'Amérique latine, et non moins apprécié sur le Continent européen, des admirateurs du Québec l'ont invité à exposer quelques-unes de ses gravures à l'occasion du Centenaire de Laval.

M. Delhez est encore un sculpteur de grand talent, et ne fait ses gravures qu'après en avoir fait tout d'abord un modèle sculpté. Originaire d'Anvers, en Belgique, il s'est établi en Amérique du Sud depuis environ 25 ans.

L'exposition des gravures de M. Delhez aura lieu à l'Atelier, rue Ste-Anne, ce soir, à huit heures et demie, et elle sera ouverte par M. Charles De Koninck.

Vari correspondence
avec Durand, July 13, 1958
July 16, 1958

① The Hollow Universe -

Schéma I The World of Symbols Construction p. 1-2

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~~II The Inanimate World of Biology p. 3~~

② The Holl. Universe - 4 pp. dactyl. copie orig. + copie carbone
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④ The Hollow Universe
Schéma pp 2 à 6.

- I The World of Symb. Const. p. 2
- II Physics p. 3
- III The Inanimate World of Biology p. 5

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⑤ 2 pages num. 3 et 4.
1 autre ...

Mathematics as "a game with meaningless symbols, played according to arbitrarily chosen rules" (Hilbert); as "nothing but tautologies" (Wittgenstein, Russell). Thus, what we believe to be the most abstract activity of reason can be transferred, often with advantage, to electronic machines that are basically no different from a wheelbarrow (Turing, Kaplan, Bronowski).

Thanks to the extrusion of what Lord Russell calls the 'metaphysical' from logic and mathematics, these have actually become an amazingly powerful tool for the investigation of nature. The paradox is that the whole edifice of modern mathematics can be constructed from mere repetition of nothing at all — not according to so-called laws of thought, but to rules which can be built into machines. The world mathematics leads to greater efficiency in the physical world, as it becomes more empty, even of the stuff that dreams are made on.

The most striking feature in modern thought on the nature of logic and of mathematics may be observed in the evolution of the concept of rigour, starting from the proposition of identity 'A is A', replacing it by the function 'A (A)', leading towards mathematics as "a game, played in silence, without words" (Weyl) and confided to machines devoid of mystery. Thus the limit of rigour appears to be achieved when nothing is said at all. In this well founded view, the only remaining activity of the mathematician as distinguished from a machine is that of selecting rules for the game. (Some modern logicians believe that machines could be made to perform even this function and, eventually, machines that produce such machines.)

THE HOLLOW UNIVERSE

We are concerned here with that total view of thought and nature suggested by the more advanced interpreters of the scientific outlook. Their final opinion is by no means accepted by all scientists. Indeed it is not even the common view amongst them; yet it is the one which, in the popular mind, is thought the most truly scientific. We have all heard of the computer-men who would lead us to believe that they are on the way to constructing machines that will be as truly mathematical thinkers as any man has ever been, implying that we shall have to change our mind about the nature of reason as characteristic of man. The challenge is all for the better if it can set us on to investigate more clearly what thought is. And Lord Russell declares that physics has now shown man to be a mere collection of occurrences, that 'Mr. Smith' is in fact a collective name for a bundle of events. Finally, outstanding biologists say that 'what life is' has become a meaningless question; that if organismic behaviour is to be explained at all, this will have to be done in terms of physics and chemistry. We do not contest the competence of those who hold such views: all of them have made signal contributions in the field of science and its philosophy. Still, it may be opportune to assess the import of such opinions by comparing them with those which they appear to replace. No matter how disturbingly nihilistic they appear, we must face even the extreme positions which follow in the wake of progress in science.

A first, general point worthy of attention is that the names "Mathematics," "Physics," "Biology," and "Psychology" are still in use even though the kind of subject-matter and knowledge they

now stand for differ almost beyond recognition from what they were to those who first used such terms. In other words, these names have become strictly equivocal, and their new meanings can be understood without any knowledge of the earlier ones. For example, what we call mathematics appears to be largely a prodigious development of what the Greek philosophers had named "logistikè" or "logismós," as distinguished from mathematical science, so that "the people who calculate" were not necessarily mathematicians, even though the latter could not do without computing; but computation was not the same as demonstration. The new calculus, discovered by Newton and Leibnitz, or rather all of analysis, which sprang from it, was, in John von Neumann's words, "the first achievement of modern mathematics, and it is difficult to overestimate its importance. I think it defines more unequivocally than anything else the inception of modern mathematics, and the system of logical analysis, which is its logical development, still constitutes the greatest technical advance in exact thinking."

Again, the many meanings of the Greek word "physis" and of the Latin "natura" are actually dispensed with in our scientific outlook, although scientists, for some reason or other, continue to use this name as well as its derivatives. I mean that, looking closely into the way in which we proceed in physics, the distinction between nature and artifact nowhere appears as crucial. The point is that any discussion about what nature is as distinct from art or craft, whether natural things are different from machines, seems irrelevant to what we are actually doing.

If the distinction between living and non-living is at best an unlikely hypothesis, the very name, "biology" should be recognized as a mere linguistic convenience. Finally, "Psychology," as the name of a certain branch of experimental science, must fare even worse when referred to "psyche" or "soul" as something which the living, and man in particular, are believed to be possessed of. The fate of the "vitalism" of some decades ago has done away with all that: I mean the discarded theory which, though using an Aristotelian vocabulary, had actually nothing to do with what the Philosopher meant by the same words and definitions. The ill-defined "soul" of Descartes has indeed been duly absorbed by the machinery which attended it.

Strange as it may seem, I have not the slightest intention of objecting to these facts, nor to the views which we accept at least as partial. Rather, my aim is to show, on the one hand, that unless we assess the present situation in the light of earlier views, we will fail to appreciate what has actually been achieved; and we want to make plain, on the other hand, that when we generalize the scientific outlook as it is commonly understood, the only thing left to us is wonder at the hollowness of nature and of thought--to a point where even Einstein's conception of nature as the work of a wondrous intelligence would now be out-of-date.

Perhaps the more simple and efficient way of achieving this purpose might be to try and deduce our generalized scientific outlook by ignoring certain positions and distinctions that were current in the golden age of Greek philosophy. For there remains, amongst eminent scientists of our time (such as Heisenberg, de Broglie, Schroedinger, Born, Jordan, and Oppenheimer, to mention

only a few), enough regard for the beginnings of scientific thought, to warrant such a dialectical procedure.

elementary points we will encounter the question as to the exact sense in which our computing machines may ^{be allowed} ~~deserve the attribute~~ to think.*

~~Just a few weeks ago~~ ^{recently} you read in the newspapers that groups of psychologists, neurophysiologists and linguists gathered, late in November, at Britain's National Physical Laboratory for an international conference on 'The mechanization of thought processes.' The scientific correspondent of the Manchester Guardian reported "that it is rash to rule out the likelihood that one day it may be possible to design machines which can for themselves (given suitable experience of practical problems) form the kind of judgment which characterizes the higher flights of creative intellectual activity. It will be a long time, of course, before a machine will do for modern physics what Einstein did for it at the turn of the century. But it is important that at this stage there appears to be no obvious reason why this should not turn out to be possible." I regret to confess my failure to be shocked at this bold anticipation. The challenge of the machines is all for the better if it can help to investigate more clearly what thought it, ^{if need be,} and, to disengage the higher flights of creative intellectual activity from the machinery which attends them in the human brain. ^{Meantime,} ^{proves} Electronic hardware ~~has already~~ ^{shown} that machines can be logicians and mathematicians much in the sense in which we understand these terms nowadays.

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Reaching down for the ultimate foundation of modern logic and mathematics, we find that it was already expressed, and very clearly so, by a Greek philosopher, Democritus, some two thousand years ago. The position which Aristotle attributes to this predecessor of his is

again so embarrassingly simple that I have some misgivings in quoting it as the basic idea of the vast edifice that now rests upon it. But that was the way with Greek philosophers: they had the wisdom to ponder the simplest things and to seek therein the basis ~~of all that was to come~~. ^{what is to be explained.} Edgar Allen Poe pointed this out ~~in~~ ⁱⁿ ~~the~~ The Purloined Letter; ~~that~~ "The principle of the vis inertia, for example, seems to be identical in physics and metaphysics. It is not more true in the former, that a large body is with more difficulty set in motion than a smaller one, and that its subsequent momentum is commensurate with this difficulty, than it is, in the latter, that intellects of the vaster capacity, while more forcible, more constant, and more eventful in their movements than those of inferior grade, are yet the less readily moved, and more embarrassed and full of hesitation in the first few steps of their progress."

I waive what he calls "metaphysics" and come to Democritus's opinion as quoted by Aristotle: "One thing cannot be made out of two nor two out of one." He meant something ^{which may appear quite trivial,} ~~that seems quite trivial~~, viz., that the number two is exactly the same as one plus one, so that to say $1+1=2$ is just another way of saying that $1+1=1+1$. Two, then, is nothing new over and beyond one and one. Though Democritus expressed it clearly, the same idea was already held by Thales, who believed that numbers were actually just heaps, or, as we would say today, mere classes or bundles.

The statement of Democritus may seem trivial, but I hasten to object that it is not. Aristotle was fully aware of this, and I point it out as an apt illustration of the most basic principle of what we call 'logic' and 'mathematics' in our time, as distinguished from some earlier meanings of these names. It contains, more than in ovo, the modern conception of number as a mere collection or aggregate. ~~that~~

A number is

no more than a logical fiction and symbolic construction. Nearly
 Bertrand
 a half century ago Lord/Russell, in his Introduction to Mathematical
 Philosophy, explaining to the English public Frege's definition of
 number, observed quite pointedly "that number is a way of bringing
 together certain collections,..." However, the implication of this
 conception of number was eventually more fully realized by an early
 pupil of his, the already mentioned Ludwig Wittgenstein. ^{In My Mental Development} Lord Russell says
 reported ~~not~~ recently ~~that~~ that he himself "had thought of mathematics
 with reverence, and suffered when Wittgenstein led me to regard it
 as nothing but tautologies." ^{However that may be,} Russell's disappointment should not
 obscure the fact that the method based on Democritus's view provides
 the most exact of the sciences with an indispensable tool, one that
 had been around ^{unnoticed} from the earliest days of arithmetic as the art of
 calculation, ^{though its potentialities had passed unnoticed.} Plato called this technique 'logistikè'; Aristotle's name
 for it was 'logismos.' However, they distinguished the technique
 from mathematics as a science. Science, ^{and very clearly so} ~~at least~~ to the latter, was
 the effect of reasoning by way of syllogistic demonstration, as we
 find it exhibited, later, ^{and more completely,} in the Elements of Euclid. ^{*} Demonstration,
 in this sense, was not the same as calculation, although in mathematics
 one could not demonstrate without computing. But the computation it-

Footnote
 ↓

* Unless proof be taken in a false broad sense. If you tell someone ~~that~~ you that Mr. Smith is in the next room, and asks you to prove it, you could do so by opening the door for him to see that Mr. Smith is really there. This is the meaning of 'demonstration to sense.' sense

self was no proof. ^{**} We shall return to this point later. Meantime we may confine ourselves to the observation that mathematics nowadays is almost wholly identified with and confined to the art of calculation. This is implied in the conception of number as "a way of bringing together certain collections." Numbers are defined by the operations that can be performed upon them. As Hermann Weyl put it: "their being exhausts itself in the functional role which they play and their relations of more or less." As a result, 0, 1, -1, ^{1/2, √2, etc.} ~~fractions, etc.~~ are in this just as much numbers as 2 or 3.

* But syllogistic demonstration I do not mean the ~~rules~~ of syllogistic rules of the Prior Analytics, which are themselves demonstrated but which are not themselves demonstrations.

That mathematics is now largely equated with its technique, or rather that all mathematical entities are ~~now~~ defined by the technique, is an observation based upon what mathematicians now actually attend to, especially those who ~~are concerned with~~ ^{reflect upon} what they are doing. This assimilation of ~~modern~~ mathematics with the mushrooming art of calculation I find confirmed quite literally by the late John von Neumann: The new calculus, discovered by Newton and Leibnitz, or rather all of analysis, which sprang from it, was "the first achievement of modern mathematics, and it is difficult to overestimate its importance. I think it defines more unequivocally than anything else the inception of modern mathematics, and the system of logical analysis, which is its logical development, still constitutes the greatest technical advance in exact thinking."

The freedom of the art is exhibited by the fact that, in calculating, we are never concerned with what the things are about which we calculate, ~~but~~ but only with how we can operate upon them: they are defined in terms of what we can do with them--much as the physicist who ~~is not concerned with~~ ^{does not stop to think} what time is apart from his ability to measure it. My statement remains nonetheless somewhat ambiguous. I must therefore explain ~~it~~ ^{at least} two ways in which it could be understood. We are all familiar with Lord Russell's saying that "Mathematics may be defined as the subject in which we never know what we are talking about, nor whether what are saying is true." A French mathematician, Jacques Hadamard, gives an illustration of what this means, ^{at least} although I do not believe that he intends it to convey all that Russell had in mind. Here is the example: "Having bought 6 metres of cloth at 12 francs a meter, how much does one have to pay? In raising this problem, are we really talking about cloth? Not at all. Instead of asking the price of 6 metres of cloth at 12 francs a meter we could just as well have asked the price of 6 pounds of meat at 12 francs a pound. We might have replaced the meat by copra, and the pupil could have provided the answer without even

asking the teacher what copra is. Hence, in raising this problem one does not know what one is talking about; or, to put it otherwise, there is no need to know it. Here, then, is a first, simple instance, we have the notion of mathematical abstraction."

This is one way of understanding mathematical abstraction, but there are other ways, too. (There was Plato's, and then the widely different one - *not to mention M. Hadamard's own in his Mathematical Field.* which Aristotle taught, Neither had anything to do with the case in point.)

4 Here is one further understanding which occurs to me. M. Hadamard points out that in computing we forget all about cloth, meat, copra, and francs; but we do not forget about numbers in this particular illustration. But number is in itself a very ambiguous term. For it could be taken as a name, but also as a mere symbol.

as opposed to
Permit me to dwell upon this possibly relevant distinction. 'Man' is a name which stands for a certain type of animal, and 'Socrates' is the name for an individual man. But 'the pale, homeless, flute-playing, unshaven barber, at the corner of Nowhere Street last night' is not exactly a name, but we can pin all this down by a single symbol, let it be Y, and use it in the calculus of propositions. The reason why we cannot cover with a single name all of what ~~is~~ *referred to* that barber—whose name is actually Oscar—is that all those things do not have the kind of unity which naming requires. What we symbolize by Y is an accidental whole, for a man can be pale without being homeless, homeless without playing *the* flute, or a barber without being unshaven, or play the flute elsewhere. *—all the difference between a heap and a man.* All this taken together is what we call an accidental whole. And though ~~this~~ *the* aggregate cannot be given a single name, it is the simplest thing in the world to assign a symbol to it. For even what is not in itself a per se whole in the manner of a man or a circle ~~x~~ can nevertheless be gathered by the mind, ~~and~~ *and* set apart, provided with a symbol that is one. There is, indeed, a definite notion of heap or aggregate, but no particular heap has a name by it-

self. You can speak of 'the heap in Mr. Smith's back yard,' but ~~it will~~ it will.

~~It~~ ^{be} not a name. Still, we can agree that Y stands for that heap made up of old tires, ^{some} rusty pipe, broken milk-bottles, a sagging pumpkin, etc. It may be the only member of its class, but it is defined clearly enough by being in Mr. Smith's back yard, and there is no ambiguity

about the symbol, so long as ~~the heap is there~~ ^{it can be referred to that particular heap} ~~the class of which this particular heap is a member~~

In other words, unlike names, symbols abstract from what is one per se. ~~A~~ ^{pointed out that} Aquinas said, "Symbolum collectionem quamdam importat," as ~~the sign of what~~ ^{the symbol} is 'thrown together.'

~~A symbol~~ When distinguished from the sign that is a name, refers to what is no more than a collection, an aggregate, a heap, an accidental whole. Therefore, if the number two be taken as a collection, prescind-

ing from whatever unity the collection may have, two is not really a name, but a symbol, ~~and this symbol 2 dispels the~~ ^{which has the advantage of dispelling} ambiguity from calcula-

tion. For it is plain that while computing we ignore whether 2 stands for one two, a per se whole, or for two ones, a class or collection. ^{It is like seeing man as an aggregate of number limits.} Actually we pay heed to the whole as a collection, but to no more than that. Hence, from this point of view, $1+1=2$ is exactly the same as $1+1=1+1$; 2 is $1+1$ for short, which is the number Democritus had in mind.

But if 2 is taken as a number over and beyond $1+1$, if it has its own irreducible kind of unity, such that in removing a unit you destroy the novelty of two, this number is not just $1+1$ —all of which must of course be put aside by the computer. He must be as indifferent to what numbers are apart from their being collections, as is the highway policeman who weighs in trucks but pays no attention to whether the load is one of potatoes, cement, horses, or men. From the computer's point of view, the only thing new about ~~and~~ is the symbol, and who was responsible for that?

Traditional philosophy could raise a difficulty at this juncture. If numbers are accidental collections, why should they have distinctive properties that follow analytically from what this or that kind of number is? The number two, for instance, differs from the number three: the one

is even, the other odd, and each, as such, have certain demonstrable properties; on the other hand, both are prime numbers ^{s.i.e. numbers that cannot be broken up into factors;} and 2 is the first of them, ^{and 3 is the next.} How does symbolic construction account for this? To what do the properties belong? This ^{problem - if it is a problem - does not concern} ~~should not disturb~~ the computer, ^{apparently} for characteristics such as those will [^] arise from the operations he performs upon certain collections, and he will define both number and properties in terms of these operations. 2, 3, 5, 7, etc. will be prime numbers because they are divisible only by the unit; ^{'divisible' refers to our operation, not to what prime numbers would be apart from it.} The same holds for geometrical entities. As Hermann Weyl put it: "For the mathematician it is irrelevant what circles are. It is of importance only in what manner a circle may be given,..." It is as if we said that it is irrelevant for us what man is; it is of importance only in what manner, ^{we can meet one.} ~~may may be given~~ In the terms of traditional philosophy, this means that the mathematician is not at all concerned with definable natures, ^{nor with} ~~the~~ the properties that can be demonstrated from the definition of 'what' they are absolutely, ^{taken as the middle term.} Which is another way of saying that they abstract from science in Aristotle's sense, [^] something which even Aristotle and Euclid had to do when computing.

If computation can be such a rigorous technique, it is precisely because, in it, number is ^{is taken as} no more than a collection, ^{so that} ~~because~~ $1+1=1+1$ is exactly the same as $1+1=2$. Lord Russell states this very plainly when he says that "there is no doubt about the class of couples: it is indubitable and not difficult to define, whereas the number 2, in any other sense, is a metaphysical entity about which we can never feel sure that it exists or that we have tracked it down. It is therefore more prudent to content ourselves with the class of couples, which we are sure of, than to hunt for a problematical number two which must always remain elusive. Accordingly we set up the following definition:--The number of a class is the class of all those classes that are similar to it. Thus the number of a couple will be the class of all couples. In fact, the class of all couples will be the number 2, according to our definition."

In other words, the calculator does not nor should he commit himself to what numbers are in any other sense. It is thanks to the extrusion of the "metaphysical" from what Lord Russell calls logic and mathematics, that ^{their technique} ~~that~~ should have developed into an amazingly powerful tool, even for the investigation of nature. There is then no reason for grief when we are led to regard such a ^{logic or} mathematics as nothing but tautologies. An ^{resolved} equation is ~~valid only when~~ the part on the right ^{turns out to be} ~~is~~ exactly the same as the part on the left. Computation is the most noncommittal operation we could possibly perform. E.g., when we divide two into ~~the equal parts~~ one and one, one and one are not something new — ^{they were never even 'parts', to begin with; we just thought them up as parts of a symbolic 2.} In Democritus's view, we can divide two, not because two is divisible, but because two is already divided. ~~In other~~ ^{To be quite literal, we should say} ~~words~~ 'two are two,' and divisibility actually refers to our operation ^{of dividing,} not to what two is. From the computer's point of view, the singular "is" could be a linguistic obfuscation of the fact that his 2 is no more than a calculator's fiction, a symbolic construction: what the symbol 2 stands for is exactly the same as what 1+1 stand for. The symbol 2 is 1+1 for short.

This basic idea was plainly expressed by the poet Goethe, in a passage that echoes Democritus, and which is quoted with approval by modern logicians and philosophers of mathematics: "Mathematics has the completely false reputation of yielding infallible conclusions. Its infallibility is nothing but identity. Two times two is not four, but it is just two times two, and that is what we call four for short. But four is nothing new at all. And thus it goes on and on in its conclusions, except that in the higher formulas ~~that~~ ^{the} identity fades out of sight." ←

Analytical philosophers tell us expressly that 4 is just 1+1+1+1, abbreviated. The symbol four is an arbitrary sign, bringing 1+1+1+1 together by a fiction which, in computing, soon becomes indispensable.

Symbolization, even of this primitive type, did not come about as easily as we might think. The birth of 0, the most modest of all symbols, is a fascinating illustration of our point. Mathematicians of the ancient world had no appropriate symbol for zero. Yet once established it was not more difficult to use than ~~the~~ counting with the fingers of the hand. So that in the mechanics of the computer 0 became a number, just as much as 2; and 1 as well, and -1 *— which e*

, as Aristotle did,

Before moving on to more basic questions concerning these simple elements, we ^{are ~~asked~~ ^{meant} to see} ~~could point out~~ what is meant by rigour or exactness in the operation of computation. Again we find this expressed in Democritus's

d hardly to the case if)
we defined number as
e 'a plurality measured
by the unit.'

dictum which, as he applied it to nature, provided the basis for his *physical* atomism. ^{For} If 2 is exactly the same as 1+1, then, in saying 1+1=2 you are

about as noncommittally exact as can be. In fact, you do not even have to "say" it; it is there for everyone to see, whether anyone actually sees it or not. Is anything gained by knowing or saying ' $1+1=2$ ' when 2 is neither more nor less than $1+1$? A mirror could reflect this as well as your eyes and brain. A speedometer can grind out numbers until the whole machine breaks down. If it was a good meter, it guaranteed

that the number of miles was (roughly) equal to the number that last turned up. ^{Besides,} This number is not without its own kind of abstractness, ^{an equal number} for, ~~the same number~~ could be registered by the photo-electric eye that

counts the people entering the stadium. Whether anyone would be paying attention to their equality or not, ~~there it would be, nonetheless~~ ^{the same, but would be} If there were as many miles as there were people, their number would be undubitably the same, and one's knowing or saying it would not alter the

case. Once the symbols have been agreed upon, the operations henceforth involved are obviously mechanical; ~~and here~~ ^{in fact} the machines are ~~certainly~~ more reliable than a human computer. And if you objected that the machines

can't read their numbers, you ~~must~~ ^{would have to} admit ^{all the same} that they can store them away, and eventually bring them back.

How simple it is to construct a machine that tells us about what it has

done, what it has stored away, and what it is going to do next, without knowing in the least what it is doing or saying. The basic condition of all this is that $1+1=1+1$, or 2 for short. If 2 were something radically new and distinct from $1+1$, even the most refined electronic hardware would fail us. — *Perhaps we should add, at this juncture, that*

Now we know what is meant by a 'logical fiction,' such as the symbol 2. It is not logical in the sense of the term used by Aristotle, but should rather be related to what he called 'logismos.' We also know what "this magic of symbolic construction" is, at least with regard to 2. But where do we get the raw materials for the construction? How are the members of the classes given, or how do we obtain them? How do we achieve the members of the classes, and the members of the classes that are classes of classes? Some philosophers of mathematics believe that in the end this problem reduces to 'Where do the natural numbers or integers by which we count objects, where do they come from?' The German Mathematician Kronecker () said that "God made the integers, all else is the work of man." This statement is most ambiguous. I believe it no

more than I do that, though God made man, He did not 'make what it is to be a man,' or even 'what it is to be a house,' *although there is no such thing as a man, or a house, or even 'what it is to be a house,' in a way that is apparently different from that of* Still, Kronecker had a point: *such as 0, or $\sqrt{2}$, in a way that is apparently different from that of* for we do construct all other numbers, *Now the question is: Are the in-*

tegers themselves a construct created by our own mind? *Hermann Weyl* was emphatic that they were. Reflecting upon the present status of the foundations of mathematics, he added: "However, it is surprising that a construct created by mind itself, the sequence of integers, the simplest and most diaphanous thing for the constructive mind, assumes a similar aspect of obscurity and deficiency when viewed from the axiomatic angle. But such is the fact; which casts an uncertain light upon the relationship of evidence and mathematics. In spite, or because, of our our deepened insight we are today less sure than at any previous time of the ultimate foundations on which mathematics rests." Let not this worry us for the moment. How do we

to call for ~~an~~ definition is the same as to ask for an interpretation of the symbol. ~~an~~ Where John Stuart Mill said that "All definitions are of names, and of names only," we say, here, that all definitions are of symbols. There can be no definition of what the symbol stands for. If there were a definition of 2 that is more than an interpretation of the symbol, viz. $1+1$, ~~that~~ would mean that two is something over and beyond the mere collection, which is the business of ~~the~~ mechanical computation.

BROUWER

construct the sequence of whole numbers?

Let us put down a series of strokes one after another. They are strokes,

may be taken as
but they ~~are also~~ symbols; ~~for~~ dots would do as well, or apples, horses, and even
as many different kinds.
~~that many nothings.~~ If we put down /////, we might pair them with

the fingers of one hand, ~~or~~ with the same number of apples, *with a finger, an apple, a star, a thought,*
The number ~~and~~ *the*
of strokes will be the same as the number of fingers and of apples, if *broomstick of*
mother with.

there is one apple for each stroke, and one finger for each stroke, or

that many ones of and so on for who know you these.
for each apple. The strokes ~~are~~ the articulated symbol of all the classes

that have the same number: they are a class of classes. We have chosen

the more convenient *arabic* symbol 5, the cipher. ~~Note again that~~ *now* We can forget
or by horses,
all about strokes; they might have been replaced by dots, /or by that many

each differing in kind;
nothings ~~even of different kinds~~ all of these will be classes having the
same number, viz. 5. (As the members of classes become more numerous the

need for symbolization becomes more urgent. How could you distinguish *at a glance*
between 21 and 22 if you did not have these abbreviated symbols? Sym-

bolically, nothing could be more simple than 10^{12} for a thousand billions.)

What then is the cardinal number five? Professor Kasner answered *this question* in no
uncertain terms: "The cardinal number of the class C is thus seen to be the

symbol representing the set of all classes that can be put into one-to-one
correspondence with C. For example, the number five is simply the name, or
symbol, attached to the set of all classes, each of which can be put into one-

to-one correspondence with the fingers of one hand." If you ~~have any~~ doubt

~~about~~ the validity of this observation, just watch a cash-register and see
what it does with ~~symbolic~~ numbers. *And why should we do what it can do?*

We have constructed an integer. How do we construct different integers?

We got involved with 5. (We did so, not only to reach Professor Kasner's
statement, but also because the ~~the~~ fingers of one hand have been--and sometimes
still are--an important standard for counting, ~~until some one thought up the~~
possibly a shepherd to keep track of his sheep.
use of calculi or pebbles.) Now let us compare one series of strokes with

another. We might use the same five strokes this way:

(a) // or 2

(b) /// or 3

In this process, which is again called "constructive," we can decide which of the ~~xxxxxx~~ groups is the larger, by checking one against the other, stroke by stroke. Here we have different numbers, different symbolic constructions.

But how can ~~that~~ ^{the} vast and intricate edifice of modern mathematics (no living mathematician knows more than one fourth of it) arise from such humble beginnings, and allow us to probe nature as successfully as we do? Our first question ~~now is~~ ^{will be}: How do we construct the sequence of integers? /// is //+/, or 3 for short. As we add one more stroke, we obtain a different collection. How long can this go on? If it is a question of time, then if time ~~goes~~ ^{went} on forever, and if we were there that long, ~~we~~ ^{would} or machines to take over the drudgery--there ~~would~~ be no end of the sequence, which is a tautology, ^{assuming that we know what we mean by 'forever'?} But how can we know that the sequence can go on and on without actually carrying it out, in such a way that whatever number n is given, it is always possible to pass to the next n'; or, if n is possible, so is n'? (By 'possible' we here mean that, a thing being posited, nothing impossible follows.) How do we know that nothing impossible follows from $n+1$? If, as Weyl says, "the open countable infinity is basic for all mathematics," the process by which the integers are created, and in which functions of an argument ranging over all integers n are to be defined, ~~we~~ ^{we} are, indeed, ~~faced~~ ^{as so many have believed, perhaps} with a basic problem? ^{might point out that of course $n+1$ is possible, since that is what it is, namely $n+1$. Yet modern philo-} ~~Now it seems that in seeking the root of this infinite~~ ^{sophers of mathematics insist upon} process, ~~we have not made much progress since the Greeks.~~ We have, ~~in~~ ^{on the other hand,} ~~fact~~ ^{must} thrown overboard most of the attempts at verification made ~~even~~ ⁱⁿ this most critical age.

I. The World of Symbolic Construction: Logic and Mathematics.

Formalization as symbolic construction, and reasoning as mechanical operation. The definition of number as a collection of collections. The attempt to derive mathematics from the syncategorematic terms of logic. The reduction of logic to logicistic.

Mathematics as "a game with meaningless symbols, played according to arbitrarily chosen rules" (Hilbert); as "nothing but tautologies" (Wittgenstein, Russell). Thus, what we believe to be the most abstract activity of reason can be transferred, often with advantage, to electronic machines which, though more complex, are basically no different from a wheelbarrow (Turing, Kanlan, Bronowski).

However disturbing this may appear to some, it is

Thanks to the extrusion of what Lord Russell calls the 'metaphysical' from logic and mathematics, *that* these have actually become an amazingly powerful tool for the investigation of nature. The paradox is that the whole edifice of modern mathematics can be constructed from mere repetition of nothing at all — not according to so-called 'a priori laws of thought,' but after freely chosen rules that can be built into machines. The world of mathematics leads to greater efficiency and control in the physical world in the measure that it becomes ~~more~~ empty, even of the stuff that dreams are made on.

The most striking feature in modern thought on the nature of logic and mathematics may be observed in the evolution of the concept of rigour, starting as it did from the proposition of identity 'A is A', then replacing it by the function 'A (A)', leading on to "the game, played in silence, without words" (Weyl) and confided to machines devoid of mystery. Thus the limit of rigour appears to be achieved when nothing is said at all. (Wittgenstein) In this well founded view, the only remaining activity of the mathematician as distinguished from a machine is that of selecting rules for the game. (Meanwhile, some modern logicians believe that machines could be made to perform even this function, and eventually machines ~~that~~ produce such machines.)

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to

II. Physics: The Shadow World of Symbols.

Ancient physics began with questions such as "How can something become, at all? What does the word 'nature' stand for? What is nature? What can we do to understand what is and does in the world? What is movement? What is place? What is time?" Not only the answers which have been given, but even the legitimacy or relevance of the questions themselves are debatable. However that may be, no one engaged in scientific work can afford ~~time~~ to discuss them if he is to make headway in his field. Without discussing even what is meant by 'universe', modern astronomical observation and theory have ~~lead~~ far away from the cozy kitchen of Aristotle's De Coelo and Dante's Divine Comedy.

In what sense has the physical world become empty? Eddington described it as a shadowy world of symbols. The raw materials of the physicist are measure-numbers, 'manufactured articles' containing a generous share of symbolic construction. The tremendous strides of this science kept pace with increasing mathematization. (Witness, the use of Group Theory.) The point is that this method really works.

Nonetheless a change has occurred in the human mind, which appears to be nothing short of a mutation: a change affecting man's ability to wonder. The student of nature no longer asks the kind of questions which obsessed the ancient mind, nor could he get very far if he did. Lord Russell says that of Aristotle's four causes, modern science admits only one, namely the efficient cause. (Actually, we do without this type of cause: no such causal relationship finds expression in an equation.) Russell does not mean that there are no other causes in nature; he merely observes that no other type of cause occurs in the scientific account of the world. In fact, it can be shown that muddling preoccupation with any other type of why or wherefore was the main cause of delay in the progress of science.

Aristotle had shown that the idea of good or of purpose is foreign not only to pure mathematics, but also to mathematics as applied in the study of nature. (Mathematics, to him, was a realm of beauty.) But the metrical investigation of nature was aimed to reveal only one aspect of a more varied and comprehensive whole. He realized that as we leave the animal kingdom, we can know very little about purpose. Now, by that radical change of mind I mean the scientist who, as a man, sees no further cause for wonder once he finds the answer to the kind of question he asked.

The fact remains that in the scientific outlook the natural world is devoid of nature in any of the senses recorded by the ancient mind. We ought to realize that the words we continue to use in our scientific context, such as matter, form, body, nature, substance, cause, agent, action, energy, and even life, are no more than metaphors.

We must face the fact that if the world were no more than what can be known of it in the scientific outlook, it would be a very hollow one indeed, and its ultimate rationality none other than the kind which can be wrought by a machine. What is Mr. Smith? A mere bundle of events, a collection of occurrences. What is his person apart from all these occurrences? A mere imaginary hook, from which the occurrences are supposed to hang. The day we could manage life in such a world, we might look forward to the disintegration of mankind in total equanimity.

III. The Inanimate World of Biology.

If we took into account the etymology of the words 'inanimate' and 'biology,' the title of this lecture would be a contradiction in terms. Actually it is not, if we follow current opinion. (There are exceptions, such as the physicist Irwin Schroedinger.) Experimental biology presents no single trait clearly known to be characteristic of living beings. The method we follow — leading to what Aristotle called knowledge from causes that are prior in being, namely matter and agency — is such that the distinction between living and non-living could hardly be more than unwarranted hypothesis. Outstanding biologists believe that whatever the difference, it could be nothing like a so-called essential one.

It was with Descartes that the 'principle of life' was conceived in the mode of a wedge driven into physiochemical reality. The 'vitalism' of some decades ago, though not that crude, was in the same vein. On the other hand, Aristotle's way of discussing the problem of life is at once so simple and so difficult, so foreign to our method of questioning, that it is as likely to remain outside the domain of our biology as life itself. The newest way of answering 'What is life?' is to show that the ~~question~~ ^{problem} is meaningless; apparently it begs the question, based as it is on the assumption of a real difference between the things which we happen to call alive, and those we call inanimate. If 'scientific explanation' is confined to what we have seen, all living phenomena must be accounted for in terms of the stuff they are made of, which is obviously neither more nor less chemical than that of stone or smoke. Thus the enigma of life is already solved by the very nature of a method which has proved its worth. In other words, if life is to be explained in a scientific way, this will have to be done in terms of physiochemistry.

Evolution, therefore, has ceased to be a general problem. What are called 'natural species' are merely different arrangements of the same. 'Higher or lower' means 'more or less complex,' in the sense than an electronic computer is

relatively more complex than a slide rule. New arrangements are induced by stray radiation in nature. If the random mutation is favoured by subject and milieu, it may result in a new, relatively stable species. All this seems to occur without design, purpose and design being themselves the product of something that "just happened," as Empedocles said some 2500 years ago. Thus the appearance of the animal who wonders what kind of an animal he is^{is} the result of just another random mutation, and (as an aristotelian) I can see no reason why it should not be. It is the law of great numbers that does the tricks and eventually strays into a mere bundle of events which asks how aimless frequency can account for itself. This question, of course, is meaningless, when "nothing is but was is not."

THE HOLLOW UNIVERSE

We are concerned here with ^{that} total view of science and its aims, ~~such as the one~~ suggested by the more advanced interpreters of the ~~modern~~ scientific outlook. Their final interpretation is by no means accepted by all scientists, ~~indeed it is~~ ^{not even the} ~~same~~ common view amongst them; yet it is the one which, in the popular mind, ~~is thought~~ the most truly scientific.

The names 'Mathematics,' 'Physics,' 'Biology,' and 'Psychology' are still in use, yet the kind of knowledge and subject ^{matter} they stand for differ almost beyond recognition from what they ~~were~~ ^{for} those who first used them. These terms have become strictly equivocal, and their new meaning can be understood without any knowledge of the earlier one. What we call mathematics, the Greeks ~~had~~ named 'logistic'; the many meanings of the Greek word 'physis' have ~~not~~ been explained away as irrelevant to the scientific outlook; 'biology' is no more than a sheer linguistic convenience, when the distinction between living and non-living is at best an unlikely hypothesis; 'psychology' must fare even worse, since 'psychè' or soul has ~~been reduced to a mere~~ ^{been reduced to a mysterious thing which some people} still believed ~~man~~ ^{to be} possessed of.

The most fascinating trait of the scientific outlook is the way in which it interprets formalization and explanation. The result is a world empty of anything which philosophy had believed ~~to be~~ essential to it. To achieve such a view of the world it is enough to replace abstraction and demonstration by formalization and calculation, and to conceive of the future as contained in the past.

I. The World of Symbolic Construction: Logic and Mathematics.

Formalization as symbolic construction, and reasoning as mechanical operation. The definition of number as a collection of collections. The attempt to derive mathematics from the syncategorematic terms of logic. The reduction of logic to logicistic.

Mathematics as "a game with meaningless symbols, played according to arbitrarily chosen rules" (Hilbert); as "nothing but tautologies" (Wittgenstein, Russell). Thus, what we believe to be the most abstract activity of reason can be transferred, often with advantage, to electronic machines which, though more complex, are basically no different from a wheelbarrow (Turing, Kaplan, Bronowski).

Thanks to the extrusion of what Lord Russell calls the 'metaphysical' from logic and mathematics, these have actually become an amazingly powerful tool for the investigation of nature. The paradox is that the whole edifice of modern mathematics can be constructed from mere repetition of nothing at all — not according to so-called 'a priori laws of thought,' but after freely chosen rules that can be built into machines. The world of mathematics leads to greater efficiency and control in the physical world in the measure that it becomes ~~more~~ empty, even of the stuff that dreams are made on.

The most striking feature in modern thought on the nature of logic and mathematics may be observed in the evolution of the concept of rigour, starting as it did from the proposition of identity 'A is A', then replacing it by the function 'A (A)', leading on to "the game, played in silence, without words" (Weyl) and confided to machines devoid of mystery. Thus the limit of rigour appears to be achieved when nothing is said at all. (Wittgenstein.) In this well-founded view, the only remaining activity of the mathematician as distinguished from a machine is that of selecting rules for the game. (Meanwhile, some modern logicians believe that machines could be made to perform even this function, and eventually machines ~~that~~ produce such machines.)

II. Physics: The Shadow World of Symbols.

Ancient physics began with questions such as "How can something become, at all? What does the word 'nature' stand for? What is nature? What can we do to understand what is and goes in the world? What is movement? What is place? What is time?" Not only the answers which have been given, but even the legitimacy or relevance of the questions themselves are debatable. However that may be, no one engaged in scientific work can afford ~~time~~ to discuss them if he is to make headway in his field. Without discussing even what is meant by 'universe', modern astronomical observation and theory have lead far away from the cozy kitchen of Aristotle's De Coelo and Dante's Divine Comedy.

In what sense has the physical world become empty? Eddington described it as a shadowy world of symbols. The raw materials of the physicist are measure-numbers, 'manufactured articles' containing a generous share of symbolic construction. The tremendous strides of this science kept pace with increasing mathematisation. (Witness, the use of Group Theory.) The point is that this method really works.

Nonetheless a change has occurred in the human mind, which appears to be nothing short of a mutation: a change affecting man's ability to wonder. The student of nature no longer asks the kind of questions which obsessed the ancient mind, nor could he get very far if he did. Lord Russell says that of Aristotle's four causes, modern science admits only one, namely the efficient cause. (Actually, we do without this type of cause: no such causal relationship finds expression in an equation.) Russell does not mean that there are no other causes in nature; he merely observes that no other type of cause occurs in the scientific account of the world. In fact, it can be shown that muddling preoccupation with any other type of why or wherefore was the main cause of delay in the progress of science.

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*"L'être n'est qu'un bon dans le non-être," if you
see what I mean.*

Regarding the subjects of mathematics, we are invited, so it seems, to identify them with and restrict them to the logical fictions and symbolic constructions that provide the "creative definitions" of a technique which operates according to arbitrarily chosen rules, the operations themselves being of a purely mechanical nature, as our computers demonstrate. ¶ As to the physical world, we can reach what is commonly called ^{the} scientific outlook by simply identifying the study of nature with mathematical physics taken as a limit towards which all the branches of experimental science converge. This application of mathematics to ^{sensible} reality (as Aristotle practised it in his theory of the rainbow) must prescind from "nature" in favour of mere "sense data," and take "movement" as a "state" (nowadays a succession of immobile states) rather than as ^{one} kind of becoming; it also compels us to ~~neglect~~ neglect sensible qualities as unamenable to measure. Further, if "in science it is the past that determines the future, not the future the past," Lord Russell is right when he concludes that the good or "final causes do not occur in the scientific account of the world." From this point of view, the ^{universe} ~~world~~ turns out to be a vast tautology from which even thought, as the characteristic of a certain type of being produced by nature, must be expelled. The fore-mentioned identity appears to be confirmed inasmuch as we can discern no clearcut line to divide physics from chemistry. ¶ Finally, the difference of the

(4)
living from the inanimate fades when we fail to
distinguish external experience, such as that of
a tangible surface or number, from the internal expe-
rience of being alive, as when we are aware of touching
an object or of seeing a number of things, or when knowing
that we know, or knowing that we knew; or when we recognize
something we call good, such ~~as~~ as, that a man see, have
arms and legs, have food when hungry. But if this
distinction falls short of being scientific in the
current sense of ~~the word~~ the word, is it therefore
irrelevant to what ^{is} things are and to ~~the~~ knowledge
of ~~them~~ of what things are?

II

1. Eddington - Gr. Th.
2. Einstein: Limiting process, Idealisation.
3. Nonetheless: we only get answers in terms of our question. And so'....

4. Whence the tenacity?

The notion of 'event':

A bundle of events. Why 'Mr. Smith is'?

The crude conception of substance: if you peel off or ~~scratch away~~ the accidents....

Quid, actually? For more tenuous than Russell's Mr. Smith. This shown by instant: time composed of non-existents.

Time & space replaced by causal relation. Cf. Weyl.

But does that make Mr. Smith less substantial?

Diff. in nature of questions. Cf. Wittg. - Also diff. in wonder. Suppose you wonder 'what time is'....

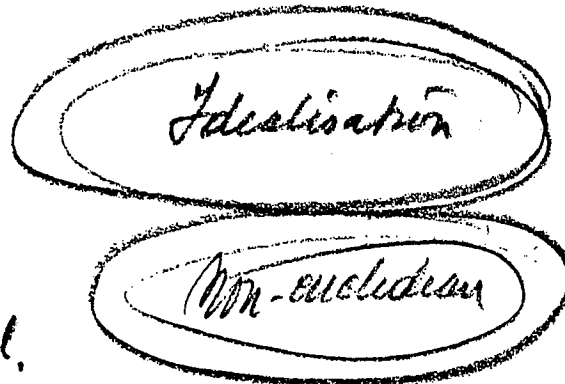
Two effects of wonder (In Hattk.)

Two kinds of wonder.

Contrad. triangles

operational definitions

impul. div. of sc. & phil.



Notes pour Hgr Pareet.

Notes de CDK. pour le sermon de la Meire marquant l'ouverture des tribunaux - Québec, sept. 1954.

1. Le S. Père rappelle que l'ordre juridique est lié à l'ordre moral.
2. Il est opportun de le rappeler. On tend à confondre normes de production et normes morales.
3. Les relations humaines ne sont pas simplement des rapports de production.
4. Le gouvernement des hommes par des hommes, et les lois humaines doivent servir ~~l'humanité~~ le bien humain, ~~l'humanité~~
~~l'humanité~~
en se réglant sur la loi maternelle qui est une participation de la loi éternelle dans la créature raisonnable.

A l'occasion de la Semaine Sociale de
Rennes et du cinquantenaire des Semaines Sociales
de France, S.S. Pie XII terminait sa lettre auto-
graphe du 22 juillet 1954, par les paroles que voici:
"Il faut que l'ordre juridique se sente de nouveau
lié à l'ordre moral. Et plaise à Dieu que celui qui
commande, comme celui qui se soumet, n'aient désor-
mais devant les yeux que l'obéissance aux lois éter-
nelles de la vérité et de la justice!" (Doc. Cath.,
8 août 1954, col. 966-7)

Depuis environ trois siècles la philoso-
phie juridique (et il faut surtout se méfier de
ceux qui prétendent n'en pas avoir ni de vouloir
en faire!) assimile les lois de la conduite des
hommes aux règles de la production d'une oeuvre
extérieure. En fin de compte, cela revient à dire
qu'on veut substituer à la prudence, vertu intel-
lectuelle de l'agir, l'habileté de la fabrication.
Certes, si d'être un homme de bien ne demandait que
l'effort d'apprendre un métier, de même que la plu-
part des hommes deviennent capables de faire quelque
travail utile, ainsi seraient-ils par là même des
hommes de bien. D'après les dictées de Lénine, la
vie sociale des hommes devrait être calquée sur "la
discipline de l'atelier", organisée en vue de la
production. Cette discipline, précisait-il, doit
s'appliquer avec une telle rigueur, par "les ou-

vriers armés", et tout écart des règles établies si promptement puni sans nul merci, que la nécessité de les observer "deviendra très vite une habitude". [Lénine souligne ces deux mots.]

Par malheur cette conception des règles de la conduite humaine n'est pas propre aux marxistes. Entendons qu'elle n'est que trop généralement reçue par tous ceux qui se font de l'ordre juridique une conception positiviste, pour ne pas dire, simplement, opportuniste. [Citer, ici, des extraits d'un discours de M. Robert Anderson, dont copie ci-jointe.]

Pourtant, la distinction entre l'art, dont le but est la qualité, la bonté de l'oeuvre extérieure, et la prudence, dont la fin est la bonté même de l'agent, est si radicale que la théologie voit en Dieu même une distinction à faire entre l'art divin, par lequel le Créateur produit les choses qu'il fait; et le gouvernement divin, où Dieu dirige ses oeuvres vers leur fin, qui n'est autre que sa propre bonté en Dieu.

Si, par impossible, Dieu, produisant les créatures, n'était pas autre chose qu'un artisan; si Dieu s'en tenait à produire, sans plus, ses oeuvres ne pourraient avoir pour fin que leur propre bonté d'oeuvres, et leur développement ultérieur ne serait alors que l'effet d'une chiquenaude à la Descartes, développement qui n'aurait pour toute mesure que l'essence même de ces oeuvres, leur essence étant conçue comme une sorte de ressort comprimé. On imposerait ainsi à Dieu, comme modèle, l'artiste, ou artisan humain qui, en produisant une oeuvre n'a d'égard que pour les règles de son art, etc; son oeuvre une fois produite, s'en désintéresserait, sans nul égard à l'usage, ni de son art ni de son oeuvre. Or, c'est précisément l'usage de l'art, qui relève de la prudence. Le seul fait de construire sans permission une bonne maison sur la propriété d'autrui n'est pas contraire aux règles techniques de la construction comme telles; cela ne ~~ne~~^{fait} pas de la maison une oeuvre mal construite. De même le médecin qui se mettrait à disposer d'une vie humaine sans laisser aucune trace pourrait, ce faisant, démontrer qu'il en sait plus long que le pro-

fane et n'aurait rien fait de contraire aux règles de la technique. Si dans l'un et l'autre cas le faire était habile, l'action n'en était pas moins mauvaise: non pas à cause d'une infraction aux règles de l'art, mais pour avoir manqué aux règles de l'agir, aux lois de la conduite, qui sont d'ordre moral, et dont l'application est l'office de la vertu de prudence.

Voici comment saint Thomas démontre la Providence de Dieu. [Voir Ia Pars, q. 22, a. 1, c. et ad 1.] Marquer, surtout, la distinction à faire entre l'ordre dans les choses, le bonum ordinis qui leur inhère, et l'ordre des choses à la bonté de Dieu. Celui-ci, en tant qu'il trouve sa mesure dans l'intelligence divine, qui est la raison de cet ordre, s'appelle précisément providence. L'exécution de cet ordre, voilà en quoi consiste le gouvernement divin. [Cf. ibid. ad 2.]

Or, cette "ratio gubernationis rerum in Deo sicut in principe universitatis existens, legis habet rationem. Et quia legem oportet dicere aeternam". Voir Ia-IIae, q. 91, a. 1, c.]

Or, la loi naturelle n'est autre chose que..... [Voir, ibid. a. 2.] Et les lois humaines n'ont d'autre fin que... [a. 3.] Toute loi, même celle établie par les hommes, doit être référée à la loi éternelle.

Voilà pourquoi l'ordre juridique est lié à l'ordre moral.

Le bon gouvernement, les législateurs et ceux qui aillent à faire valoir la justice, coopèrent, à leur façon, au gouvernement divin. De là leur grave responsabilité.

Par là on voit aussi la perversité d'une philosophie juridique qui voudrait se soustraire à cet ordre souverain, comme des soi-disant législateurs qui ne voient dans les lois qu'un expédient du jour, n'ayant, pour tout principe, que l'opportunisme de celui qui détient le pouvoir de contrainte, ou de laisser-faire.