

Christianity and Scientific Effort

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Calvinism has come to the kingdom for such a time as this. Shall we speak of making a *Case for Calvinism* or shall we seek for her a place under the sun for Calvinism next to other systems of thought? Calvinism is Christianity come to its own. She and she alone has the answers for the desperately sin-sick world of our day. In particular she and she only, has the answers for the dilemma of modern science. "The unbelieving philosophy of nature," said the late Dr. Valentine Hepp, "is lying at death's door."¹

Hepp adds: "Only the Calvinistic world can create any order in the chaotic condition of science, because Calvinism is the most consistent and harmonious Christendom. It puts all rationalism under the ban. Human reason is not considered an autonomous power, but a gift of God which must always remain subject to the revelation of God."²

From these two remarks on the part of Hepp we may well take our cue this evening. In the first place let us ask if it be really true that natural science lies at death's door. In the second place let us see whether and in what sense Calvinism has the answer to the disease of science.

The Dilemma of Modern Science

When a college student in a modern university begins his career he is told that the purpose of his education is to organize his experience. To do so he must learn to use an impersonal method of intellectual inquiry. He must seek for a clarification of the basal principles of human experience. He must arrive at conclusions about life that will meet with universal assent. In the past, he is informed, men have used the method of authority. That is, they have used, not the method of the authority of the expert, which is quite legitimate, but they have submitted their intellects completely to a church or a

¹ *Philosophy of Nature*, p. 199.

² p. 51.

book. In such a case the "individual relinquishes his independent efforts to determine what is true or false."³

In criticism of the idea of authority, the student is told that if the individual man is liable to error this does not prove that the authority he leans on is not also liable to error. "But even if it were granted that authority is less frequently liable to error, what justification is there for not tolerating alternative inquiry? For we cannot in advance decide on just which occasion the individual will be wrong. Consequently we can not wave aside any objection to authority until that objection is refuted on specific grounds. Thus there is very high probability that on the authoritarian method error must occur: but what is more serious, such error is perpetuated, and therefore far more costly than mere error is likely to be."⁴

There is then, the student is informed, no escape from error anywhere. Men have followed vain hopes when they, in desperation, cast themselves upon authority. But gradually they have learned to take the matter of knowledge into their own hands. They have learned to follow the evidence wherever it might lead them. They have followed that which all men can see to be true. To be sure, there is still the individual. He has his prejudices. He has his limitations. He is often controlled by his likes or dislikes. But the scientific method is the method which marshals evidence on effective grounds alone."⁵ "The individual introduces ideas, the scientific community appraises them by its objective criteria."⁶ "The scientific method agrees with the authoritarian method in recognizing that individual men are extremely fallible. But whereas the latter method transfers the function of inquiry to a given man or given group of men, who are at best fallible in only lesser degree, the former develops a set of procedures which are the prerogatives of no single group."⁷ "In science, the greater the number of trained men the greater the likelihood of its advance. In authority, on the contrary, the greater the number of trained men, the greater the likelihood of its breakdown: for it the growth of intellectual independence, dissension under so rigid a method is inevitable."⁸

³ Randall and Buchler, *Philosophy and Introduction*, College Outline Series, p. 51.

⁴ p. 51.

⁵ p. 59.

⁶ *Ibid.*

⁷ p. 60.

⁸ p. 60.

With these introductory remarks on the contrast between the method of authority and the method of science the teacher then leads the pupils somewhat more fully into the field. "It is important now," he says, "to make explicit a distinction between two very different aspects of science: formal science, which embraces the sciences of mathematics and formal logic, and empirical science (or natural science), which embraces the sciences called 'physical' and 'social' chemistry, biology, physics, economics, sociology, etc. The term 'empirical' means 'relating to experience.' Formal science asserts nothing about natural phenomena: it is independent of experience, and none of its proofs rest on how facts actually stand."⁹ "In other words, each empirical science deals with some aspect of what can be experientially known, and attempts to formulate laws about it; it tests its theories by observing with the special technique that it employs, a set of facts."¹⁰ In the case of formal science we regard statements as hypothetically true "and ascertain in accordance with rules and definitions what other statements would, in consequences, have to be true."¹¹

There are several points about this description as the college student reads it in Randall and Buchler that will likely draw his attention.

1. These men do think that there is basic opposition between what they call the method of authority and the method of science.

2. These men apparently are not of the opinion that authority and science operate in different fields and so need not to clash at all.

3. These men do not think that science speaks of that which is less important than religion. They do not say that science deals only with phenomena while religion deals with noumena: or that science merely describes the external aspects of things in this world leaving men quite free to believe about God what they wish. Even empirical science is for them an explanation of the structure and workings of nature. "The purpose of empirical science is to understand the structure and working of nature. If we had to summarize its essential procedure in the broadest terms, we might do so as follows. As a result of certain observations he has made, or as an outgrowth of knowledge he already possesses, the scientist finds himself confronted with a problem concerning objects or facts. He may ask any of a number of questions: 'What explains the properties of these objects?' Or, in order to interpret what he has observed, to see a connection among the

⁹ p. 61.

¹⁰ p. 61.

¹¹ p. 62.

facts before him and thereby understand their significance, he forms an hypothesis (theory), or rather several hypotheses. He must then test these hypotheses, in order to discover the most satisfactory among them. A hypothesis tells him how to look at the facts. Each hypothesis prescribes an approach. His testing begins when he inaugurates systematic or a deliberate observation (experimentation), to see which of the alternative prescriptions is favored by the facts he had not observed before forming the hypotheses.”¹² “The purpose of science is not to arrive at an exhaustive catalogue of individual facts but at a system of general principles in terms of which these facts can be explained and rendered more significant.”¹³ For Randall and Buchler there are therefore two mutually explanatory principles of human experience: the scientific and the authoritarian. And each principle is comprehensive in its sweep as well as totally exclusive of its opposite.

4. These men have settled upon the scientific method as the true method in terms of the scientific principle itself. They were quite consistent in doing so. The issue as they see it is whether man has or has not in himself the right to interpret his experience in terms of principles that he himself discovers within his own experience. Accordingly, when they say that it is probable that authority will err they assume that authority must be tested by experience as experience is interpreted by the man who does not believe in authority. They say that authority will probably err and that what it says must be tested in each particular case by a method such as authority cannot recognize.

5. These men have settled the issue between authority and the scientific method without appeal to even as much as single fact of experience. Their assertion that authority will in all probability often be wrong is made on purely theoretical grounds before any empirical research has been made.

This may suffice to indicate that our student will likely wish to look into the matter of the relationship of the scientific method and its accomplishments for himself.

1. He will wish, of course, to look into the question whether these men are really representative of modern thought on the place and meaning of science. Assuming for a moment that they are, and knowing that they are exceedingly well informed men of high standing, then:

2. He will realize that he cannot dispose of the whole problem in terms of a few general remarks. One such general remark is that surely there can be no conflict

¹² *Idem.*, p. 67.

¹³ p. 68.

between science and Christianity because there is only one God and there can be no conflicts between his revelation in and about us, that is, general revelation, and his revelation for our redemption, that is, special relation. In this general remark there lies no doubt the solution. But that it is the solution our student will be quite unable to see with intelligence till after he has made some analysis of the meaning of his own position. For there are many non-Christian scientists who would make the same general remark and yet mean something quite different from what we as Christians and particularly what we as Reformed Christians mean by it. For these non-Christian scientists the word of God means virtually the same as The Universe. So for them to say that there is one God is to say that there is one Universe and that there is no ultimate disharmony in the universe. Is it the same as to say that science assumes that there is Order in Nature.

3. Our student will find little help and perhaps some confusion by making the distinctions between description and explanation. To be sure, the Scientist merely describes what he sees. But he describes in terms of hypotheses. And these hypotheses teach him, he is told, what to look for and how to look at the facts of observation. And he must from the outset exclude some hypotheses as less likely true than others. Moreover his description includes the testing of hypotheses by facts. Not till final testing by experiment is made is the scientific act completed. The problem therefore cannot be solved by making a general remark to the effect that baseballs will fall off the Washington monument for unbelievers and for believers at the same rate of speed. This is no doubt true. And it is important. But it is not part of the problem of the relation between modern descriptive science and Christianity. That problem is how a method which produces a product such as it produces, that is, such as a non-Christian view of nature, is related to Christianity with its method which produces such a product as it produces, that is, the Christian view of nature.

4. Our student will also find very little help from the general statement that general revelation comes to all men and is there for all to see while special revelation comes only to some men and is accepted only by Christians by the power of the Spirit of God. It is, of course, true that general revelation comes to all men. But the problem is what each man does with it. It is his reaction to it which is the thing that counts. We are comparing two principles of interpretation. The Roman Catholic does not and need not take this question of interpretation into account except only in so far as men make obviously materialistic, mechanistic, or pantheistic interpretations. The Romanist is not concerned with asking whether the methodology of science, or for the matter of that, the methodology of non-Christian philosophy as based upon the assumption that of human reason, as not first interpreted in terms of Christianity, is right or wrong. Romanism assumes that "reason" has an area in which it is autonomous. It assumes that the reason of the Christian and the reason of the non-Christian are in this area equally

capable of interpreting or describing reality right. At most the Roman Catholic will maintain that a Christian is better off than is a non-Christian because he has some additional light that his non-Christian friend does not have.

And if one should be surprised at this in view of the fact that scientists are so outspoken in contrasting authority and scientific methodology, the explanation lies in the fact that the Romanist authority is not really different from that of the expert.

By this time our student seems to be deep into his problem. He has told himself that he will have to face the full significance of the modern scientific approach. And the full significance of it seems to be that, to all intents and purposes, it involves an explanation of the whole of experience in terms of a principle that is exclusive of Christianity as he has been taught to believe in it in his childhood days. And he has also told himself that he will not fall back on a lower form of Christianity, a Christianity like Romanism or Arminianism which makes lesser demands on the natural man than does the Reformed Faith in order to seek to solve his problem. The slogan of *Pro Rege*, everything for the king, including the field of science, has not for aught been taught him from his youth by the great Abraham Kuyper.

All for God or all for man; these appear to him to be the two mutually exclusive battlecries of two forces engaged on global combat without quarter.

But even this is not to fathom fully the complexity of the problem. If it were simply a matter of total war and nothing more, things would be terrible, but simple. But he has been told by his teachers that there is much that is constructive in the effort of the unbeliever. He has been told that common grace enables us as Reformed Christians, to incorporate into our interpretation of life the truths which non-Christian scientists have discovered for us. Does Calvin say that every bit of knowledge and of truth that is found anywhere must be seen as having its origin ultimately in the Holy Spirit? And do not Reformed Confessions speak of the light of nature, of glimmering and sparks that man, in spite of his sin, has retained of the knowledge of God and of virtue?

His Way Out of the Difficulty

We have led our student into difficulty. We have closed several tempting doors of escape to him. We must also try as far as we can, to get him out of his difficulty. At the beginning we made the boast that Calvinism has the answer. To make plain in what sense and how this is true it is well to stress at once that it does not find the answer by way of further refinements on solutions that others have offered. Hepp has well said:

"Those who hold the Calvinistic worldview are standing all but alone."¹⁴ The answer lies in presupposing the existence of the triune God of Scripture and of Scripture as the infallible Word of this God.

But to do this is to admit and admit gladly that Calvinism has no answer at all, if by answer is meant that which is penetrable to the mind of man. The Calvinist is not the most clever reasoner. He is not the deepest thinker. He is not the blindest believer. His God does not probably exist. His God does not possibly exist. He is not the reality corresponding to man's greatest thought. His nature does not "correspond to logic, that is, to the law of contradiction." His existence does not "correspond to fact."

To start from any or all of these propositions is to start from the bottom and work to the top: it is to say that the man resembles the child and that the Creator is like the creature. But you can only say that the man resembles the child, if you have first said that the child resembles the man. You do not prove that the sun exists by looking for it with an electric bulb. The very idea of an electric bulb is that its light is derivative, that is comes ultimately from the sun. Shall he that hath planted the ear not hear? If even the derivative knows then surely the original does. St. Augustine has taught us all we need to know on this score.

And this is the essence of the idea of revelation. It is to the effect that the very nature of every fact is revelatory of God and of his plan for the world to his own glory. There can be no other facts but such as do actually show forth the fact of the greatness and glory of God.

To say this much is to be utterly dogmatic, dogmatic in the sense of making apodictic assertions without evidence for doing so in the eyes of him who is not a Christian. Yet it is nothing more than the a. b. c. of what every Christian says when he asserts the doctrine of creation and the doctrine of the providence of God to be true on the authority of Christ speaking in Scripture.

2. In thus asserting that the God of the Scripture must be presupposed as existing and therefore as manifesting himself so fully in the world so that nothing exists that is not revelation of him, is to look at the two "books" of revelation, the Bible and the book of nature as part 1 and part 2 of the same book. The greatest of reformed theologians have stressed the fact that not even in paradise before the fall of man did general revelation come to man as something by itself. God came to man through the facts of his creation but he also spoke supernaturally to Adam about his task with respect to

¹⁴ *Op. cit.*, p. 149.

these facts. Thus special or supernatural preredemptive revelation accompanied the revelation of God to man through the facts of creation from the outset of history.

And this interdependence of natural and supernatural revelation puts the stamp of God's covenant claims upon each fact confronting any man at any point in history. It is of the very essence of the Reformed view of revelation that every man of the whole human race was represented in Adam. Every man was in Adam confronted with supernatural revelation as conjoined with and interpretive of natural revelation. When Paul therefore speaks of man as being responsible for seeing the divinity and power of God round about him he adds that this has been so from the beginning. Paul stresses the unity of history. If men do not now have the supernatural revelation of God's grace given unto them, this is due to the fact that God is leaving them to the consequences of their rejection of the supernatural as well as natural revelation that he had given them even in paradise. The race as a race is conjointly responsible for the cultural task that God in paradise gave man to do. "Go work in my vineyard," that was the original command of God to man. That same commandment speaks still in every fact confronting man.

In particular, it is of importance to note that man as made in the image of God is himself directly revelational of God's commandment to himself. What on a Roman or Arminian basis would be purely subjective, namely the activity of man the knower, is from the fully biblical point of view still objectively revelational of God to man. So man can never escape having knowledge of good and evil. He cannot do wrong without his moral consciousness within him rebuking him. He cannot do any good without his moral consciousness approving of his doing it. Thus what is sometimes called the image of God in the wider sense, man's rationality and morality, must still be viewed as God speaking to man in the imperative voice. God speaks in the imperative voice to man because he cannot speak otherwise. And man cannot be otherwise spoken to than by authority. The whole of the created universe is the means by which the I-thou relationship of God and man is effected.

If all this be so then it follows, too, that the manipulation of every fact in the universe in every branch of science must be taken to be a means by which the believer in God and his Christ must call the unbeliever to repentance. Each fact is by itself calculated to call men to repentance. But the believer must be engaged in making these facts (brought into relation with one another) sound, if possible, still more unmistakably and clearly to be the voice of God calling men back to God.

Shall we say then that study of science in general was not meant to be a means by which sinners are called to the salvation that is in Christ? Shall we say this because the things of morality and religion in the narrower sense cannot be manipulated the way we

can manipulate material things? Or shall we say this because the things of God cannot be brought to the test in the way that scientists would test a theory by experiment?

The Christian religion cannot be defended piecemeal. It proves its truth to men, whether they accept it or not, by offering itself as the foundation of proof. It is fatal to say that there is at least as good a case for Christianity is probably true. Christianity is true or nothing is true. Christianity is in accord with logic because logic, to be logic, must be in accord with Christianity. Christianity is in accord with the facts of experience because these facts, if they would be experienced, better take refuge under the roof of Christianity.

Armed with such convictions as these our student would need no longer have to fear to face the question under discussion. He would then have no immediate and ready answers for detailed problems of science, but he would have a philosophy of science that would enable science to make sense to itself. And he would no longer approach the unbelieving colleague in the laboratory timidly asking whether there may not be, at least some area of human experience, which both of them could agree on interpreting in the same way by means of the same principle. He would rather boldly though humbly ask his colleague to see that unless he is willing to come over to the side of Christianity, he will lose the fruit of his labor.

The Call to Conversion

Let us now think of this student as he seeks to call his fellow scientist to repentance lest he finally lose both himself and the fruit of his scientific labor as well. In general this should mean that the believer can show the unbeliever that unless the universe which science investigates is what the Christian says it is, then there would be no such thing as science. It would be to indicate that unless the providence of God upholds all things as the creation has brought all things into existence, and unless the one all inclusive plan or purpose that God has with the universe be back of all things, then there would be no intelligible way in which facts could be shown to be facts and laws could be shown to be laws. All the basic concepts of science would be floating concepts, a network thin and airy up in the sky, without any ascertainable contact with anything empirical. On the other hand, the facts would be one mass of blooming buzzing confusion without ascertainable separate existence the one from the other.

To put the matter this way is to suggest that modern science is inseparably involved in modern philosophy and has not been able and never will be able to solve the riddle how its universals and its particulars, its constructions of thought and its empirical data,

may be brought into union. (Incidentally, it may be added that modern theology in its main representatives faces the same insoluble situation.)

When the matter is approached in some such form as this then we are frankly taking the Christian position for granted as true. We are not first starting from experience in order to prove the truth of the Christian religion from experience. If we did that then our position would ultimately fall into the same pit of rationalism-irrationalism in which modern thought is in its death gasp. In other words, it is the frankly authoritarian position of the triune God of Scripture from which we start in order then to show that unless we thus start there is no possible intelligibility in the scientific procedure.

1. Let us now briefly examine how it appears that modern scientific procedure is utterly unintelligible if taken on its own premises.

We may do this by discussing in turn the question how knowledge, that is, scientific knowledge, is supposed to get under way, with particular stress on the question of the data of knowledge, that is its empirical reference, then turning to the question of the meaning of hypotheses and their application to the data of science and thirdly asking the question of verification of these hypotheses by testing them in relation of facts.

Where and what are the facts which science uses as its empirical foundation? Well, you say, pointing your finger, there they are, in the barnyards, and in the zoos for biology. There, take the elephant, that is a fact big enough and plain enough. What is wrong with the non-Christian counting, weighing and measuring the facts of common sense and how could there be any difference between his results and yours? But you need only to read Sir Arthur Eddington's description of the elephant in scientific terms to see that his scientific elephant looks quite different from the animal in the zoo. He says he is concerned as a scientist with three things only: there is always, first the mental image which is in our minds and not in the external world: there is, second some common kind of counterpart which is in the external world but is of inscrutable nature; and there is, third a set of pointer readings which exact science can study and connect with their pointer readings.

In his book *The Philosophy of Physical Science*, Eddington uses the famous illustration of the ichthyologist. He speaks of selective subjectivism. In other words, he lays great stress upon the indirect and abstract character of science.

In another book *Science and the Unseen World* he speaks of the symbolic texture of the scientific outlook. "And if today you ask a physicist what he has finally made out the aether or the electron to be, the answer will be not in terms of billiard balls or fly wheels or anything concrete; he will point instead to a number of symbols and a set of

mathematical equations which they satisfy. What do the symbols stand for? The mysterious reply is given that in the phenomena of the physical world it necessary to know the equations which the symbols obey but not the nature of that which is being symbolised."

It may be objected that such men as Eddington are not really representative of the best there is among empirical scientists. Eddington, you see, is an idealist and draws idealist conclusion in philosophy from the fact that the human subject is involved in the scientific procedures. Surely, you say science starts from the empirically given facts, facts not dependent on the mind of man.

Well, then listen to a realist critic of Eddington. Says C. E. Joad in his *Philosophical Aspects of Modern Science* on criticism of the position of Eddington: "Thus the world of common experience is the *datum* from which the physicist starts and the criterion by which he determines the validity of the structure he raises. It is, therefore, presupposed as real and objective throughout." But Eddington is not slow in answering this by saying: "The argument seems to be that unless a *datum* is presupposed to be objective no inference can be based upon it. This is so astonishing a suggestion that I wonder whether it can possibly be Mr. Joad's real opinion. The data furnished by individual experience are clearly subjective, and it is ultimately from these data that the scientific conception of the universe is derived—for what we call collective experience is a synthesis of individual experience." Elsewhere he speaks of the cyclic scheme of knowledge with which science has familiarized us as being illustrated by the house that Jack built "which instead of so coming to an end repeats itself indefinitely—that worried the cat, that killed the rat, that ate the malt that lay in the house, that was built by the priest all shaven and shorn, that married.... Wherever we start in the cycle we presuppose something that we reach again by following round the cycle. The science of physics constitutes such a cycle; and equally we may contemplate a series of cycles embracing that which is beyond physics. Starting at the point of the cycle which corresponds to our individual perceptions, we reach other entities which are constructs from our perceptions."¹⁵

Now from our point of view as Christians it makes no difference whether one takes the more "subjective" point of view of Eddington or the more "objective" point of view of Joad. Whether the scientist be subjectivist or realist, so long as he does not start with the doctrine of creation and redemption of Scripture, all factuality is lost in a bottomless pit.

¹⁵ *Nature of the Physical World*, p. 295.

The only alternative there is to the creation and redemption of all factuality by God is the idea of Chance. And the idea of Chance is an ingredient in every form of scientific theory and in every form of philosophical theory not directly based on Scripture.

The various modern schools of philosophy and of the philosophy of science are struggling in vain with the problem of the meaning of fact. They cannot find the first fact or set of facts from which they are supposedly taking their point of departure except by means of the idea of a universal principle, that is all comprehensive of all facts. A fact not set into such a system of relationships, they say, is wholly empty of intelligible communicative content. At best it would be an individual subject, merely psychological impression, from which there would be no exit to relationships with other facts.

The idealist logicians such as F. H. Bradley and B. Bosanquet, following the example of Hegel's *Phenomenology of the Spirit* point out that every statement about any fact is by implication a statement about reality as a whole. For a fact is, they say, what it is by virtue of the relationships that it sustains to other facts and to itself at other times and other places.

In his *Philosophy of Organism* Alfred N. Whitehead stresses the same thing when he points out that in recent science as over against the classical science of the time of Newton, time is made an ingredient in the thingness of the thing. We are, therefore, not dealing, he says, with facts or with unchangeable substances back of these facts in the way that the early empiricists thought they did. These substances were inscrutable. We are really dealing with events as the ultimate units of human experience. But these events, as the very idea of event indicates, have only a relative independence. They are like the whitecaps of the waves that we see on the ocean; they are basically part of one grand event which is the universe of our experience. The old substances must, therefore, be reduced to functions within experience. And the old distinction between subject as knowing and object as known must be thought of as a distinction within a deeper unity which is called Nature.

Cornelius Benjamin finds it impossible to decipher exactly what part of the total knowledge situation we speak of when we say that we know a fact or a set of facts is contributed to the object proper and what part to the physical conditions under which it is observed; what part to the bodily organism of the observer and what part to the mind of the observer. Accordingly, he speaks of descriptive sciences in distinction from explanatory sciences as those who emphasize the idea of fact.¹⁶ Description, he says,

¹⁶ *Introduction to the Philosophy of Science*, p. 197.

"calls attention to the more obvious properties and relations of events, and explanation indicates those which are less obvious."¹⁷

In short, the question of the discovery of facts from which to begin, has, in modern science, and in particular since the time of Kant, been a matter of baffling import to the scientists and the philosophers who have taken the trouble to look into it. On a non-Christian basis facts have no determinate character till they are manipulated by the knower. That knower is man assumed as being autonomous. This knower, as autonomous, imposes structure on nature, thus virtually making nature.

Put differently it may be pointed out that on the basis of modern science and philosophy reality is, on the one hand, assumed to be wholly without any structure and is, on the other hand, assumed to be already wholly structured by man. Morris Cohen, another outstanding writer on scientific methodology put the matter as follows. "A completed rational system having nothing outside of it nor any possible alternative to it, is both presupposed and beyond the actual attainment of any moment."¹⁸

Such then, broadly speaking, is the philosophy of fact which the non-Christian scientist today assumes to be the only available view. It is composed of the two ingredients of utter meaningless contingency and of complete exhaustive rationalization. On both counts such a philosophy of fact would be destructive of the most basic concepts of the Christian religion. The idea of utter contingency means that God together with man is confronted with, or rather is immersed in, a bottomless and shoreless ocean of pure meaningless darkness. To use an expression from F. H. Bradley, we might say that on such an assumption there would be no positive character in any one fact in distinction from any other fact. Nor would there be any possibility of distinguishing any fact from any other fact. Only a Calvinist can account for the fact of counting. That is only a Calvinist can offer a basis on which counting makes any sense. And on the other hand, the matter of exhaustive rationalism means that man is in no sense dependent upon God for his knowledge; all knowledge is 'in' from all eternity.

Hypotheses

Now comes the question of the nature and application of hypotheses.

¹⁷ p. 197.

¹⁸ *Reason and Nature*, p. 158.

1. In the first place we note that since the idea of utter contingency is involved in the non-Christian idea of facts, so it is also involved in its idea of hypotheses. And this points directly to the notion that theoretically on the non-Christian basis, any hypothesis is admissible.

2. This implies at once that if Christianity wants to be considered as the explanation of the phenomena of nature or history then it must present itself as one of these hypotheses.

3. This implies that the Christian position will be considered illegitimate as an hypothesis because it cannot be verified by appeal to facts (see below).

4. It has, therefore, been found over and over again that if religion be considered as legitimate by science then it must be of the nature of a faith construct. It must be of the nature of Kant's practical postulate to which one holds morally knowing that intellectually it has no standing at all. In other words, a view of Christianity that has definite intellectual content is said to be irrelevant or unverifiable and if religion of any sort is to be thought of as consonant with science it is of an indefinite and vague variety such as has been offered in modern times, by men who themselves are or were very conscious of having a theology that is at least in accord with science, namely, such men as Schleiermacher, Ritschl or Barth.

"Nobody knows, but your hypothesis is wrong and ours is right." That is the thing many a modernist says, in effect, if not in words, to the Christian believer.

But the problem, as the modern philosopher of science himself faces it is, of course, how theoretical relationships that are worked out conceptually by the knower, may apply to the facts beyond him. In the book of Randall and Buchler to which reference was made, the authors make an absolute distinction between formal and empirical science. Formal science, they say, is not concerned whether its assertions of internal, hypothetical relationships fit onto the facts of nature. As noted above, Eddington frankly speaks of the cyclical character of scientific knowledge and draws subjective conclusions from it. In other words we are back to a phenomenal-noumenal distinction such as was made by Kant. Science is said or assumed to be dealing with the I-it relationship of life. There may be, we are told, another and higher dimension that deals directly with the I-Thou relationship.

We have seen that it was impossible for the non-Christian scientist on his assumptions to find fact. But if he had found one and if then he was to speak of it to others, then he would have to reduce this fact to a repeatable instance of a law and the

law itself would be such as he, with billions of other Chance-produced individuals, had seen fit arbitrarily to call such.

Verification

Finally, there is the matter of verification. But nothing further of any significance need or can be said about the facts. How can there be verification by means of facts if there are no facts at the outset of investigation that can be said to be other than the momentary sense impressions of a man who himself is as a fact an indistinguishable part of the featureless blob that has seen fit to climb out of the morass of Chance to have a look at itself.

We noted that in the book of Randall and Buchler there is a sharp separation between formal and empirical science. Yet these men assert: "We test an explanation by deducing from it consequences in accordance with the rules of formal science, which is thus seen to play a vital part in empirical science."¹⁹ And Whitehead in his various works, but particularly in the one on *Science and the Modern World* differentiates recent science and its advancement to no small extent from classical science by the fact that in modern times there has been a great development of mathematics. Even 17th century science made its great advances in comparison with previous centuries by means of the great generalizations of the differential calculus and other mathematical simplifications. These simplifications enabled science to substitute the notion of functions for that of substances. But modern or rather recent mathematics has, he says gone much further in its process of generalization and simplification. It enables science, therefore to reach the utmost in the way of generalization.

But now the question arises again how such generalizations shall have any application to the facts of empirical nature. Whitehead himself admits that he cannot explain this. This fact must rest, he argues, on our simple faith. He thinks that the simplifications will reduce the number of unknowables of earlier science. Simplification will bring the concepts of substance and force and causality into the light of day; there will be nothing mysterious about them. Ideally we can know about them. But then there is the question of their application to the facts of every day life. For these simplifications must be thus tested. So the result is that just as we think that by means of generalization and simplification we have the most basic and comprehensive

¹⁹ p. 70.

explanation of facts so we must also say that today: "Heaven knows what seeming nonsense may not tomorrow be demonstrated truth." ²⁰

Thus it turns out that there is no intelligible meaning in the idea of fact, or in the idea of hypothesis, or in the idea of verifying hypotheses by facts in the procedure of modern science.

We are not seeking to play off one school of science against another. We are rather pointing out that on no non-Christian basis can anyone interpret reality in any sense of the term that would have any meaning.

It is imperative that this should be pointed out. For only so can Christians do their duty as Christians. They must cite the facts of creation and redemption through Christ against the unbeliever. It must be demonstrated to the unbeliever that in his presuppositions there is no intelligibility in the procedure of science in which he has been so eminently successful. The prodigal son may serve as an illustration as to the reason why he is so successful; he employs the capital that he has not earned but inherited from his father.

Modern science has to live from that which in its assumptions it negates. The Christian doctrine of revelation, of special and general revelation as interdependent, shows itself to be the only foundation of the possibility of science.

Thus it is also shown how the positive accomplishment of the non-Christian scientist's own accomplishments testify against him. Every day that the prodigal spend another dollar he sees it is a dollar that has come from his father. Surely he should state the facts as they are. Deep down in his heart, by virtue of the fact that in his own make-up he is revelational of God and due to the fact that he is surrounded by a universe that, with himself and in reaction to himself, is revelational and nothing but revelational of God and of his plan, the unbeliever knows that his own view is wrong and that of the believer is right. But he is not given a full opportunity to contrast the two views if, following the style of the Romanist or the Arminian, we seek to interpret the idea of revelation as though it were only something coming to man who is not and has not been from the beginning himself revelational.

²⁰ *Science and the Modern World*, p. 116.

The Methodology of Science

Address given before the Science Affiliation, Wheaton, Illinois, 1946

I count it an honor to be asked to address a few words to you on the question of epistemology in relation to science. The question I am particularly anxious to discuss with you is that of the relation of Christianity to current scientific methodology. Of course, I can touch on only one or two main points.

Non-Christian scientists frequently claim to have no concern about such things as a theory of reality and a theory of knowledge. They want, as they say, merely to describe the facts of the universe as they find them. So they go about their affairs, describing facts as they find them in physics, in biology, in chemistry, in psychology, in sociology, and in many other departments of life. But each time they find the facts to be such as to exclude such biblical doctrines as creation, sin, providence, and miracle. By merely describing the facts, the average non-Christian biologist finds evolution rather than creation to be true. By merely describing the facts the physicist finds the laws of nature to be self-operative rather than controlled by the providence of God. By merely describing the facts the psychologist excludes the fall of man as having any bearing on the problem of evil in man.

There are, it is true, many variations among the descriptions of facts as they are given by non-Christian scientists. As far as my limited acquaintance goes, however, it is generally true to say that what passes for mere description of fact among them is at the same time an explanation of facts and such an explanation as would, if true, prove Christianity to be false. In contrast with what has just been said about non-Christian scientists, one finds that Christians who are scientists often also seek merely to describe the facts as they find them. But their description invariably accords with such biblical doctrines as creation, sin, providence, and miracle.

Barring details and qualification in a fuller discussion, it appears to the "man in the pew" that a life and death struggle is going on under cover of a neutral description of facts. It is a life and death struggle between those who worship and serve the Creator and those who worship and serve the creature. The former describes the facts in terms of and in consonance with the basic presuppositions of Christianity while the latter describes the facts in terms of and in consonance with the basic presupposition of some form of non-Christian philosophy.

It need be no matter of surprise to the Christian that non-Christian scientists are, at bottom, fighting for their purely man-centered interpretation even when they engage in

"openminded" and "neutral" description of facts. Scripture informs us that all men are sinners and seek in all that they do to suppress the basic truth of their responsibility to their Creator. They always have an "axe to grind." To say this is not to charge men with a lack of the surface honesties and sincerities of civilized life.. It is only to be concerned with the deepest controlling motives of men and to interpret these motives in accordance with Scripture.

The non-Christian scientist, then, carries with him, as his second nature, the assumption that man is the final reference point of his own interpretation of human experience. This assumption is like a pair of colored spectacles cemented to his face. It is in terms of this assumption that he observes the facts. It is in terms of this assumption that he forms his hypotheses with respect to the facts. And it is in terms of this assumption that he tests his hypotheses with facts. It is but to be expected then that he will invariably describe the facts in such a way as to exclude the truth of Christianity.

It is of the utmost importance, then, to note this basically immanentistic prejudice that controls what is spoken of as the purest description of facts on the part of the non-Christian scientist. But there is another point, second in importance only to the one just mentioned. It is to the effect that in spite of their basically false immanentistic assumption non-Christian scientists can and do convey much truth by means of their description of facts. If the basic assumption of non-Christian thought were true, Whirl world be king. The human mind itself would be the product of Chance. For nothing less than Chance is the alternative to the biblical doctrine of God's plan with respect to the universe. And on a Chance foundation there could be no description of facts. But the universe is not what the non-Christian assumes it to be. And precisely for this reason is it, that even those who work with false assumptions can discover much truth about the facts of the world. No created mind can function in any field, even for the fraction of a second, without taking for granted the fundamental rationality of the universe and of the coherence of the human mind in relation to it. But the universe has no rationality and the human mind has no coherence within itself or in relation to the world except upon the presupposition of the truth of Christianity. So then the non-Christian scientist must live on "borrowed capital." If he had to live by his own capital he would choke forthwith even as a scientist. To be sure, the non-Christian does not self-consciously borrow the Christian's principles. Like the prodigal son, he lives on the father's substance without owning this to be the case. But as the prodigal was able to live and prosper in spite of being a prodigal so also the non-Christian scientist can describe the "uniformities of nature" in spite of his worship of Chance.

If now the situation may be broadly characterized as has been done, it would seem that there is a less and a more adequate way for Christians to meet it. The less adequate

way is to ignore and the more adequate way is to recognize the fact to the constant interpenetrations of description of fact with epistemological and metaphysical assumption. The less adequate way assumes that it is possible for believers to engage in fully intelligent discussion of facts with unbelievers without entering upon the problem of the philosophy of fact. The more adequate way would combine a discussion of philosophy of fact with every description of facts.

If as Christians we limit ourself to the production of facts and more facts, assuming that the unbeliever is really willing to follow them as soon as they come within his ken, our labors will be largely expended in vain. Not to challenge the unbeliever's epistemological assumptions is, from his point of view, tantamount to an admission of their validity. And to present facts and more facts to an unbeliever, whose basically immanentistic assumption we have tacitly granted is much like pouring water through a sieve. The unbeliever can "do away with" an infinity of facts as long as his assumptions are not challenged. The presentation of facts as such loses all of its challenge if it is not accompanied by the presentation of the total Christian life and world view.

The more adequate method may, therefore, be compared to that of modern global warfare. In such warfare all branches of the service act, or should act, in self-conscious interdependence. In some circumstances one branch of the service rather than the other may bear the brunt of the defence or attack. But inherently all branches need one another. In some such way it would seem that the work of Christian scientists needs to be supplemented by the work of Christian philosophers and theologians. Or, better far, the Christian scientist will be most effective in his work as a scientist, and especially in his effort to make his scientific work count as an apologetic for Christianity, if he is, at the same time a philosopher and theologian.

I realize how well nigh impossible it is for any one person to be a good Christian scientist and at the same time a good Christian philosopher. I also realize that the present deplorable situation, in which the several branches of Christian service seem all too often to run off by themselves to fight the battle alone, is due more to the lack of Christian work in the field of philosophy than to the lack of the Christian work in the field of science. Christian scientists, it would seem, have far outstripped Christian philosophers in point of productivity. No doubt then, I am asking you scientists to perform the almost superhuman task of doing the work you have done and, in addition, to do the work many of us non-scientists should have done but have so largely failed to do.

I am speaking then, as a layman, as a "man in the pew" about the "perfect preacher." I am speaking of an ideal which, I hope, we may seek, in some measure, to realize. Shortly before the conclusion of the war I saw a large billboard ad. There was a man

pointing to a beautiful new automobile. From his mouth came the words, "I may dream mayn't I?" Well, I have been dreaming, too.

I saw a large group of scientists, Christians all, working in so many fields of science. All of them knew what they were about. Having been taken out of the cave of sin by the power of the Holy Spirit, they saw and described the facts of the universe for what they really are, God-created and God-controlled. They observed facts and more facts but always such facts as show forth in their very existence and in their every relationship, the glory of God the Creator and Christ the Redeemer. They formed new hypotheses in order to discover new facts and in order to shed new light in facts already discovered, but always such hypotheses as would be in accord with their fundamental presupposition pertaining to God and His plan. In short, they worked as those who know that no facts but Christian theistic facts can ever be observed and that no hypotheses but Christian theistic hypotheses can have genuine relevance to experience.

Then I saw these men in my dream standing in the gates reasoning with the men who worship Chance and Fate or a combination of the two. The really global war began. The Christians challenged the non-Christians not merely with respect to their description of fact but with respect to their description of fact as expressive of a non-rational philosophy of fact. It was made clear to the non-Christians that all their scientific success of the past was to be ascribed to the fact that reality is not what they assumed it to be but that it is rather what Christians know it to be. How could any fact have a definite quality and thus be distinct from other facts if Chance were ultimate? How could there be any laws of nature if it were not for God's all comprehensive plan with respect to the universe as a whole? In short, it was shown, that if the non-Christian scientific description of facts really answered to the non-Christian scientist's philosophic assumption with respect to fact, there could be no description of fact at all. The very idea of fact and of law with respect to facts would be unintelligible. In this way Christian theism appeared as the only possible presupposition in terms of which science itself is possible.

I saw also in my dream that the Christian scientists were themselves much encouraged by the progress they were making. As they realized more than ever how the spirit of hostility to the truth expressed itself even in the supposedly neutral description of fact, they rejoiced the more because now they were no longer themselves encouraging men in this hostility. They were now really able to expose the bankruptcy of any scientific methodology that is not self-consciously or unconsciously based on

Christian theism. Having done their full duty they could, in good conscience, pray to the God of all grace to make their presentations effective in the hearts and lives of men.¹

¹Van Til, C., & Sigward, E. H. (1997). *The works of Cornelius Van Til, 1895-1987* (electronic ed.). New York: Labels Army Co.