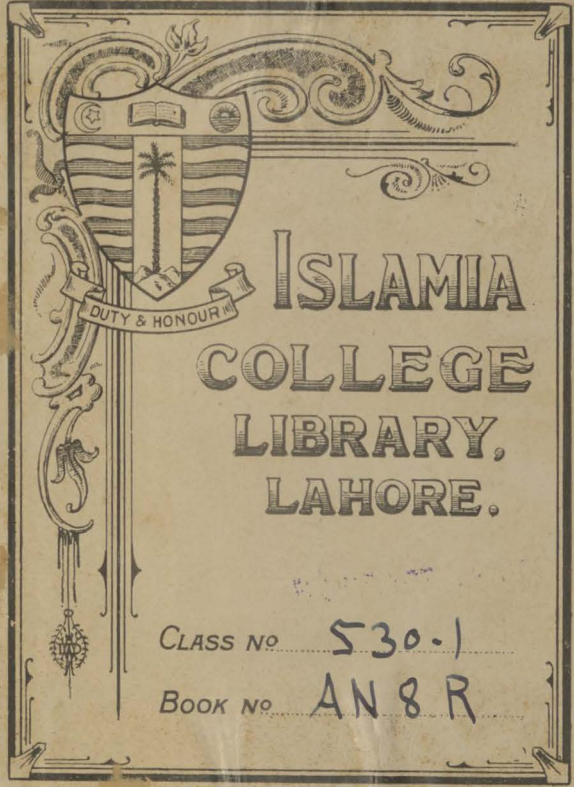


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RELATIVITY AND RELIGION

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RELATIVITY AND RELIGION

AN INQUIRY INTO THE IMPLICATIONS OF
THE THEORY OF RELATIVITY WITH
RESPECT TO RELIGIOUS THOUGHT

BY

H. DOUGLAS ANTHONY

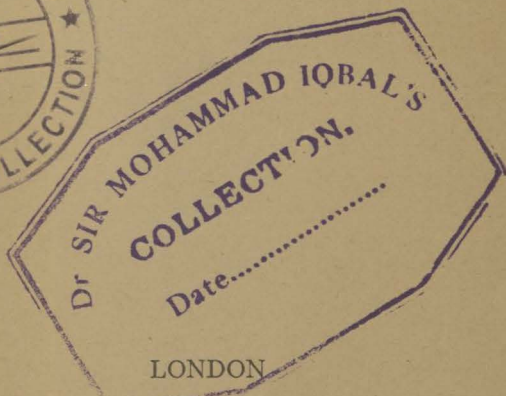
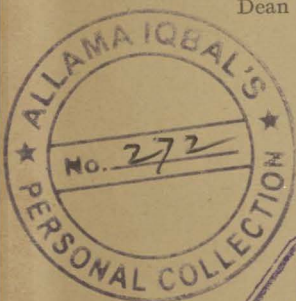
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WITH A FOREWORD BY

THE REV. W R. MATTHEWS, D.D.

Dean of King's College, London



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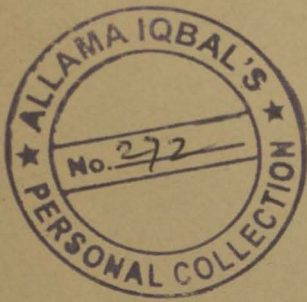
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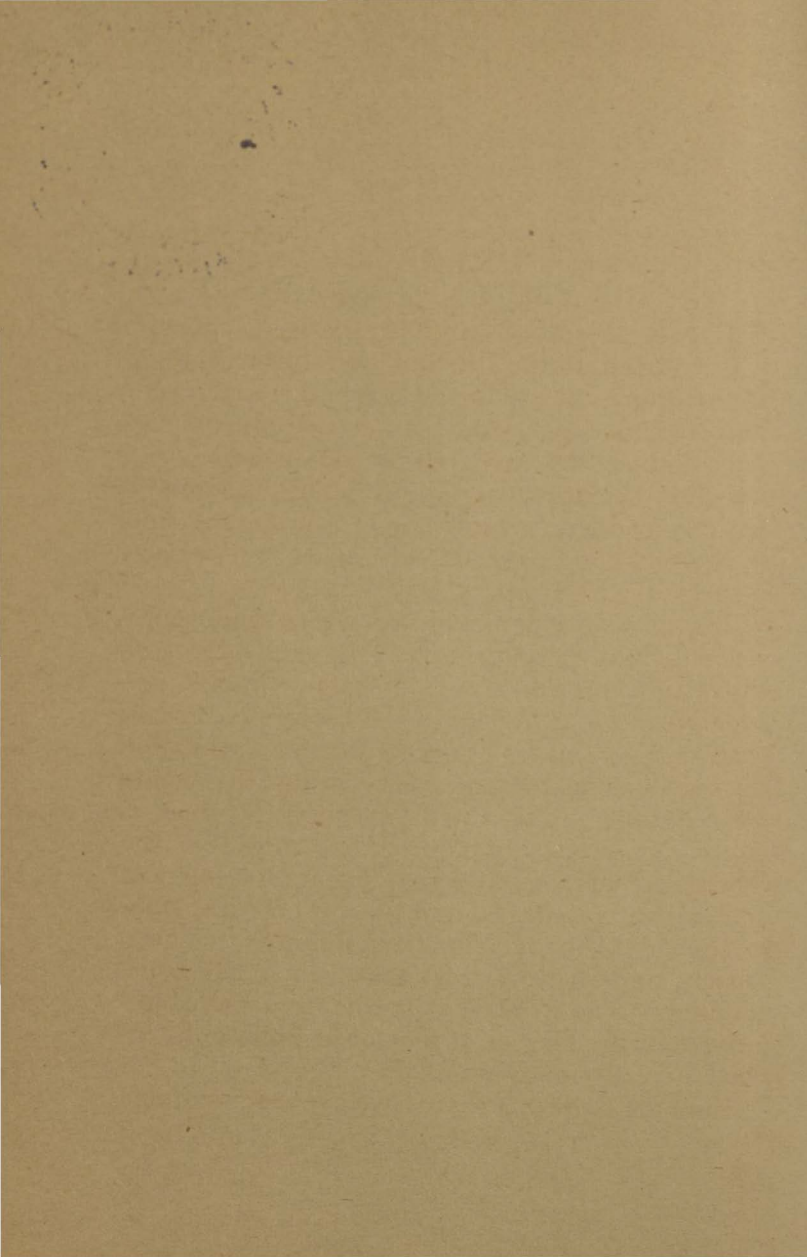
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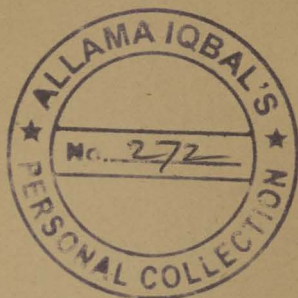
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TO
THE MEMORY OF MY PARENTS

Research





PREFACE

THE object of this inquiry is discussed in detail in the Introduction, but with regard to the interest it has for the general reader a reference to practical issues may not be out of place. In a subject of this nature the technical side, whether scientific or philosophical, cannot be entirely avoided; yet it is hoped that there is much in the following pages which can be read without a specialized training.

It will no doubt be admitted that philosophy, science, and religion must together ultimately throw light on the vexed question of human personality and man's place in the Universe; but one shrinks from this task of co-ordination, because of the high standard of general knowledge that would be required. The whole question of what is really the essence of Christianity must, on the theoretical side, be related to current philosophical and scientific theories, and on the practical side, to the problem of Christian Reunion. These aspects underlie the treatment which has been adopted. The work is in substance a thesis approved for the Degree of Doctor of Philosophy in the University of London.

Since the Armistice there have not been wanting

signs of a Christian spirit in international relations: not the least hopeful is the spirit of brotherhood which prevails within the various organizations affecting the youth of the world. To many of us, service in the Army emphasized the pettiness of the unfortunate divisions of Christianity, and to-day a similar report is received from the Mission Field. It is to be hoped that movements such as the Lambeth Appeal, the Malines Conversations and the recent World Conference on Faith and Order at Lausanne, are leading to a genuine attempt at co-operation based on a mutual understanding of what is of primary and secondary importance in Christianity.

Westminster College, S.W.I.

September, 1927.

H. D. A.

FOREWORD

By the REV. W. R. MATTHEWS, D.D., DEAN OF
KING'S COLLEGE

I GLADLY take the opportunity which Dr. Anthony has given to me of writing a few words of introduction to his interesting book. There can be no question of the importance of the subject which he has here discussed. Few to-day would be prepared to deny that Theology must take account of the progress of natural science, and must strive to weave the knowledge which is constantly growing of the objective Universe into its teaching on the nature of God and His relation with the world. There is, perhaps, a danger involved in a too indiscriminating application of this obvious principle. There is a temptation to carry over the latest theories of natural science directly into theological construction. The result of such a hasty attempt at a *liaison* between Science and Theology is frequently harmful to both studies. As Dr. Anthony rightly points out religious thought has been affected by scientific ideas mainly through the medium of philosophy. This is surely the true way. Theology must always be closely allied with philosophy, since both alike are con-

cerned with the thinking out of a view of the world ; but it is the business of philosophy to estimate the bearing of new scientific theories on our conception of Reality as a whole. The evolution principle is an example of the process to which I am referring. Philosophical reflection has transformed it from an empirical theory applicable to certain natural phenomena into a general concept embracing the whole range of Being. It is in this latter form that it provides material for the Theologian, and we may observe that whereas in its purely scientific aspect it seemed from the point of view of religious belief to be destructive, in its more philosophical interpretation it is throwing new light upon God's creative activity. The principle of Relativity appears to be not less revolutionary in its probable consequences than the idea of evolution. Dr. Anthony has therefore acted wisely in giving a great deal of attention to its philosophical interpretation, and not the least valuable part of his book is his review of the attempts made by metaphysicians to incorporate the principle of Relativity in their systems.

Dr. Anthony does not claim to be more than a pioneer in a new field of thought. In my judgment he has the qualities required for the fruitful breaking of new ground in this field. He has a firm grasp of the fundamental Christian experience and the requisite mathematical and philosophical equipment combined with a critical judgment. It is probable that some of his

tentative conclusions may prove startling to some who have grown up in older modes of thought. One who is engaged in conquering a new world for Christian thought cannot claim infallibility, but he may at least claim a tolerant and sympathetic hearing from those who acknowledge allegiance both to Christ and to truth.

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INTRODUCTION

“THE completeness of Divine Truth will be brought to view by the completing of all surrounding truth.” These words of the late Dr. W. F. Moulton are both charter and inspiration for all who seek to interpret, to men and women of the twentieth century, the reasonableness of Christian Theism. They also presuppose a theory of relatedness which, we shall find, is one of the main implications of the principle of relativity. “The modern view of the world differs from the ancient and the mediæval in that we have to-day become permeated with the conception of continuity. The connection of all events with one another, the unbroken linking of all things, is a postulate of our thought, whether we be scientific men, or philosophers, or plain persons.”¹

There is therefore sufficient reason for attempting an investigation as to how far the implications of the theory of relativity affect religious thought. It is perhaps as well at once to state the idea of religion which is presupposed in what follows. Various definitions, in particular with regard to the Essence of Christianity dealt with in Chapter

¹ W. R. Matthews, *The Idea of Revelation*, p. 24.

X, will be referred to later, but the one used is, that religion is the attempt to live in harmony with the Universe as a whole.¹ With this view in mind, our task is to discover the implications, if any, of the Theory of Relativity with respect to Christian religious thought.

The method of treatment consists of three stages. In Part I, a review is made of THE DEPENDENCE OF RELIGIOUS THOUGHT ON CURRENT IDEAS and the conclusion is reached that the influence of science on theology should be sought mainly through the medium of philosophy. The position maintained in the first Part naturally leads in Part II to a discussion of CURRENT IDEAS MODIFIED BY RELATIVITY with special reference to philosophy. Part III deals with the corresponding IMPLICATIONS WITH RESPECT TO RELIGIOUS THOUGHT.

The results of the third Part centre round three positions. The first discusses the importance of the individual outlook in religious thought, and special reference is made to the work of Troeltsch in this direction. The second position raises the question of the relative importance of

¹ This definition is based on the one suggested by McTaggart, who describes religion "as an emotion resting on a conviction of a harmony between ourselves and the universe at large" (*Some Dogmas of Religion*, p. 3). The introduction of the word "attempt" seems desirable in view of the sense of failure or insufficiency sometimes associated with religious experience. The definition given above also presupposes that there is some sort of harmony possible. It further includes the highest in religion, emphasizing life in relation to the universe as a whole.

Christian Doctrines involving the place of authority and a possible finality. The third is an attempt to approach the Christian Theistic position from the standpoint of the new realism so often associated with the modern scientific outlook. In this, the implication of relatedness is prominent. The last chapter of Part III is an attempt to estimate the importance of these three positions with respect to theology and especially with respect to the future of organized Christianity.

To some it may seem unnecessary to emphasize Part I, for most people would agree that religious thought does depend on current ideas; in fact, it is almost obvious that with an increased knowledge, statements of Christian belief may require some modification. At any rate it seems reasonable that an attempt should be made to express them in current thought-forms, rather than in the language of a past generation which needs to be specially interpreted for the present.

Such a view, however, does not appear to be accepted by all, for even as recently as the Church Congress of 1924,¹ in reply to the desire

¹ "However eager the Church may be to speak to men in their own language, the present Babel in the philosophical world makes such a task quite impossible, at any rate in our time.

* * * * *

The Church can afford to wait quietly, assured that the deposit of Truth entrusted to her will yet be needed and prove of priceless worth to an age which at present rejects it with scorn, and, drunk with the new wine of knowledge falsely so-called, bids us in tones the more aggressive because the more inwardly

for a restatement of Christian belief in the language of twentieth-century thought, it was stated that owing to the varied claims of modern philosophers, it is better to retain the language of the earlier centuries which had been found trustworthy by the Church.

But in reply, it may be pointed out that the very nature of philosophy precludes the idea of a fixed system which will remain the same for all time, and into which Christian belief may be rigidly arranged. The fact that the controversy, say between modern idealism and realism, is still far from settled, only reminds us of a sentence that could be written in Hume's day:

"There is nothing which is not the subject of debate, and in which men of learning are not of contrary opinions,"¹

and would probably apply to most periods in the history of philosophy.

If Christian thought is to give up her claim of helping in the quest of truth, then the above attitude referred to at the Church Congress may be admitted; but if Christian life and belief are to stand in living relation to the modern world and the life of everyday, then religious leaders must be prepared to join sympathetically uncertain, to repeat its shibboleths in place of our creeds, its new formulæ in place of the tried and through many centuries well-sifted and accredited symbols of our faith."—H. M. Relton on "The Use and Necessity of Creeds" (*Report of the Church Congress, Oxford, 1924, pp. 231-2*).

¹ *A Treatise on Human Nature*, Hume. Introduction.

in the quest for truth, ready to receive as well as give.

“For, if truth be at all within the reach of human capacity, it is certain it must lie very deep and abstruse; and to hope we shall arrive at it without pains, while the greatest geniuses have failed with the utmost pains, must certainly be esteemed sufficiently vain and presumptuous.”¹

It is not maintained that all will take the same interest in, or derive the same help from, the attempt to place theistic belief in its relation to modern science and philosophy. But it does seem a clear part of the Church's duty to recognize sympathetically the position of many outside, as well as within, organized Christianity who do not find satisfaction in merely accepting, on ecclesiastical authority, statements of doctrines which may sometimes be couched in terms of discarded philosophical or scientific theories. Surely a grave responsibility rests on religious thinkers who would have us wait until philosophic and scientific theories are more settled, and in the meantime accept without question the position and creed of those who are able to base their religious belief on experience which has a traditional background of thought. The importance of the matter is not overstated by Hobson in a chapter on “Natural Science and General Thought”:

“It seems clear that all attempts that may be made to base theistic, or more general, religious belief upon

¹ *A Treatise on Human Nature*, Hume. Introduction.

intuitional knowledge obtained directly in actual experience, either of the mystical order or of a more ordinary kind, will ultimately prove insufficient as a basis for such belief amongst a very large number and probably the majority of men. The history of religion shows that this is the case. Belief based upon direct intuition will, for those who have it, remain unaffected by discursive thought in relation to Philosophy and Science; and it is not for the sake of such persons that it is necessary to treat of the relations which theistic belief may have with philosophical or scientific views. For the more thoughtful members of the community, these relations have in our time, an inestimable importance; and the influence of the views formed of their specific character has an ultimate effect upon the attitude towards theistic belief of multitudes of men who do not consciously concern themselves with such relations on the more theoretical side. Accordingly, the nature and extent of any influence which Natural Science exerts, or ought to exert, upon theistic belief, both in its general and its more specific characters, presents a problem, the importance of which can hardly be overestimated, in view of the effect which solutions of it may have, directly upon the cognitive side, and indirectly upon other sides, of the religious consciousness." ¹

Fortunately there are, among leaders of liberal and evangelical Christian thought, those who recognize the importance of the attitude of scientists in this twentieth century. The following words of the Dean of St. Paul's are complementary to the position of W. F. Moulton

¹ E. W. Hobson, *The Domain of Natural Science*, p. 468.

with regard to the completeness of Divine Truth:¹

“In the fourth and fifth centuries, and again in the thirteenth, the Church was abreast of the best science and philosophy of the time. Is there any reason why it should not be so again? Assuredly the burdens which traditionalism lays upon the necks of the disciples are no part of the burden of the Cross. There is not the slightest evidence that our Lord ever intended that a man must outrage his scientific conscience as a condition of being His disciple. The conditions which He imposed were hard, but they were of a very different order; and we cannot afford to lose men who desire to accept those conditions and to devote their lives to His service, because the unthinking majority of Church members are still, it appears, content to live in a pre-Darwinian and pre-Copernican universe.”²

¹ *V. supra*, p. 1.

² W. R. Inge, *Liberalism in Religion*, p. 16 (Papers in Modern Churchmanship, I).

PART I

The Dependence of Religious Thought
on Current Ideas

CHAPTER I

PRE-COPERNICAN VIEWS

CHAPTER I

PRE-COPERNICAN VIEWS

CREEDS AND THEORIES OF THE UNIVERSE.

(a) THE BIBLE.

Old Testament.

Apocrypha.

New Testament.

Greek Thought.

(b) THE ALEXANDRIAN SCHOOL.

Deductive.

Empiricists.

Clement and Origen.

Decline.

(c) THE FEUDAL SYSTEM.

Anselm's Doctrine of the Atonement.

CHAPTER I

PRE-COPERNICAN VIEWS

THE statement that religious thought is dependent on current ideas would appear to many a commonplace and obvious truth, making further comment unnecessary. Yet the history of Christianity reveals how frequently the implications of such a statement have been ignored in theological controversy; both sides, perhaps, having failed to realize the dependence of their opponents' position on current ideas. The question of a relative aspect of truth has often been overlooked and in consequence, where there should have been mutual recognition, dogmatic assertions have paved the way for bitterness, persecution and schism.

Now every religion, however crude its worship or complicated its ritual, has at its centre some sort of belief about the universe. In fact, a philosophy of life in general seems inevitable, although at times it may be held unconsciously and only revealed in an emergency or crisis.¹

¹ Such a crisis is to be found in the Great War. The book, *The Love of an Unknown Soldier* (pub. John Lane, The Bodley Head), calls attention to this background of men's lives, which is revealed in emergency: "Our men's courage leaves me breath-

Especially is this true of religion—it must have, implied or explicit, a creed, a working hypothesis for life. In a recent book Professor Hoernlé draws attention to this and then makes the following quotation: “every creed is a view of the universe, a theory of man and the world, a theory of God.”¹

This dependence of religious thought on current ideas can be easily traced in the history of Christianity. The revolution in thought associated with the work of Copernicus makes it desirable to limit this chapter to pre-Copernican Views—Biblical, Alexandrian and Feudal.

(a) THE BIBLE.

Belief in a fixed universe is the background of all Biblical writers. The earliest speculations of primitive man naturally assumed that the earth was flat—“merely the district in which he lived.”² Heaven was a kind of dome resting

less. It is only the undiscussed nobility of their purpose, that keeps them going. It isn't orders; it isn't pay; it isn't the hope of decorations. It doesn't matter who or what our men were in civilian life, they all show the same capacity for sacrifice when in danger. Some of them were public-school men; some served behind counters; some were day labourers. We have several who have been in gaol; they're every bit as good as the others. War has taught me, as nothing else could have done, how to love and respect my brother-man. I feel humbled in the presence of the patient unconscious pluck of these fellows” (pp. 144-5).

¹ Hoernlé, *Matter, Life, Mind and God*, p. 171.

² Hastings, *Enc. Relig. and Ethics*, art. “Earth, Earth-Gods,” by MacCulloch, Vol. 5, p. 127.

in some way upon the earth. Such primitive ideas tended to survive, and by the time of the Old Testament writers a more elaborate three-fold division of a fixed universe had been developed. A good idea of the ordinary conceptions of an ancient Semite may be gathered from a diagram by O. C. Whitehouse.¹ In brief the main features of the system were, a flat earth with the vault of heaven resting on mountains, beneath was Sheol and beneath that again were the waters under the firmament supporting the earth. The heavenly bodies described their journeys across the fixed vault of the sky.

It is not necessary to refer in detail to passages which reveal this idea of a fixed universe divided into three parts. The evidence can be found in the Pentateuch,² the eighth-century prophets³

¹ Hastings, *Dict. Bible*, art. "Cosmogony," Vol. I, p. 503.

² E.g. Genesis vii. 11 refers to the waters above and beneath the firmament as the source of the flood. Exodus xx. 4, The Second Commandment and its references to heaven above, the earth beneath and the water under the earth, shows how prominent the belief in a threefold division must have been.

³ E.g. Amos ix. 2: "Though they dig into hell, thence shall mine hand take them; and though they climb up to heaven, thence will I bring them down." G. A. Smith refers to this as a ruder draft of the Hundred and Thirty-Ninth Psalm (*The Book of the Twelve Prophets*, Vol. I, p. 188). *V.* also Psalm xix. 4-6. The idea of a flat earth is especially prominent in the reference to the heat of the sun: "His going forth is from the ends of the heaven and his circuit unto the ends of it; and there is nothing hid from the heat thereof."

and in the Apocrypha.¹ At the time of our Lord the same belief was held. The significance of such an outstanding saying as "Heaven and earth shall pass away; but my words shall not pass away,"² is only fully appreciated when we realize that in Semitic thought "heaven and earth" stood essentially for what is fixed and immovable. The idea of heaven as God's throne and earth as His footstool was taken over from the Old Testament. The Spirit descending as a dove out of heaven,³ the Ascension, Peter's vision of the vessel let down from heaven,⁴ all imply the same concept of the universe. St. Paul with his Hebrew training has the same Semitic outlook: "Who shall ascend into heaven? (that is to bring Christ down) or Who shall descend into the abyss? (that is to bring Christ up from the dead)."⁵

The contribution of Greek thinkers to the conception of the universe must not be ignored, although their influence on the popular belief, already outlined, does not appear to have been great. If the work of Thales is indefinite, Pythagoras, at any rate, taught "that the earth, in common with the heavenly bodies, is a sphere, and that it rests without requiring support in

¹ Ecclesiasticus i. 3: "The height of the heaven, and the breadth of the earth, and the deep, and wisdom, who shall search them out?"

² Mark xiii. 31; Matt. xxiv. 35; Luke xxi. 33. See also *infra* pp. 196 ff.

³ Mark i. 10; Matt. iii. 16; Luke iii. 22; John i. 32.

⁴ Acts x. 11.

⁵ Rom. x. 6, 7.

the middle of the universe.”¹ Plato’s interest in astronomy was centred round its geometrical aspect² and Aristotle seems to have held the spherical nature of the heavenly bodies, partly on account of the Greek desire for “perfect” figures. With regard to later thought, we must turn to Stoic philosophy as a possible influence on the popular conception of the universe.³

¹ Berry, *Short History of Astronomy*, p. 24.

² *Republic*, VII. “Let us then make use of problems in the study of astronomy, as in geometry. And let us drop the heavenly bodies, if we want truly to apprehend astronomy, and render profitable that part of the soul which is naturally wise.” The insistence on geometry as fundamental is significant in relation to the changes that are taking place in our ideas of space and time to-day, as Weyl says in the Introduction to *Space, Time, Matter* (Trans. Brose, p. 1): “The Greeks made Space the subject-matter of a science of supreme simplicity and certainty. Out of it grew, in the mind of classical antiquity, the idea of pure science. Geometry became one of the most powerful expressions of that sovereignty of the intellect that inspired the thought of those times. At a later epoch, when the intellectual despotism of the Church, which had been maintained through the Middle Ages, had crumbled, and a wave of scepticism threatened to sweep away all that had seemed most fixed, those who believed in Truth clung to Geometry as to a rock, and it was the highest ideal of every scientist to carry on his science ‘more geometrico’ And now, in our time, there has been unloosed a cataclysm which has swept away space, time and matter hitherto regarded as the firmest pillars of natural science, but only to make place for a view of things of wider scope and entailing a deeper vision.”

³ The importance of Stoic philosophy has been estimated by Arnold (Hastings, *Enc. Relig. and Ethics*, art. “Stoics,” Vol. II, p. 860): “Rooted in the strong moral instincts of the Semites, it grew to embrace the scientific knowledge of the Greeks, and

The following description indicates the Stoic view. "In the centre of the Universe reposes the globe of the earth; around it is water, above the water is air. These three strata form the kernel of the world; which is in a state of repose, and around these the Ether revolves in a circle, together with the stars which are set in it. At the top in one stratum are all the fixed stars; under the stratum containing the fixed stars are the planets, in seven different strata—Saturn, Jupiter, Mars, Mercury, Venus, then the Sun, and in the lowest stratum, bordering on the region of air, is the Moon. . . . But although the world is in empty space, it does not move, for the half of its component elements being heavy, and the other half light, as a whole it is neither heavy nor light." ¹

But although Greek philosophers were thus realizing in various ways the shape of the earth

branches out in the logical and practical methods of Roman law and education. Its range in time extends over the three centuries before the Christian era and the first three centuries of that era; that is, it synchronizes with the history of the Roman Empire. Since that time its forces have been absorbed in the development of Christianity."

¹ Zeller (Trans. Reichel), *Stoics, Epicureans and Sceptics*, p. 191. Cicero's phrase illustrates the belief in the earth as the fixed centre of the universe: "Ac principio terra universa cernatur, locata in media sede mundi solida et globosa" (*De Natura Deorum*, Lib. II, Cap. xxxix). After discussion of the sun and moon, planets are described: "circum terram feruntur eodemque modo oriuntur et occidunt" (*op. cit.*, Lib. II, Cap. xl).

and the heavenly bodies,¹ yet there still remained the underlying conception of a *fixed* earth, and so the way was prepared for the well-known Ptolemaic system which was to go unchallenged until the time of Copernicus.

(b) THE ALEXANDRIAN SCHOOL.

This reference to Greek influence leads to another illustration of the way in which religious thought is dependent on current ideas. It is to be found in the history of the thousand years of intellectual activity associated with Alexandria. This period has the advantages of length and continuity, so that we can form some estimate of the relations between science, philosophy and theology. The scientific and literary studies under the Ptolemies laid the foundation for the philosophical and religious speculations which flourished when Alexandria was definitely under Roman rule; reaction and a period of inactivity mark the final stage before the Arab conquest of the seventh century.

Although the period of scientific development must be regarded on the whole as deductive,²

¹ Eratosthenes' estimate of the circumference of the earth was 250,000 stadia. If the unit was the common Olympic stadium, the result is about 20 per cent. greater. Paul Tannery, using another interpretation, places the error as less than 1 per cent.

² Whewell, *History of the Inductive Sciences*, Vol. I, pp. 80 ff. gives interesting illustrations of inductive methods. Aristotle maintained that the circular image formed when sunlight passes through an aperture is due to the circular nature of the sun's

yet there is a notable exception in the work of Archimedes at Syracuse. In medicine, the Empiricists emphasized practical experience and went to the extreme of renouncing all theory.¹ There was therefore in the Alexandrian School some recognition of scientific method, which according to a modern writer consists of two processes: "(1) the observing and testing of a body of facts and (2) the 'ordering' or systematizing of those facts, by the discovery or creation of appropriate conceptions and hypothesis, into general and easily grasped truths."²

The method of deductive reasoning together with some appreciation of the importance of observation laid the foundations for the speculation associated with the end of the old and the beginning of the Christian era. The "tripod" of the Empirics, giving as the three bases of knowledge—observation, history (i.e. recorded observation), and judgment by analogy—naturally would exercise an important influence on contemporary philosophy. It is significant that

light. The efficiency of the lever is due to the extremity of the longer arm describing a greater circle.

Kingsley, in his Lecture on "The Ptolemaic Era," writes of the defects of the Greek mind: "Four men only among them seem, as far as I can judge, to have had a great inductive power, Socrates and Plato in Metaphysics; Archimedes and Hipparchus in Physics" (*Alexandria and her Schools*, pp. 21, 22).

¹ Heiberg, *Science and Mathematics in Classical Antiquity*, trans. by D. C. MacGregor, p. 74.

² A. E. Heath, Essay on "Science and Education," p. 229 in *Science and Civilization*, edited by F. S. Marvin.

Sextus (200 B.C.), a leader of the Sceptics, was an empirical physician.¹

There is no need to discuss the dependence of Jewish thought on the current ideas of Alexandria—Philo is an outstanding example. In the New Testament the Johannine doctrine of the "Logos" would appear to have a very marked background of contemporary philosophy. But the appearance of the Catechetical School at Alexandria demands more than a passing notice because of the way in which its leaders dealt with the relations of science, philosophy and theology.

In the ninth chapter of "The Stromateis" Clement expresses his opinion as to the necessity of human knowledge for the understanding of the Scriptures:

"Some, who think themselves naturally gifted, do not wish to touch either philosophy or logic; nay, more, they do not wish to learn natural science. They demand bare faith alone, as if they wished, without bestowing any care on the vine, straightway to gather clusters from the first. Now the Lord is figuratively described as the vine, from which, with pains and the art of husbandry, according to the word, the fruit is to be gathered.

"We must log, dig, bind and perform the other operations. The pruning-knife, I should think, and the other agricultural implements, are necessary for the culture of

¹ Article "Medicine," *Enc. Brit.*, Vol. 18, p. 43. Sextus Empiricus, the third-century physician and philosopher (about the time of Clement and Origen), attacked all positive philosophy in his *πρὸς τοὺς μαθηματικὸς ἀντιρρητικὸί* (v. note on p. 201, "Essay on Medicine," by C. Singer, in *The Legacy of Greece*).

the vine, so that it may produce eatable fruit. And as in husbandry, so also in medicine: he has learned to purpose, who has practised the various lessons, so as to be able to cultivate and to heal. So also here, I call him truly learned who brings everything to bear on the truth; so that, from geometry, and music, and grammar, and philosophy itself, culling what is useful, he guards the faith against assault. Now, as was said, the athlete is despised who is not furnished for the contest. For instance, too, we praise the experienced helmsman who 'has seen the cities of many men,' and the physician who has had large experience; thus also some describe the empiric. And he who brings everything to bear on a right life, procuring examples from the Greeks and barbarians, this man is an experienced searcher after truth, and in reality a man of much counsel, like the touchstone (that is, the Lydian) which is believed to possess the power of distinguishing the spurious from the genuine gold. And our much knowing gnostic can distinguish sophistry from philosophy, the art of decoration from gymnastics, cookery from physic, and rhetoric from dialectics, and the other sects which are according to the barbarian philosophy, from the truth itself. And how necessary is it for him who desires to be partaker of the power of God, to treat of intellectual subjects by philosophizing!

* * * * *

“‘Write,’ it is said, ‘the commandments doubly, in counsel and knowledge, that thou mayest answer the words of truth to them who send unto thee.’ What, then, is the knowledge of answering? Or what that of asking? It is dialectics. What then? Is not speaking our business, and does not action proceed from the Word? For if we act not for the Word, we shall act against reason. But a rational work is accomplished through

God. 'And nothing,' it is said, 'was made without Him'—the Word of God.

"And did not the Lord make all things by the Word? Even the beasts work, driven by compelling fear. And do not those who are called orthodox apply themselves to good works, knowing not what they do?"¹

Clement fearlessly accepted the challenge of contemporary thought:

"But the multitude are frightened at the Hellenic philosophy, as children are at masks, being afraid lest it lead them astray. But if the faith (for I cannot call it knowledge) which they possess be such as to be dissolved by plausible speech, let it be by all means dissolved, and let them confess that they will not retain the truth. For truth is immovable; but false opinion dissolves."²

In accordance with current ideas a chapter is introduced dealing with the mystical meanings in the proportions of numbers, geometrical ratios and music:

"But he who culls what is useful for the advantage of the catechumens, and especially when they are Greeks (and the earth is the Lord's and the fulness thereof), must not abstain from erudition, like irrational animals; but he must collect as many aids as possible for his hearers. But he must by no means linger over these studies, except solely for the advantage accruing from them; so that, on grasping and obtaining this, he may be able to take his departure home to the true philosophy, which is a strong cable for the soul, providing security from everything."³

¹ Clem. Alex., Strom., I, 9. (A.N.L.—Anti-Nicene Library—
I, pp. 379–80).

² *Op. cit.*, VI, 10 (A.N.L., II, p. 350).

³ *Op. cit.*, VI, 11 (A.N.L., II, p. 355).

In the last book also emphasis is laid on this broad-minded attitude toward the relations between science, philosophy and theology:

“For it is incumbent, in applying ourselves not only to the divine Scripture, but also to common notions, to institute investigations, the discovery ceasing at some useful end.

“For another place and crowd await turbulent people, and forensic sophistries. But it is suitable for him, who is at once a lover and disciple of the truth, to be pacific even in investigations, advancing by scientific demonstration, without love of self, but with love of truth, to comprehensive knowledge.”¹

With regard to the work of Origen there is the same recognition of the importance of the background of contemporary thought. Accepting the tradition, embodying the teaching of the Apostles, he maintains that “It is the office of the sanctified reason to define, to articulate, to co-ordinate, even to expand and generally to adapt to human needs the faith once delivered to the Church.”²

“Much might be said of the *De Principiis*, the most remarkable production of ante-Nicene times, but it has three merits at least that must not be omitted. Origen never slurs a difficulty, never dogmatizes, never consciously departs from the teaching of Scripture. It is in this last point that he differs most, in point of method,

¹ Clem. Alex., Strom., VIII, 1 (A.N.L., II, p. 491).

² Bigg, *The Christian Platonists of Alexandria*, p. 191.

from Clement, who not unfrequently leaves us in doubt as to the precise Scriptural basis of his ideas. Sometimes Origen's interpretations are wrong; sometimes again he attaches undue weight to particular expressions. Certain texts seem to dominate him and colour all his views. But his most daring flights always start from some point in the written Word. The connexion with the particular passage under discussion may be of the most fanciful kind, but the opinion itself is never arbitrary." ¹

His advice to Gregory Thaumaturgus is typical of his own attitude:

"Thus, your natural good parts might make of you a finished Roman lawyer or a Greek philosopher, so to speak, of one of the schools in high reputation. But I am anxious that you should devote all the strength of your natural good parts to Christianity for your end; and in order to do this, I wish to ask you to extract from the philosophy of the Greeks what may serve as a course of study or a preparation for Christianity, and from geometry and astronomy what will serve to explain the sacred scriptures, in order that all that the sons of the philosophers are wont to say about geometry and music, grammar, rhetoric and astronomy, as fellow-helpers to philosophy, we may say about philosophy itself, in relation to Christianity." ²

The attitude of Clement and Origen towards current ideas and philosophy is thus apparent, but unfortunately the later history of the Alexandrian School is far from upholding their position. It is not necessary here to enter into the Origen-

¹ *Op. cit.*, p. 193.

² Origen, Letter to Gregory (A.N.L., I, p. 388).

istic Controversy. Methodius led the first serious attack: "In the controversies that followed in the fourth century, which need not be described in detail, we mark a gradual hardening, and crystallizing of theological thought under the chilling breath of authority."¹

It is in the spirit of this growing power of "tradition" that we must leave our survey. Clement and Origen recognized the dependence of religious thought on current ideas and were prepared to allow philosophy as a medium of general influence; but the traditional school associated especially with Carthage had begun to kill religious philosophy. "The progressive degradation of Christianity into a religion of cultus affected Christian Platonism in precisely the same way in which Neo-Platonism suffered between Plotinus and Jamblichus. Dionysius the Areopagite is the representative of this application of Alexandrian allegorism to ritual and dogma."²

At the end of his article, Dr. Inge maintains that the Alexandrians satisfied the legitimate need of their age by providing "a scientific doctrine of religion, which, while not contradicting the faith, does not merely support or explain it in a few places, but raises it to another and higher intellectual sphere, namely, out of the province of authority and obedience into that of clear

¹ W. R. Inge, *Enc. Relig. and Ethics*, art. "Alexandrian Theology," Vol. I, p. 318.

² *Op. cit.*, p. 318.

knowledge and inward intellectual assent emanating from love to God.”¹

Speculation as to the course of history under hypothetical conditions is difficult; yet the stagnation in Christian thought which is associated with the anti-Origenistic attitude, must have contributed to a considerable extent in weakening the resisting-power of Christianity to the advancing tide of Mohammedanism.

(c) THE FEUDAL SYSTEM.

Another illustration, though of a different type, of the dependence of religious thought on current ideas, is to be found in Anselm's doctrine of the Atonement and the feudal background which had persisted from the time of Charlemagne. The story drawn by Eileen Power of the life of the peasant Bodo,² shows the influence of feudalism—not merely on current ideas but on the life of every day. The human interest is vividly emphasized when Bodo has to get up early on a cold morning and take his horses to plough the manorial land, while his own farm is neglected:

“On a fine spring morning towards the end of Charlemagne's reign Bodo gets up early, because it is his day to go and work on the monks' farm, and he does not dare to be late, for fear of the steward. To be sure, he has probably given the steward a present of eggs and

¹ *Op. cit.*, p. 319, quoting Harnack, *History of Dogma*, Eng. Trans., Vol. II, pp. 324 ff.

² Eileen Power, *Mediæval People*, Chap. I.

vegetables the week before, to keep him in a good temper; but the monks will not allow their stewards to take big bribes (as is sometimes done on other estates), and Bodo knows that he will not be allowed to go late to work.”¹

The lord of the manor, in this case, was Irminon, the Abbot of St. Germain des Pres near Paris, and with representatives of the Church in such positions, it is not difficult to account for the idea of God Himself as a great Over-lord, demanding various dues from His inferiors. With this background Anselm develops the doctrine of the Atonement.

The *Cur Deus Homo*² with its constant reference to the payment of debt is a good example of this feudal influence. Book I, Chapter XI, in particular deals with this idea of sin as a debt:

“*Anselm*: Thus to sin, is nothing else but not to repay to God one’s debt.

“*Boso*: What is the debt we owe to God?

“*Anselm*: The whole will of a rational creature ought to be subject to the will of God.

“*Boso*: Nothing is more certainly true than this.

“*Anselm*: This is the debt which angels and men owe to God: paying which, none sins; and every one who

¹ *Op. cit.*, p. 7.

² In Book I, Chapter XVI, Boso reveals some sympathy with the modern scientific mind:

“*Anselm*: It is certain that God proposed to replace the number of angels who had fallen from that humanity which he had created sinless.

“*Boso*: We believe this; but I should like to have some reason for it.”

does not pay it, does *sin*. This is uprightness, or rectitude of will, which constitutes the just or upright in heart, that is, in will; this is the sole and whole honour which we owe to God, and which God requires from us. Only such a will, when it can act, can do works pleasing to God; and when it cannot act, it pleases by itself alone, since no work is pleasing without it. Whoever renders not unto God this due honour, takes away from God that which is His, and does God dishonour; and *this* is sin. Also, as long as he does not repay what he took, he remains in fault; nor is it enough only to repay what was abstracted; but he ought for the insult done to return more than he took. For as it does not suffice, when one injures the health of another to give him back his health, unless he make some compensation for the injury of the suffering he has caused him; so, if one injures another's dignity, it is not sufficient that he rehabilitate that dignity unless he restore something to give pleasure to the injured in proportion to the injury or dishonour done. And this is also to be noted; that when anyone repays what he took unjustly, he ought to give somewhat which could not have been required of him had he not taken that which was another's. Thus, therefore, each sinner ought to repay the honour of which he has robbed God: and this is the satisfaction which every sinner ought to make to God."

The question of man's ability to pay is discussed in Book I, Chapter XXIV, with the following heading:

"That so long as man repays not to God that which he owes, he cannot be made blessed; nor is he excused by his want of ability."

and in this chapter there occurs the following illustration:

Anselm: . . . For if anyone sets his servant a task and enjoins him not to throw himself into a pitfall which he points out to him, whence he could by no means get out again; and that servant, despising the command and warning of his master, casts himself of his own will into that pit which had been shown to him beforehand, so that he cannot possibly perform the enjoined task; you surely do not think that this helplessness would stand him in any stead as an excuse for not performing the appointed work?

Boso: In nowise; rather would it be reckoned as making the fault greater, since he himself caused that want of power. For he sinned doubly, since what he was bidden to do he performed not, and what was forbidden to him, that he did.

Anselm: Thus man, who of his own free will incurred that debt which he cannot pay, and by his own fault cast himself into that state of powerlessness wherein he can neither pay what he owed before the fall—that is, to keep from sin—nor that which he now owes because he sinned, is inexcusable.”

Towards the end of Book II, Chapter XIX, occurs the following paragraph revealing man's debt paid by the debt due to Christ:

Anselm: To whom could He more fitly assign the fruit of, and retribution for, His death, than to those for whose salvation (as the investigation of the truth showed us) He made Himself man, and to whom (as we said) He in dying gave the example of dying for righteousness' sake. In vain, however, would they be imitators of Him if they were not sharers in His merits. Or whom could He more justly make heirs of a debt due to Him of which He Himself had no need, and of the overflowings

of His fulness, than His kindred and brethren whom He sees burdened with so many and so great debts and wasting away in the depths of misery; that what they owe for their sins may be remitted to them, and what on account of their sins they are in need of may be given them?"

The position is also put quite clearly in Meditation XI (Gerberon's edition), "Concerning the Redemption of Mankind," as the following extract shows:

"For the life of the man who is God is more precious than everything that is not God; and surpasseth every debt which sinners owe for the satisfaction of God. . . . Thus in that Man human nature offered to God freely and not as of debt what was its own, that it might redeem itself in the persons of others, in whom it had not that which was due as a debt to offer."

The mediæval Church justified servitude and the following extract from Anselm's *De Conceptu Virginali* is another instance of the dependence of religious thought on current ideas:

"There are some whose minds refuse to accept the teaching that (unbaptized) infants must be damned for the sole unrighteousness whereof I have spoken (i.e. original sin). . . . Yet even this judgment of God, whereby infants are damned, differeth much from the judgment of man. For if any man and his wife, promoted by no merit of their own but by grace alone, commit in partnership a grievous and inexcusable fault, for which they are justly degraded and reduced to servitude, who would assert that

their children whom they beget after their condemnation should not be subject to the same servitude, but rather should be restored of grace to the goods which their parents have justly lost?"¹

The earliest treatise on English law is by Glanvill, one of Henry II's greatest ministers, who wrote about 1181. In the *De Legibus Angliae* the serf's legal status is thus described:

"This must be noted, that no man who is in serfdom can buy his liberty with his own money; for, even if he had paid the price, he might be recalled to villenage by his lord according to the law and custom of this land; for all the chattels of all serfs are understood to be so far within the power of his lord, that he cannot redeem himself from his lord, by any money of his own. . . ." ²

There is surely no need to elaborate further the dependence of the statement of doctrine on current ideas. So far as we have traced pre-Copernican views the quotation that Hoernlé makes use of seems amply justified: "every creed

¹Quoted by G. G. Coulton, *Social Life in Britain from the Conquest to the Reformation*, Section VIII, "Rich and Poor," p. 337. He also points out that probably the only great Schoolman who disapproved on principle of this hereditary bondage is John Wyclif (*De Civili Dominio*): "We must further question whether the civil laws enforcing hereditary servitude are conformable to the law of Christ; and it would seem that they are not; for it is written, 'The son shall not bear the iniquity of the father' . . . therefore this law of hereditary servitude savoureth of injustice."

² *Op. cit.*, pp. 338-9.

is a view of the Universe, a theory of man and the world, a theory of God." Especially shall we find this true with regard to theories of the world and of the origin of man in the next chapter.

PART I

The Dependence of Religious Thought on Current Ideas

CHAPTER II

MODERN SCIENCE

(a) THE COPERNICAN REVOLUTION.

The Attitude of the Roman Church.
The Acceptance of the New Position.

(b) THE THEORY OF EVOLUTION.

The Conflict of the Nineteenth Century.
The Acceptance of the New Doctrine.

(c) THE PRINCIPLE OF RELATIVITY.

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CHAPTER II

MODERN SCIENCE

(a) THE COPERNICAN REVOLUTION.

DURING the period of the Middle Ages the Church naturally plays an important part as the repository of learning and, so far as ideas about the universe are concerned, we find that the Biblical background was largely preserved. The influence of Arabic knowledge on Western thought is conveniently traced by Dr. Singer in his essay on the *Mediæval Contribution of Science to Modern Civilization*; he also points out the influence of the four elements—earth, air, fire and water—of Aristotle.¹ An interesting diagram of Dante's world is given on page 137. It is not difficult to understand the position of Christian Orthodoxy and its insistence on a Biblical background of belief with regard to the universe; this position, in so far as it regarded the earth as fixed, was supported by the Ptolemaic system.

As a second example of the way in which religious belief depends on current ideas, we may consider the position of Christian theologians when Copernicus' views were becoming known.

¹ *Mediæval Contributions to Modern Civilization*, ed. by Hearnshaw, p. 133.

It must be remembered that not only was the earth considered the centre of the universe, but Jerusalem was looked upon as the centre of the land hemisphere and so the Crucifixion assumed not only a unique place in time, but also a central position in the universe. In the year 1616 the Qualifiers for the Holy Office reported on the Copernican doctrines as follows:

“That the doctrine that the sun was the centre of the world and immovable was false and absurd, and formally heretical and contrary to Scripture, whereas the doctrine that the earth was not the centre of the world but moved, and has further a daily motion, was philosophically false and absurd and theologically at least erroneous.”

Galileo had discovered the presence of Jupiter's moons and in the year 1611 a tract was published to the effect that these satellites were unscriptural.

Galileo was finally convicted on June 21, 1632, by the Inquisition “of believing and holding the doctrines—false and contrary to the Holy and Divine Scriptures—that the sun is the centre of the world and that it does not move from east to west, and that the earth does move and is not the centre of the world; also that an opinion can be held and supported as probable after it has been declared and decreed contrary to the Holy Scriptures.”¹

Here, then, is another case of the vital connection between religious thought and current ideas. The impact of the Copernican revolution on

¹ Quoted from Berry, *Short History of Astronomy*. These and other interesting extracts occur in Chapter VI.

theology created definite hostility; the pioneers of scientific discovery were condemned by the leaders of religion. Yet the views which seemed so incompatible with Christian teaching have long since been generally accepted—the heliocentric theory is assumed even in our elementary schools. It is natural to ask how scientific ideas have really influenced religious thought. History seems to reveal that the medium through which this influence has been manifested is, in the main, that of philosophy.

The general idea of the Biblical conception of the universe is so ancient and our records so incomplete that it would be difficult to trace the influence of any one branch of thought on religion. But in the case of Copernicus, the materials are more abundant and some estimate can be formed of the part which philosophy has played in the change from a position of definite theological antagonism to one of acquiescence.

In a prefatory note (not written by the author) to Copernicus' *De Revolutionibus*, it is stated that the fundamental principles laid down were merely abstract hypotheses convenient for purposes of calculation. But the dawn of such a revolution in scientific thought could not long be obscured. By the time of Galileo the theory was attracting notice as a serious attempt to explain the celestial motions and theologians realized that it involved a definite break with the older conception. The attitude of the Roman Church has already been reviewed and the official position was antagonistic

until 1835 when Copernicus' book was silently removed from the Index.¹

With regard to the Protestant Churches, the enthusiasm of the work of Reformation seems to have absorbed the attention of theologians, so that usually we find the Copernican theory ignored in their writings.² At this time we must not forget the importance of Milton in preparing men's minds for the possibility of a change in the current ideas of the universe. It is the Newtonian background rather than the mediæval; for example, in Book IV of *Paradise Lost*, after the description of a sunset, the question is raised as to whether it is the earth or the sun that has moved:

. . . . Whether the prime orb,
Incredible how swift, had hither roll'd
Diurnal, or this less volubil earth,

¹ It is significant that Darwin has never been placed on the Index.

² Luther, in his *Table Talk*, under the section of "Astronomy and Astrology" (trans. Hazlitt, p. 341), maintains the geocentric theory: "Heaven's motions are threefold, the first is, that the whole firmament moves swiftly round, every moment thousands of leagues, which, doubtless, is done by some angel. 'Tis wonderful so great a vault should go about in so short a time. If the sun and stars were composed of iron, steel, silver or gold, they must needs suddenly melt in so swift a course, for one star is greater than the whole earth, and yet they are innumerable. The second motion is, of the planets, which have their particular or proper motions. The third is a quaking or a trembling motion, lately discovered, but uncertain. I like astronomy and mathematics, which rely upon demonstration and such proofs. As to astrology, 'tis nothing."

By shorter flight to th' east, had left him there,
Arraying with reflected purple and gold
The clouds that on his western throne attend.¹

The work of the Deists and the Cambridge Platonists have a direct bearing on the attempt to express religious thought in terms of the new ideas which were becoming current, and the medium through which they worked was that of philosophy.

It is not within the scope of this chapter to trace in detail the way in which the Copernican ideas were gradually assimilated into the background of theology. We must note however that where the impact was direct, the new scientists and the theologians seemed to be alienated. Probably through the medium of philosophy (especially of the philosophers who were also mathematicians), the modification in current ideas due to the Copernican Revolution, was recognized in the background of religious thought.

In the eighteenth century the attitude of Wesley is rather that of the Reformers in concentrating on the practical and evangelical side of Christianity, but he definitely rejects the geocentric theory:

“Various theories of the earth have late appeared. But they are no more than ingenious conjectures. The same may be said of the systems of the universe, a few particulars

¹ Book IV, lines 591-6. The importance of imagery is dealt with by Wildon Carr in *The Principle of Relativity*, pp. 14 ff.

excepted. The Ptolemaic system, which supposes the earth to be the centre of the universe, is now deservedly exploded; since Copernicus has revived that of Pythagoras, which was probably received by most of the ancients. Tycho Brahe's, which jumbles both together, is too complex and intricate, and contrary to that beautiful simplicity, conspicuous in all the works of nature."¹

The Copernican ideas were thus gradually recognized and the system of Christian theology adapted itself to the new environment of thought, emphasizing the note of faith which had been

¹“On the Gradual Improvement of Natural Philosophy,” Wesley's *Works*, Fifth Ed., Vol. XIII, p. 487. It is interesting to contrast this with the attitude of the Roman Church. “In their decree prohibiting this work, *De Revolutionibus*, the Congregation of the Index, March 5, 1616, denounced the new system of the universe as ‘that false Pythagorean doctrine utterly contrary to the Holy Scriptures’” (Draper, *The Intellectual Development of Europe*, Vol. II, p. 263). Wesley did not, however, consider any theory of the universe as final. This is all the more significant in view of the recent Theory of Relativity. “There is reason to fear that even the Newtonian, yea and Hutchinsonian system, however plausible and ingenious, and whatever advantages they may have in several particulars, are yet no more capable of solid, convincing proof, than the Ptolemaic or Cartesian” (“Remarks on the Limits of Human Knowledge,” *op. cit.*, p. 490). Wesley's attitude is revealed in the concluding paragraph of this essay: “What cause have we, then, to adore the wisdom of God who has so exactly proportioned our knowledge to our state! We may know whatever is necessary for our present or eternal happiness. But how little beside can the most penetrating genius know with any certainty! Such pains, so to speak, hath God taken to hide pride from man; and to bound his thought within that channel of knowledge wherein he already finds eternal life.”

sounded at the Reformation. But the nineteenth century unhappily witnessed another direct attack on a scientific theory, made on this occasion by Protestant theologians; the theory did not deal with the motion of the earth, as in the case of Copernicus, but with the origin of man.

(b) THE THEORY OF EVOLUTION.

The change in current ideas had shifted from the realm of astronomy to that of biology, and Churchmen deemed it their duty to condemn the new doctrine as inconsistent with the Bible story of creation.¹

The doctrine of evolution has been defined as the view "that the varied species of animals and plants which we see around us, have all sprung from several, or more probably from only one common stock of lowly ancestors, and have become differentiated from each other as the centuries rolled on by the modification of various portions of the same stock in divergent directions. Since man in his bodily structure and functions closely resembles the higher animals, the doctrine of evolution assumes that the human race has also been slowly developed out of some mammalian stock resembling the modern monkeys, in the

¹ In the case of the Copernican theory, the "heresy" was persecuted chiefly for defying the authority of the *Church*. Evolution has been pilloried because of its divergencies from the *Biblical* records. The two positions seem to reflect the tendency of the change made at the Reformation from belief in an infallible Church to belief in an infallible Bible.

same way as the mammals have arisen from lower forms."¹

The contrast between this and the early narratives of Genesis is sufficiently clear to explain the consternation of theologians who placed a special emphasis on the inspiration of the Bible. There is no point in reviewing the details of the controversy between Wilberforce and Huxley, but it is significant to note that some at any rate were beginning to question the advisability of this type of direct attack; the publication in 1860 of *Essays and Reviews* shows the tendency.

The story of the struggle has been traced in A. D. White's *History of the Warfare of Science with Theology*.² The lesson which appears to stand out from the records of the last three or four centuries is that the implications of a scientific theory are not recognized in theology as a result of the direct impact of scientific on religious thought. In fact, history seems to show that the result of such impact is to alienate rather than draw scientists and theologians together. The work of modern philosophy, beginning with Descartes, has slowly modified current ideas; whether in the realm of astronomy or biology,³ it is

¹ MacBride, "Evolution a Vital Phenomenon," *Modern Churchman*, Vol. XIV, p. 231.

² For example, *v.* the reference to Mr. Gladstone's attempt in 1885 at compromise, pp. 243 ff.

³ It would require treatment at length to bring forward evidence to show how philosophy has acted as a medium, and,

in the direction of philosophy that we should look

of course, with the various influences at work in the modern world, it is difficult to specify always the rôle played by a particular branch of learning. At any rate, it is fairly clear that where the impact has been direct, results have not always been satisfactory. The attitude of Descartes affords an illustration of the way in which his theological outlook was influenced by science: "though what pertains to revelation must be accepted as it is given, metaphysical questions must be examined by the reason which is given us for that purpose. He desired to show that mathematical and eternal truths are established by God from the beginning, and that they are immutable only because He is unchangeable. God is to be regarded not merely as the Deus of the Romans, but as an incomprehensible and infinite Being, the author of all things." E. S. Haldane, *Life of René Descartes*, p. 131 (references made to Corr. Vol. I, pp. 144, 150). The following extract is from the "Discourse on Method" (p. 37): "For example, supposing a triangle to be given, I distinctly perceived that its three angles were necessarily equal to two right angles, but I did not on that account perceive anything which could assure me that any triangle existed: while, on the contrary, recurring to the examination of the idea of a Perfect Being, I found that the existence of the Being was comprised in the idea in the same way that the equality of its three angles to two right angles is comprised in the idea of a triangle, or as in the idea of a sphere, the equidistance of all points on its surface from the centre, or even still more clearly; and that consequently it is at least as certain that God, who is this Perfect Being, is, or exists, as any demonstration of Geometry can be."

In the last part of Fisher's *History of Christian Doctrine* a survey is made of the influence of modern philosophy and scientific researches on theology, beginning with Descartes. The influence of such writers as Herbert Spencer, Bergson, Lloyd Morgan on the general background of modern theology, is an illustration of the way in which philosophy may act as a medium and form a common ground for discussion.

in seeking the influence of scientific research on religious thought.¹

(c) THE PRINCIPLE OF RELATIVITY.

The twentieth century is experiencing another wave of scientific inquiry and once more theologians are faced with the opportunity of sympathetic appreciation. Prof. J. Arthur Thomson in discussing Science and Religion claims that

¹ With regard to earlier systems of thought, it may be worth while pointing out that philosophy has sometimes played a very definite part in formulating religious belief. The Nicene Creed comes to mind as reflecting the metaphysics of the fourth century. An interesting comparison can also be made between the first of the Thirty-Nine Articles and Aristotle (*Eth. Nic.*, 10, 8). Writing of happiness as contemplative energy, he discusses the attributes of the gods: "Our conception of the Gods is that they are pre-eminently happy and fortunate. But what kind of actions do we properly attribute to them? Are they just actions? But it would make the Gods ridiculous to suppose that they form contracts, restore deposits, and so on. Are they then courageous actions? Do the Gods endure dangers and alarms for the sake of honour? Or liberal actions? But to whom should they give money? It would be absurd to suppose that they have a currency or anything of the kind. Again, what will be the nature of their temperate actions? Surely to praise the Gods for temperance is to degrade them; they are exempt from low desires. We may go through the whole category of virtues, and it will appear that whatever relates to moral action is petty and unworthy of the Gods. Yet the Gods are universally conceived as living, and therefore as displaying activity; they are certainly not conceived as sleeping like Endymion" (Trans. Welldon, pp. 340-1).

Compare the opening clause of the First Article: "There is but one living and true God, everlasting, without body, parts or passions."

religious interpretation and scientific analysis are equally natural and necessary expressions of the developing human spirit.¹ History has revealed that the days of the frontal attack and of the pitched battle chiefly engender bitterness and dogmatism on both sides. Prof. Nairne has pleaded for a saner course; in his *Mater Scientiarum* he maintains that natural science is the character of the renaissance to-day, that mutual exchange of views is essential among all those who are seeking truth. "To-day our first consideration must be this; how needful it is for theology to be receptive, to understand respect and desire the new thoughts of all men, to lay these into her own heart, that heart may speak to heart again."²

The new way of regarding space and time, associated with the name of Einstein, is comparable to the change in current ideas following on the work of Copernicus. But let history teach her lesson. On the one hand we must beware of rushing wildly into dogmatic denunciation and on the other of calmly maintaining a position of indifference.³ The first physical synthesis centres round the lives of Galileo and Newton.⁴ The

¹ J. A. Thomson, *Enc. Relig. and Ethics*, art. "Science," Vol. II, p. 260.

² A. Nairne, *Mater Scientiarum*: an Inaugural Lecture delivered in the Cambridge Divinity Schools, November 29, 1922, p. 5.

³ Compare Prof. Wildon Carr's appeal to philosophers, referred to *infra*, p. 72.

⁴ *V. infra*, p. 48.

work that is being done in connection with the theory of relativity is toward another physical synthesis; a reorganization of thought is in progress. In the first synthesis amid the new ideas of the universe, much that was mediæval and Aristotelian in the conception, for example, of "matter" or "stuff" was retained as a background for the new theory. Now, this background is being sifted and the second synthesis is demanding a reconsideration of our ideas of space, time and matter. For theologians to wait until a philosophical system has been fully developed, would be to shirk responsibility in a quest towards truth, which is the proud heritage of the twentieth century. The expression of religious belief depends on current ideas, and sooner or later this dependence must manifest itself. The relation of theology to other departments of human thought is well summed-up in the closing paragraph of Prof. Nairne's Inaugural Lecture:

"Theology enters into the temper of these modern times, and also clean traverses it. Mater Scientiarum, she delights in the young masters of the coming age, would tinge their prose with her old poetry, pressing forward to some exacter art than either poetry or prose, confident with the patience of many disappointments, many second chances and much peace; adoring and obeying; self-effacing; glad to spend and be spent even though the more she love the less she be loved." ¹

¹ Nairne, *Mater Scientiarum*, p. 28.

PART II

Current Ideas modified by Relativity

CHAPTER III

RELATIVITY AND SCIENTIFIC THOUGHT

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RELATIVITY AND SCIENTIFIC THOUGHT

GENERAL INTEREST IN THE THEORY OF RELATIVITY. MODIFICATION OF THE FIRST PHYSICAL SYNTHESIS.

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CHAPTER III

RELATIVITY AND SCIENTIFIC THOUGHT

VARIOUS discussions have resulted from the prominence which the Theory of Relativity has received during recent years: sometimes the arena has been that of Physics, sometimes that of Philosophy. A well-known mathematician and philosopher once reminded his audience at the beginning of a lecture that it is at any rate possible to agree that Einstein's investigations have one fundamental merit irrespective of any criticisms which we may feel inclined to pass on them. They have made us think. But when we have admitted so much we are most of us faced with a distressing perplexity. What is it that we ought to think about?

It is just here that many people are bewildered; they feel that the new theory involves some sort of change in current ideas—it makes them think; but the field covered seems so wide and technical that the difficulty is to know what to think *about*. On the one hand, the technical statements of Einstein's views are forbidding to any but the trained mathematician, and on the other, there is a marked diversity of interpretation among trained

philosophers. It will however be necessary to form some estimate of the position of the theory in modern science, before discussing its bearing on philosophy. The main object of this chapter is to investigate the influence which the principle of relativity is having on scientific thought, although in the discussion of the respective merits of the interpretations of Einstein and Whitehead it will not be possible to ignore the philosophical background involved.

The new theory demands that we revise our ideas concerning space, time, matter and motion; in other words we are faced with the possibility of a new physical synthesis of the universe. In an interesting essay Whitehead¹ has described the first physical synthesis, taking the year 1642 as the centre of the period involved. It was the year of the death of Galileo and the birth of Newton: the full significance of the Copernican heliocentric theory was being recognized; the scholastic conception of the universe was being challenged and the Church replied by appealing to authority and to Aristotle. But in order to estimate the change in outlook to-day it will be necessary to introduce and explain certain terms.

(a) EVENTS.

The term "event" is used in its ordinary sense of something "that happens." For example, we speak of the landing of William the Conqueror at Pevensey in 1066 as an important event; it refers

¹ Essay VI in *Science and Civilization*, ed. F. S. Marvin.

to something which happened at a certain place and at a certain time. We can also refer to the events of our daily lives—at a certain time and at a certain place Mr. X stepped into a railway compartment—not an important event perhaps, but an event. If we are in the region of Westminster by day, and Parliament is sitting, we shall observe the Union Jack flying from the Victoria Tower—another event, happening at a certain time and place. In these examples we notice that both place and time are essential for describing the event.

At first we might hesitate to describe the fact that there is a flagstaff on the Victoria Tower as an event; it seems to lack the idea of time—it is always there—it has been there for years and will be presumably for many more. We grant it is a fact—but is it an event? Can we talk about position and ignore time? A little consideration will show that we cannot ignore the temporal element and that we must look upon this fact as an event. The flagstaff was not always on the Victoria Tower, and the latter was only built in the middle of last century, and those responsible for the renovation of the flagstaff know that its appearance is changing—quite apart from the physical changes which may be taking place within. We have entirely omitted any motion which the earth possesses relative to the sun and the motion of the solar system relative to the “fixed stars.” So that if we wish to be in any sense exact we must allow that the fact of the flagstaff being on the Victoria Tower is an event in which

we refer to a particular position of the flagstaff at a particular time.

These examples suffice to show that from "events" or happenings we make two abstractions—one of space and another of time. We may make further abstractions from events—such as ideas of beauty—architecture—emotion—but for our present purpose we are especially concerned with the abstractions of space and time.

It will be evident that for the purpose of science it is not sufficient to describe a position by merely saying that it is in or on a certain building—such as the Victoria Tower, which is 340 feet high and 75 feet square. We must be more exact; we could, for example, take the distances from two of the adjacent walls and the height from the ground floor, and in this way we arrive at three numbers which will give us an exact position. These three are "co-ordinates" in a system of reference consisting of two adjacent walls and the ground floor. To describe the event completely we further require the time, and so four co-ordinates are really necessary to locate any particular event: we must remember that the co-ordinates are relative to the particular spatio-temporal system of reference which we have chosen (in this case the walls and floor of the Victoria Tower and, say, Greenwich Mean Time).

We are now faced with a further difficulty, for although we have four co-ordinates to locate an event, these four numbers really define a point, whereas the events of daily life—such as the flag-

staff on the Victoria Tower—certainly involve magnitude. This leads to the method by which this difficulty may be overcome, so that we can proceed to the limit and consider “event-particles.”

(b) THE METHOD OF EXTENSIVE ABSTRACTION.

The Principle of Extensive Abstraction has been referred to by C. D. Broad as the “Prolegomena to every future Philosophy of Nature.”¹

This method of extensive abstraction is dealt with by Whitehead in *The Concept of Nature* and the following extracts may help in its appreciation:

“The point which I want to make now is that being the situation of a well-marked object is not an inherent necessity for an event. Wherever and whenever something is going on, there is an event. Furthermore, ‘wherever and whenever’ in themselves presuppose an event, for space and time in themselves are abstractions from events.”

* * * * *

“It requires no illustration to assure you that an event is a complex fact, and the relations between two events form an almost impenetrable maze. The clue discovered by the common sense of mankind and systematically utilized in science is what I have elsewhere called the law of convergence to simplicity by diminution of extent.”

* * * * *

“Accordingly an abstractive set of events is any set of events which possess the two properties, (i) of any two members of the set one contains the other as a part, and (ii) there is no event which is a common part of every member of the set. Such a set, as you will remember,

¹ *Scientific Thought*, C. D. Broad, Preface, p. 4.

has the properties of the Chinese toy which is a nest of boxes, one within the other, with the difference that the toy has a smallest box, while the abstractive class has neither a smallest event nor does it converge to a limiting event which is not a member of the set.”¹

The idea of “intrinsic” and “extrinsic” characters is then developed.

If e be an event, denote by $q(e)$ the set of quantitative expressions, defining its character, including its connexions with the rest of nature.

Let e_1, e_2, e_3 , etc., be an abstractive set, the members being so arranged that each member such as e_n extends over all the succeeding members such as e_{n+1}, e_{n+2} , and so on.

With regard to the two series

$$e_1, e_2, e_3, \dots \dots \dots e_n, e_{n+1} \dots \dots \dots$$

and $q(e_1), q(e_2), q(e_3) \dots \dots q(e_n), q(e_{n+1}) \dots \dots$
called “ s ” and $q(s)$ respectively, it is pointed out that the series “ s ” has no last term and no events which are contained in every member of the series, and so it converges to nothing.

Also the series $q(s)$ has no last term, but the various homologous quantities running through the various terms of the series do converge to definite limits.

A class of limits $l(s)$ is thus deduced which is the class of the limits of those members of $q(e_n)$ which have homologues throughout the series $q(s)$ as n indefinitely increases.

¹ *The Concept of Nature*, A. N. Whitehead, pp. 78–80. *V.* also *Science and the Modern World*, A. N. Whitehead, Chap. X.

$$e_1, e_2, e_3, \dots e_n, e_{n+1} \dots \rightarrow \text{Nothing.}$$

and

$$q(e_1), q(e_2), q(e_3) \dots q(e_n), q(e_{n+1}) \dots \rightarrow l(s).$$

In this way the set "s" does indicate an ideal simplicity of natural relations, though this simplicity is not the character of any actual event in "s".¹

"I call the limiting character of natural relations which is indicated by an abstractive set, the 'intrinsic character' of the set; also the properties, connected with the relation of whole and part as concerning its members, by which an abstractive set is defined together form what I call its 'extrinsic character.' The fact that the extrinsic character of an abstractive set determines a definite intrinsic character is the reason of the importance of the precise concepts of space and time. This emergence of a definite intrinsic character from an abstractive set is the precise meaning of the law of convergence.

"For example, we see a train approaching during a minute. The event which is the life of nature within that train during the minute is of great complexity and the expression of its relations and of the ingredients of its character baffles us. If we take one second of that minute, the more limited event which is thus obtained is simpler in respect to its ingredients, and shorter and shorter times such as a tenth of that second, or a hundredth or a thousandth—so long as we have a definite rule giving a definite succession of diminishing events—give events whose ingredient characters converge to the ideal simplicity of the character of the train at a definite instant. Furthermore, there are different types of such

¹ For full exposition *v. The Concept of Nature*, A. N. Whitehead, pp. 80-2.

convergence to simplicity. For example, we can converge as above to the limiting character expressing nature at an instant within the whole volume of the train at that instant, or to nature at an instant within some portion of that volume—for example, within the boiler of the engine—or to nature at an instant on some area of surface, or to nature at an instant on some line within the train, or to nature at an instant at some point of the train. In the last case the simple limiting characters arrived at will be expressed as densities, specific gravities, and types of material. Furthermore, we need not necessarily converge to an abstraction which involves nature at an instant. We may converge to the physical ingredients of a certain point track throughout the whole minute. Accordingly, there are different types of extrinsic character of convergence which lead to the approximation to different types of intrinsic characters as limits.”¹

The ideal minimum limits of events are called “event particles.”

The importance of Whitehead’s analysis lies in its careful investigation of what is involved in proceeding to the limit—whether we are talking about points of space or instants of time. The method, in dealing with events—involving both space *and* time—naturally leads to the ideal minimum limits of events for which the term “event-particles” has been employed.²

(c) THE PRINCIPLE OF RELATIVITY.

In order to appreciate the new relativity standpoint we must realize clearly the way in which

¹ For full exposition *v. The Concept of Nature*, A. N. Whitehead, pp. 82-3.

² *Op. cit.*, p. 86.

the older theory of mechanics treated the co-ordinates of space and time which we find to be necessary in determining an event-particle.

In describing the meaning of co-ordinates a spatio-temporal system of reference was suggested consisting of the walls and floor of the Victoria Tower and Greenwich Mean Time. If we are investigating the motions of the heavenly bodies it is clear that this system of reference, involving the Victoria Tower, is inadequate. We take an imaginary box in which we may suppose the celestial bodies to be contained and which we consider to be at rest. (The two adjacent walls and floor of the Tower will then be replaced by three adjacent sides of the box.) We can then locate our events by the three space co-ordinates and the one time co-ordinate (say sidereal time) and so deduce from observation certain mathematical relations between the co-ordinates of the events. Newton's famous Laws of Motion agree so well with these results of observation that times of rising and setting and of eclipses are predicted with accuracy years in advance (and published in the *Nautical Almanac*) and we might be tempted to say, that whatever else the new theory may change, it must not alter the Laws of Newton, which are the foundation of the Science of Mechanics. But before going further we must call attention to the underlying assumptions that have been made. We have treated this box as being absolutely at rest and we have assumed that the three space co-ordinates have no dependence whatever on the

one time co-ordinate. In other words, we have regarded the events of the universe as being "spread out in a single space and moving down the ages in a single 'corridor of time.'" ¹

But this simple way of regarding events was definitely abandoned by the pioneers of the Theory of Relativity; the time and space co-ordinates are not looked upon as independent and we have to realize that it is not possible to think of one system of reference (like the box) as being absolutely at rest.

Now the problems of rest and motion have long been recognized, as evidenced by Zeno's arguments in the fifth century before Christ. We are all familiar with the confused notions caused by one train beginning to move slowly while our own remains at rest in the railway station. The difficulty of recognizing absolute motion is clearly realized if the observer is reclining on a deck-chair and looking up into a clear sky while his boat is travelling uniformly. If a sea-gull is just keeping up with the ship, then we have the sensation of its hovering overhead; if however the friendly bird slackens, we are faced with the curious phenomenon of its flying backwards. Although these and many other instances of like nature are of daily occurrence and illustrate the idea of relative motion, yet this idea is not so simple as it appears, and when a large relative velocity is involved the results are very different from what might have been expected.

¹ T. P. Nunn, *Relativity and Gravitation*, p. 24.

Our first choice of a spatio-temporal system of reference was that of the Victoria Tower and Greenwich Mean Time. In dealing with celestial motions we used a hypothetical box—(supposed to be absolutely at rest)—and sidereal time. Our observer on the ship, in choosing a system of reference involving say the deck, would have to treat the sea-gull as flying away from him. It is evident that the choice of the particular spatio-temporal system of reference rests with the observer. The Theory of Relativity is concerned with the changes involved when we consider events as located in a reference system of an observer A, and the same events as located in a reference system of an observer B, where the two spatio-temporal reference systems are moving relatively to one another. We might for example consider A to be situated on our Earth and B on the planet Mars. What would be the relation between the space-time co-ordinates of the same event in the two systems? An answer to this question, when the relative velocity of the systems remains the same, is given by the "Lorentz Transformation" in which B's space co-ordinates depend, not only on A's space co-ordinates but also on A's *time co-ordinate* as well, and in which B's time co-ordinate depends, not only on A's time co-ordinate, but on A's space co-ordinates as well.

The position is more clearly seen in mathematical symbols:

Let the two spatio-temporal systems of reference locate an event by the co-ordinates (x, y, z, t)

and (x', y', z', t') respectively where the t 's refer to the time co-ordinates and the remainder to the spatial co-ordinates. Further denote the one system by O and the other by O' .

For simplicity we shall consider the system O' to be moving relatively to the system O in the direction of OX only (OX being the x -axis of co-ordinates) with constant velocity " v " (i.e. we assume velocity-components along OY , OZ to be zero).

The transformation equations on the Newtonian hypothesis will be

$$\left. \begin{aligned} x' &= x - vt \\ y' &= y \\ z' &= z \\ t' &= t \end{aligned} \right\} (1)$$

The Lorentz transformation gives

$$\left. \begin{aligned} x' &= \beta (x - vt) \\ y' &= y \\ z' &= z \\ t' &= \beta \left(t - \frac{vx}{c^2} \right) \end{aligned} \right\} (2)$$

where
$$\beta = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

" c " being the velocity of light.

Now for ordinary purposes the velocity " v " is extremely small compared with " c ."

For example, " v " in the case of an express train is say 60 miles per hour or $\frac{1}{60}$ miles per

second, whereas “ c ” is about 186,000 miles per second, so that the ratio

$$\frac{v}{c} = \frac{1}{60 \times 186,000}$$

$$= \frac{1}{10^7} \quad (\text{Approx.})$$

and $\frac{v^2}{c^2} = \frac{1}{10^{14}} \quad (\text{Approx.})$

and hence for practical purposes—at any rate as far as terrestrial velocities are concerned— $\frac{v^2}{c^2}$

can be neglected and β regarded as unity, also $\frac{vx}{c^2}$

will be extremely small compared with t . In which case the Lorentz transformation becomes the ordinary Newtonian transformation.

But what is important to notice is that not only does the spatial co-ordinate x' depend on the relative velocity “ v ” of the two reference systems, but also the time co-ordinate t' given by $t' = \beta \left(t - \frac{vx}{c^2} \right)$ also involves the spatial co-ordinate “ x .”

As Newton's views presuppose that the co-ordinates of space and time are independent, it is not surprising that the laws of motion assume a new form when the Lorentz transformation is recognized. In 1905 Einstein published what is now known as the *Restricted (or Special) Principle of Relativity*, asserting that if the behaviour of a

physical system be expressed as a mathematical law referred to A's spatio-temporal system of reference, then if this law is true, it must preserve its mathematical form when it is referred to B's spatio-temporal system of reference, where B's system is moving with uniform velocity relative to that of A: the Lorentz transformation being used in transforming the co-ordinates. If the motion of B's system of reference is not uniform with reference to A's system, then we are no longer dealing with the *Restricted* but with the *General Principle of Relativity* which was gradually made known through scientific journals during the War.¹

If we grant the truth of the principle of relativity, the formulation of physical laws naturally assumes a different aspect from that which appears in Newtonian mechanics. Newton's laws of motion depend on his idea of "force." His law of gravitation asserts that the force of attraction between two masses varies directly as their product and inversely as the square of their distance apart. Einstein's law of gravitation cannot be

¹ The following extract is from W. de Sitter on Einstein's Theory of Gravitation in the *Monthly Notices of the Royal Astronomical Society*, LXXVII (1916), p. 177: "The principle of general relativity asserts that the space co-ordinates and the time are entirely irrelevant and have no physical meaning whatever. In fact, we never observe anything but a combination of time and space. Nobody has ever measured a pure distance, nor a pure interval of time. Always the distance or the interval of time is measured from a material point (event) m_1 at time t_1 and at the place (x_1, y_1, z_1) to another point m_2 at another time t_2 and another place (x_2, y_2, z_2) ."

expressed in this simple mathematical form, and as Prof. Whitehead has pointed out, there are alternative laws of gravitation which may be deduced from the principle of relativity. But whatever gravitational law is adopted, it must at any rate be capable of the accuracy of celestial prediction which obtains in the Newtonian system, and on which the Nautical Almanac is based. In this sense relativity must fulfil and not destroy Newton's laws.

There is however one prediction on the Newtonian theory which does not agree with observation. The direction of the axis of the planet Mercury's orbit is gradually rotating relatively to the fixed stars, but the amount of rotation predicted (taking into account the presence of all the known planets) is 43 seconds of arc per century, less than the displacement actually observed.

Various explanations have been suggested, such as the presence of an unknown body; but this hypothesis in explaining Mercury's orbit introduces difficulties with regard to other members of the solar system. Assuming the principle of relativity, we find that this unaccounted part of the motion of the perihelion of Mercury (i.e. the point at which the planet is nearest the sun) is explained within the limits of observational error.

Another result of the theory is associated with the recent Eclipse expeditions. On the relativity principle the path of a ray of light passing near the sun should be deflected: there is obvious difficulty in observing this unless the light of the sun be so obscured that the apparent position of

stars which appear near the sun can be photographed. At a total eclipse this is possible: the photographic plates are developed and compared with photographs of the corresponding part of the heavens when the sun is absent. Both the expedition of 29th May, 1919, and that of February, 1923, gave displacements of the stars whose light had passed near the sun, and it is generally admitted that the results are in support of the theory.

In addition to the various tests which have been applied, there are others which in the future may have an important part to play in the development of the Principle, and perhaps help in deciding whether the interpretation given by Einstein and Eddington or that by Whitehead should be adopted. One of the most significant results of the Principle of Relativity is the tendency to co-ordinate gravitational and electrical phenomena.

(d) EINSTEIN AND WHITEHEAD.

Before discussing the bearing of the theory of relativity on philosophic thought, it is desirable to draw attention to the interpretations of Einstein, representing the orthodox relativist position, and those of Whitehead. Reference to a philosophical background cannot however be wholly deferred to the next chapter.

Einstein's well-known illustration of an observer, outside the earth's gravitational field, in a box which is being dragged by the lid with acceleration "g," shows how such a gravitational

field can be produced without reference to attracting matter.¹ In order to bring out the difference between a "Galilean" and a "Permanent" gravitational field, the following illustration, due to Prof. Nunn,² is useful.

An observer is shot into the air travelling in a transparent shell and is pursued by rockets and other projectiles. Since all are subject to the earth's gravitational field, the motion of the other bodies (neglecting air-resistance) will appear to the observer as being along straight lines, and hence the observer might imagine that he was no longer in a gravitational field (in which bodies left to themselves would move in parabolas). Such a field, which can be created or destroyed by suitable motion of the observer's spatio-temporal system of reference, is called a "Galilean" field—referring to Galileo's law that uniform rectilinear motion implies the absence of external force.

Now suppose observer and projectiles are projected with sufficient velocity toward the sun to enable them to travel outside the earth's field. Those projectiles near the observer will be subject to the same gravitational field and will move, relatively to him, in straight lines as before. But those which have travelled appreciably nearer the sun will be in a different gravitational field to that of the observer and will appear to him to be

¹ Einstein, *Relativity, The Special and the General Theory*, trans. R. W. Lawson, pp. 66 ff.

² Nunn, *Relativity and Gravitation*, pp. 31 ff.

travelling in curves. Thus no motion of the observer's system of reference will eliminate the effect of the sun's gravitational field everywhere. Such a field is called "Permanent."

In order to explain the existence of this permanent gravitational field, Einstein maintains that we must regard space and time as possessing certain intrinsic characters, which give rise to the accelerations which cannot be eliminated. On his theory it thus becomes possible to speak of the "curvature of space." This leads to an important difference in the interpretation of Einstein and Whitehead. The latter will not attribute physical properties and hence heterogeneity to space. It is a cardinal article of his philosophic faith that temporal and spatial relations must be uniform in character, and that if we assume the contrary we surrender the basis which is essential for the knowledge of nature as a coherent system.

Whitehead has introduced a fundamental physical idea which he calls the "impetus" ¹ to express the field of activity of events in the neighbourhood of some definite event-particle in the four-dimensional manifold:

"The event-particle E is related to any neighbouring event-particle P by an element of impetus. The assemblage of all the elements of impetus relating E to the assemblage of event-particles in the neighbourhood of E expresses the character of the field of activity in the neighbourhood of E. Where I differ from Einstein is that he

¹ Whitehead, *The Concept of Nature*, p. 181, and in greater detail, *The Principle of Relativity*, pp. 78 ff.

conceives this quantity which I call the impetus as merely expressing the characters of the space and time to be adopted and thus ends by talking of the gravitational field expressing a curvature in the space-time manifold. I cannot attach any clear conception to his interpretation of space and time. My formulæ differ slightly from his, though they agree in those instances where his results have been verified. I need hardly say that in this particular of the formulation of the law of gravitation I have drawn on the general method of procedure, which constitutes his great discovery.”¹

There are ten quantities in terms of which the characters of the assemblage of elements of impetus of the field surrounding an event-particle E can be expressed, and we can express these ten in terms of two functions which Whitehead calls the “potential” and the “associate potential” at E. The “integral impetus” is obtained by adding up all the elements of impetus in the whole path of the attracted particle, and the law of motion would be stated by saying that the integral impetus is stationary for an infinitesimal displacement.²

Comparing Einstein’s law with Whitehead’s, the potential impetus would correspond to a spatio-temporal measurement which would require a knowledge of the actual contingent physical field before it is possible. Measurement on Einstein’s theory lacks systematic uniformity. “For example, we could not say how far the image of a luminous object lies behind a

¹ Whitehead, *The Concept of Nature*, pp. 181-2.

² *Op. cit.*, p. 183.

looking-glass without knowing what is actually behind that looking-glass.”¹

It is thus seen that Whitehead's theory is ultimately bound up with his philosophy of nature, though he himself would be the first to recognize “the magnificent stroke of genius by which Einstein and Minkowski assimilated time and space.”²

Attention should be drawn to the fact that the constant “ c ” which appears in Whitehead's theory is a limiting value, in no way dependent on the velocity of light.³ Some statements of the orthodox relativist position appear to make the velocity of light so fundamental that light itself seems in a privileged position among the phenomena of nature.

Whitehead's theory not only gives the same predictions which have so far been verified by experiment; it also points to the existence of phenomena to which Einstein's theory does not lead.⁴ If neither of the laws of gravitation (i.e. Einstein's and Whitehead's) survive further tests of delicate observations, there are still two other sets of tensor differential equations which on Whitehead's theory of nature satisfy the requirements, which are as follows:

¹ Whitehead, *The Principle of Relativity*, p. 83.

² *Op. cit.*, p. 88.

³ Whitehead, *The Principles of Natural Knowledge*, p. 160.

A velocity greater than “ c ” cannot represent any time system, and accordingly its physical significance must be entirely different from that of a velocity less than “ c .”

⁴ The case of the moon's motion is discussed by Whitehead in *The Principle of Relativity*, p. 83.

(i) To have no arbitrary reference to any one particular time-system.

(ii) To give the Newtonian term of the inverse square law.

(iii) To yield the small corrections which explain various residual results which cannot be deduced as effects of the main Newtonian law.¹

The possibility of these alternative laws depends on Whitehead's contention of the whole bundle of alternative time stratifications arising from the uniform significance of events. The discussion of uniformity and contingency must be deferred to the chapter dealing specifically with Whitehead's theory.²

Scientific thought in general has been profoundly changed with regard to space, time, matter and motion, and we have seen how two interpretations of the Principle of Relativity have been formulated. Both answer the demands of a scientific theory—namely, that it should agree with observation. Where they differ in predictions, experiment may in the future decide; but what is of supreme importance in any modification of current ideas is to realize the philosophical background that the theory demands. This will be the subject of the next chapter.

¹ These laws are dealt with in *The Principle of Relativity*, pp. 85-7.

² *V. infra*, Chap. VII, p. 127 ff.

PART II

Current Ideas modified by Relativity

CHAPTER IV

RELATIVITY AND PHILOSOPHIC THOUGHT. NATURE OF THE PROBLEMS

MODERN SCIENCE AND PHILOSOPHY.

(a) THE FIELDS AFFECTED BY THE NEW THEORY.

Views of Wildon Carr.

Haldane.

Whitehead.

Nordmann.

Eddington.

Weyl.

(b) NATURE OF THE PROBLEMS.

Critical and Speculative Philosophy.

Solipsism.

The Relativity of Knowledge.

The Relatedness of Nature.

Laws in the External World.

CHAPTER IV

RELATIVITY AND PHILOSOPHIC THOUGHT. NATURE OF THE PROBLEMS

ALTHOUGH Einstein's work has its immediate influence in changing current ideas in scientific thought, yet, as suggested in Part I, so far as fresh scientific doctrine may affect religious thought, we should really look for this influence through the medium of philosophy. It is the purpose of this chapter to suggest the bearing of the modern scientific outlook on philosophy and in particular to state the nature of the problems raised by the theory of relativity. Certain assumptions, especially with regard to space and time, have been universally accepted both by science and common sense, and it is because these assumptions are challenged by the modern relativity position that the scientific world has been forced to reconsider fundamental notions and aims. Hobson, in a brief examination of the ideal aim of physical science, regards this aim as a modest one compared with that of general philosophy. "There is no need to make Science responsible for the inferences which Philosophy may make

from scientific results, and least of all for the underlying ontological, or other, assumptions upon which such inferences may be based."¹ But philosophy must not ignore the results of scientific inquiry, otherwise it would be guilty of that artificial division, into separate and independent branches of experiences, so characteristic of the Middle Ages.²

An illustration of diverse philosophical treatment is to be found in the views of two mathematicians and philosophers—Descartes and Whitehead. The former starts with the Aristotelian conception of matter as "stuff" devoid of extension in time, and then considers space as an abstraction from objects, and an aggregate of space-time relations between objects as forming events. Whitehead however replaces "stuff" by

¹ E. W. Hobson, *The Ideal Aim of Physical Science* (A Lecture delivered before the University of London, November, 1924), p. 4.

² "From the days of Albert the Great (1206-1280) theology and philosophy had pursued their course as separate sciences, each more or less independent of the other. The domains of natural and supernatural knowledge had been carefully marked out." C. R. S. Harris, "Duns Scotus and his relation to Thomas Aquinas," *Proc. Aristotelian Soc.*, 1924-25, p. 221; *v.* also reference in Whewell to the way in which Aristotle was prohibited (Council at Paris, 1209) and subsequently taught in public (The Logic at Paris, 1215). The *Natural Philosophy* and *Metaphysics* were prohibited by a decree of Gregory IX: but Albertus Magnus and Thomas Aquinas wrote commentaries on Aristotle's works and in the fifteenth century no university degree could be taken without a knowledge of Aristotle (*History of the Inductive Sciences*, Vol. I, pp. 326-7).

events and makes process fundamental. Beginning with the concrete totality experienced, nature is an abstraction and events are abstractions from nature; space and time both being abstractions from events. But before proceeding further with the problems which are raised by the theory of relativity, it will be convenient to survey the scope of the fields affected by the new theory.

(a) THE FIELDS AFFECTED BY THE NEW THEORY.

Haldane's work, *The Reign of Relativity* and Wildon Carr's *The General Principle of Relativity* called forth an Article in *Mind*¹ criticizing the argument that Einstein's scientific theory is based upon a distinctively philosophic principle. The problems raised by these two works will be discussed in later chapters, but although criticism

¹J. E. Turner, Dr. Wildon Carr and Lord Haldane on "Scientific Relativity," *Mind*, Vol. XXXI, N.S., No. 121. The concluding paragraph is: "All this implies, finally, that what philosophy has to recognize in scientific relativity is simply an increased degree of accuracy due to the greater exactitude of physical concepts; which means again, that little, if indeed anything, truly metaphysical is in question at all. The established conclusions of the Theory will contribute to the future Philosophy of the universe; but this involves neither a complete revolution in fundamental concepts, nor any substantial advance in the Idealist view of experience and knowledge. 'Change in standpoint' once more, 'gives no change in the actual'" (p. 52).

Although caution is required in dealing with the relation of the scientific theory to philosophy, as we shall find in Chapters V and VI, yet the position taken up by Mr. Turner appears rather extreme. This second physical synthesis will surely have some influence in modifying our concepts of space and time.

will there be made of some of Wildon Carr's and Haldane's contentions, yet it is necessary to emphasize that philosophy must not refuse to take into account the standpoint of scientific relativity. "My argument is addressed to my fellow-philosophers. I am amazed at what seem to me their short-sightedness in imagining that philosophy can be indifferent to this stupendous revolution in science." ¹

In the sequel to *The Reign of Relativity*, Haldane points out how philosophy is becoming more and more dependent on materials which the sciences alone can provide for its work. "Physics and metaphysics have got into a territory which is a monopoly of neither, and the students in these branches of knowledge have to try to assist each other to a full consciousness of the nature of the knowledge employed and of its methods." ²

Although the standpoint of Whitehead is different from that of Wildon Carr or of Haldane, he recognizes the wide scope of the influence of the new theory. "The doctrine of relativity affects every branch of natural science, not excluding the biological sciences. In general, however, this impact of the new doctrine on the older sciences lies in the future and will disclose itself in ways not yet apparent." ³

¹ Wildon Carr, "Einstein's Theory and Philosophy," *Mind*, Vol. XXXI, N.S., No. 122, p. 177.

² Haldane, *The Philosophy of Humanism*, p. 32.

³ Whitehead, *The Principle of Relativity*, p. 3.

Most expositions of the theory of relativity enter into a discussion of the meaning of the universe. Nordmann devotes a chapter to Science and Reality and concludes it thus:

“One might sum it up by saying that the Einsteinians have taken as their motto the words of Auguste Comte: ‘Everything is relative, and that is the only absolute.’

“Newton, whose spatio-temporal premises Henri Poincaré vigorously refused to admit, and classical science take up an attitude, on the contrary, which Newton himself well described when he wrote: ‘I am but a child playing on the shore, rejoicing that I find at times a well-polished pebble or an unusually fine shell, while the great ocean of truth lies unexplored before me.’ Newton says that the ocean is unexplored, but he says that it exists; and from the features of the shells he found he deduced certain qualities of the ocean, especially those properties which he calls absolute time and space.

“Einsteinians and Newtonians are agreed in thinking that the external world is not in our time entirely amenable to scientific research. But their agnosticism differs in its limits. The Newtonians believe that however external to us the world may be, it is not to such an extent as to make ‘real time and space inaccessible to us.’ The Einsteinians hold a different opinion. What separates them is only a question of degree of scepticism. The whole controversy is reduced to a frontier quarrel between two agnosticisms.”¹

Eddington in his popular description, *Space, Time and Gravitation*, gives the last chapter the

¹ Nordmann, *Einstein and the Universe*, p. 172.

title "On the Nature of Things."¹ The conclusion of his Romanes Lecture states the position:

"If I have succeeded in my object, you will have realized that the present revolution of scientific thought follows in natural sequence on the great revolutions at earlier epochs in the history of science. Einstein's special theory of relativity, which explains the indeterminateness of the frame of space and time, crowns the work of Copernicus, who first led us to give up our insistence on a geocentric outlook on nature; Einstein's general theory of relativity, which reveals the curvature or non-Euclidean geometry of space and time, carries forward the rudimentary thought of those earlier astronomers who first contemplated the possibility that their existence lay on something which was not flat. These earlier revolutions are still a source of perplexity in childhood, which we soon outgrow; and a time will come when Einstein's amazing revelations have likewise sunk into the commonplaces of educated thought.

"To free our thought from the fetters of space and time is an aspiration of the poet and the mystic, viewed somewhat coldly by the scientist who has too good reason to fear the confusion of loose ideas likely to ensue. If others have had a suspicion of the end to be desired, it has been left to Einstein to show the way to rid ourselves of these 'terrestrial adhesions to thought.' And in removing our fetters he leaves us, not (as might have been feared) vague generalities for the ecstatic contemplation of the mystic, but a precise scheme of world-structure to engage the mathematical physicist."²

¹ *V. infra*, pp. 144-5.

² Eddington, *The Theory of Relativity and its Influence on Scientific Thought*, pp. 31-32. The Romanes Lecture, 1922.

One of the outstanding contributions is that of Hermann Weyl. In the Preface to the First Edition of *Space, Time, Matter*, he maintains that wider expanses and greater depths are now exposed to the searching eye of knowledge, regions of which we have not even a presentiment. We are brought much nearer to grasping the plan that underlies all physical happening. His wish was to present Einstein's Theory of Relativity as an illustration of the intermingling of philosophical, mathematical and physical thought, but he admits that in his book the mathematician predominates at the expense of the philosopher. The concluding paragraph of his Introduction, however, states the need of philosophy:

"All beginnings are obscure. Inasmuch as the mathematician operates with his conceptions along strict and formal lines, he, above all, must be reminded from time to time that the origins of things lie in greater depths than those to which his methods enable him to descend. Beyond the knowledge gained from the individual sciences, there remains the task of *comprehending*. In spite of the fact that the views of philosophy sway from one system to another, we cannot dispense with it unless we are to convert knowledge into a meaningless chaos."¹

These quotations from distinguished thinkers are sufficient to indicate the scope of the influence of relativity and its general bearing on philosophic thought. We shall now survey the nature of the problems to be discussed.

¹ Weyl, *Space, Time, Matter*, p. 10.

(b) NATURE OF THE PROBLEMS.

It is advisable in any discussion of the bearing of relativity on current philosophical ideas to remind ourselves of the function of philosophy. A convenient division has been made by C. D. Broad.¹ The analysis and definition of fundamental concepts and the clear statement and criticism of fundamental beliefs, he calls *Critical Philosophy*. The other division is that of *Speculative Philosophy*; its object being to reflect on the results of the various sciences and of the religious and ethical experiences of mankind, in the hope that we may reach some general conclusions as to the nature of the universe and our position and prospects in it.

Now the theory of relativity, with its modifications in our ideas of space and time, and consequent criticism of fundamental concepts, must make its influence felt in critical philosophy. And in so far as such concepts enter into our view of reality and of the nature of the universe, it is clear that the implications of the theory of relativity must also find a place in speculative philosophy. In discussing the modifications in current ideas it will not be possible to keep the treatment of these two branches of philosophy entirely separate, but in the writings on the relation of Einstein's work to philosophy two tendencies may be discerned.

On the one hand, there is the tendency to gather from the scientific theory some implication

¹ C. D. Broad, *Scientific Thought*, Introduction.

of a very general nature or some emphasis which is alleged to support a particular system of philosophy; the chief interest in this attitude lies in the sphere of speculative philosophy. On the other hand, there is the tendency to study the scientific theory carefully in relation to our concept of nature, criticizing current ideas and, if necessary, our modes of thought and reasoning; the chief interest at first in this attitude lies in the sphere of critical philosophy, but it is natural that the modifications in current ideas should lead also to theories associated with speculative philosophy.

One course of treatment that is open is to examine this latter tendency first; but as the critical attitude has already been developed to a certain extent in the last chapter on the relation of the theory to scientific thought, it seems desirable to investigate the positions of those writers who appear to make deductions of a very general nature from the scientific theory. This order of treatment has also the advantage of agreeing with that adopted in Part III, which leaves the implications of a definite philosophical position until the end, in order to attempt a setting of Christian belief in the thought of the twentieth century.

Our first task, therefore, will be to state the problems raised by those who emphasize the general implications of the theory of relativity. From the standpoint that has been developed in Chapter III it is clear that the observer and

his particular spatio-temporal frame of reference play a very important part. At once the question of the individual and his outlook on the universe suggests itself; is there support here for a subjective idealism? One idealistic writer can interpret a philosophy of the principle of relativity in terms of Monadology and he claims a definite advance in overcoming the solipsistic problem which faces all idealistic philosophy. This view, held by Professor Wildon Carr, is discussed under the heading of An Idealistic Claim in Chapter V.

There is also another implication which has been put forward on the side of epistemology; if so much depends on the observer, then truth may be relative and knowledge also. What is the relation of it all to reality? Viscount Haldane would treat Einstein's scientific principle as an illustration of the wider philosophical principle of the relativity of knowledge. This contention is examined in Chapter VI.

Both Wildon Carr's and Haldane's writings deal with the very general implications of the theory and centre round the speculative interest of philosophy. The work of A. N. Whitehead comes within the sphere of critical philosophy, and to this extent he is typical of the new realist attitude, but his treatment is leading to a definite position in philosophy. He also sees the importance of the observer, but he is careful to analyse what is implied in the use of the term observer and to point out the important part

that the observer's body plays. In his opinion the scientific theory emphasizes the Relatedness of Nature, and with this emphasis is involved a critical attitude toward the Aristotelian two-termed relation of subject to predicate. His philosophy maintains the essential importance of process, and the doctrine of the uniform significance of events together with the contingency of appearance. The importance of Whitehead's work is generally admitted and an attempt is made in Chapter VII to expound his position. In addition to the implication with respect to the Relatedness of Nature, the doctrine of Time is also specially discussed.

Reference has already been made¹ to the orthodox relativists, and some indication has been given of the reason why Whitehead's interpretation has been followed rather than that of Einstein. Eddington, as the outstanding exponent of the latter's theory in this country, has made some reference to the philosophical implications at the end of *Space, Time and Gravitation* and also in his later book on *Mathematical Theory*. He raises the question as to whether after all there are genuine laws in the external world. This problem, together with the allied question of irrational laws, will be discussed in the opening section of Chapter VIII, which is in the nature of a survey of the modifications made in current ideas by the theory of relativity.

There are, of course, various writers on this

¹ *V. supra*, p. 62.

subject, but it seemed necessary to restrict the discussion to those whose views have been prominent on the relation of relativity to philosophy. The next three chapters deal therefore, in the main, with the work of Wildon Carr, Haldane and Whitehead.

PART II

Current Ideas modified by Relativity

CHAPTER V

AN IDEALISTIC CLAIM

CHAPTER V

AN IDEALISTIC CLAIM

(a) MONADOLOGY.

Attitude to Scientific Reality.

Solipsistic Claim.

Atomic and Monadic Orders.

(b) THE MONAD'S PERSPECTIVE.

The Monad and the Universe.

The Perspective as Absolute.

Soldier and Skylark.

(c) MONADIC INTERCOURSE.

Mental Images.

Expressive Action.

Illustrations.

(d) THE ALLEGED SUPPORT FROM RELATIVITY.

Statement of the Principle.

Subjective Standpoint.

CHAPTER V

AN IDEALISTIC CLAIM

(a) MONADOLGY.

MUCH of the philosophic thought of the last few years has centred round the question as to whether the theory of relativity gives support to the idealist or to the realist view of the universe. There is one idealistic claim in this direction which demands more than a passing notice; to the title of his recent volume, *A Theory of Monads*, Wildon Carr has added *Outlines of the Philosophy of the Principle of Relativity*. It is clear from the introductory chapter, dealing with recent development of scientific thought, that he claims that the modern scientific revolution supports the theory that no reality can exist apart from mind:

“Science hitherto, in claiming concreteness for its object, has imagined a pure object free from all subjectivity. Modern science is now coming into line with modern philosophy in the recognition that *actual* experience alone is concrete. This is what is meant by the idealistic interpretation of the principle of relativity—not that scientific reality has no other basis than the ideas in the minds of subjects of experience, but that it is based

on an objectivity which derives its whole meaning from the concrete experience of the subject.”¹

The contrast drawn in the last sentence between what the idealistic interpretation *is not* and what it *is*, is presumably important, but on examination it seems rather difficult to appreciate exactly wherein the contrast lies. On the one hand, the hypothesis that “scientific reality has no other basis than the ideas in the minds of subjects of experience” *is not* to be considered as the idealistic interpretation of relativity; on the other hand, the idealistic interpretation *is* that scientific reality “is based on an objectivity which derives its whole meaning from the concrete experience of the subject.” If this objectivity derives its *whole* meaning from the experience of the subject, it apparently must be considered as completely depending on the ideas in the mind of the subject; but this is the first hypothesis which has already been excluded.

This question of the relation of reality to the individual raises the whole problem of solipsism, and the claim made by the author in the Preface demands careful investigation, especially in view of the idealistic interpretation of the principle of relativity quoted above.

He recognizes that philosophy has been paralysed by the inability to offer any escape from the solipsistic dilemma, and that in the

¹ H. Wildon Carr, *A Theory of Monads: Outlines of the Philosophy of the Principle of Relativity*, pp. 9-10.

theory of monads this difficulty has always seemed to assume its most intractable form. Wildon Carr claims that the argument developed in the second and illustrated in the tenth chapter of his book does satisfy him on this point.¹

But before examining this argument, which claims to relieve idealism from the difficulty of solipsism, it is necessary to investigate carefully the sense in which Wildon Carr is employing the term "monad." The first chapter, "The Windowless Monad," deals with the two orders—monadic and atomic. "The mind taken with its experience in its integrity and indivisible unity is a monad. The monad is a simple substance, but substance conceived as an active subject owning its activities and not as a substratum of qualities or attributes."²

But in contrast to this mental or monadic order there is the atomic order which we think of as physical reality and "to belong to it or form part of it is, in the common sense and scientific meaning, to exist."³ The physical arrangement of passengers in a railway carriage is of this atomic order. The illustration is developed further in order to reveal the nature of the immediate order. The bearing of this paragraph on the solipsistic problem is so important that it must be borne in mind during the whole discussion of Wildon Carr's claim:

¹ *Op. cit.*, Preface, p. v.

² *Op. cit.*, p. 35.

³ *Op. cit.*, p. 19.

“Each of my fellow-passengers is, like myself, a mind. Each mind is a universe, a universe reflected into a centre, as though into a mirror, and every centre as an individual point of view. Between one mind and another there is absolutely nothing in common, neither space nor time, neither object nor event. To a mind all reality is experience and to each mind its own experience. All experience is personal experience. Thus I and my fellow-passengers each knows only a private space and a private time, and the objects and events which for each of us occupy this space and time are private and incommunicable.”¹

This definite and uncompromising statement seems to suggest that the author has crossed the Rubicon and established himself in a solipsistic position; if we start with this idea of private space and time, and objects and events which are private and incommunicable, it is difficult to see how an escape is to be made from a position of extreme subjective idealism.

Before leaving this chapter in which the “windowless” character of the monad is established, the illustration of the mustard seed should be noted. It is interesting that an idealist should recognize a twofold order of reality, atomic and monadic, which is present throughout the whole range of human knowledge, but it is difficult to harmonize this clear division into atomic and monadic with the present results of biology:

“The small mustard seed is a constellation of molecules and atoms which obeys the atomic order of the

¹ H. Wildon Carr, *op. cit.*, p. 19.

physical world. Its analysis—chemical, physical, electromagnetic—offers no difficulty, neither, save for obvious practical difficulties, does its synthesis. So far as it belongs to the atomic order its nature is transparent.”¹

Wildon Carr then proceeds to show there is something else which cannot be analysed and he is led to the conception of the mustard seed as a monad. But compare the above quotation with the following extract from a recent elementary work on biology by Sir Arthur Shipley:

“All living organisms are built up of protoplasm and its products. . . . It is impossible to analyse by chemical or physical means *living* protoplasm, for any attempt at such analysis at once kills it.”²

So that the analysis to which Wildon Carr refers is that of the *dead* mustard seed, but presumably his train of thought presupposes a living mustard seed throughout. The difficulty of his position must also appear in the borderland which divides animate and inanimate nature.

The general tendency seems to be that of maintaining the twofold reality of the monadic and atomic orders; yet the chapter concludes thus:

“There are not monads and atoms. When we view real existence as a monadic order there are no atoms; when we view it as purely a system of external relations, that is, as atoms, there are no monads. The two orders

¹ H. Wildon Carr, *op. cit.*, p. 22.

² Sir A. Shipley, *Life*, p. 7.

are not of equal validity. When we view reality as atoms we are taking an abstract view for a practical end.”¹

Wildon Carr apparently maintains therefore a twofold order of reality, the components of which must not be thought of as existing side by side. We have already pointed out the difficulty of this clear-cut distinction on the biological side; and bearing in mind the uncompromising nature of the private world of the monad we proceed to see how the position of solipsism is avoided.

(b) THE MONAD'S PERSPECTIVE.

The argument is developed in the second and tenth chapters. At the beginning of the second chapter, “The Monad's Perspective,” we are told that there is “nothing real but monads.” There must surely be some confusion in the use of the terms real and reality, for the first chapter has developed a twofold order of reality, atomic and monadic, and yet we are now confronted with what appears to be a dogmatic assertion that there is nothing real but monads.²

The question of unity and diversity in nature is discussed and the monadic theory is offered as the explanation:

“There are not monads and universes, but to each monad belongs its universe, which is the universe. The monad determines from within the perspective of its universe, inasmuch as it is a centre from which the uni-

¹ Wildon Carr, *Monads*, p. 37.

² *Op. cit.*; contrast pp. 21 and 38.

verse is viewed and into which the universe is mirrored. In this perspective lies the principle of unity and diversity." ¹

But with the restrictions already laid down by Wildon Carr with respect to the monad's private world, how is it possible to maintain that "to each monad belongs its universe, which is the universe"? The monad's universe is a private one, how then can it possibly be described as "the universe"? The device of mirroring the universe into the monad as a centre, presupposes that there is a common universe to be mirrored, but the author is quite definite in his assertion. "There is no common universe of the monads, open to all and private to none." ²

The references to vision through telescope and microscope lead up to the denial of an absolute standard of reference such as the Newtonian space or the ether; here presumably the author has in mind the modern scientific background of Relativity. But it is surprising to find that in his conclusion he associates the term "absolute" with "perspective."

"The perspective itself is absolute, and the norm of magnitude in all perspectives is constant, not variable. It is this which is essential in the monadic theory. Reality is not an absolute within which monads are and from which their reality is derived. The monads are the reals." ³

If perspective itself is absolute, it is difficult to

¹ *Op. cit.*, p. 40.

² *Op. cit.*, p. 45.

³ *Op. cit.*, p. 50.

harmonize this view with one expressed earlier, "the monad determines from within the perspective of its universe."

In the illustration of the soldier and the skylark, both being present during the battle, the author invites anyone to challenge the following statement, "On the objective side there is no common factor,"¹ but it hardly seems necessary for us to do so, as the author himself, a few sentences earlier, seems to have given the basis for such a challenge:

"The reality we will call the battle, and we suppose that it exists in the experience of the soldier and in that of the skylark, and that they alone experience it."

If we start with this reality which both soldier and skylark experience, it is difficult to assert later that on the objective side there is no common factor.

Perhaps this theory of the monad's perspective and the nature of reality may be summed up in the following extract:

"I recognize as real only what is in my perspective and by reason of its belonging to my perspective; but the reality I recognize is that what is for me a perspective has in itself a perspective of its own in which perspective I may have a place. Whatever cannot be thought of as subject of experience cannot be thought of as real."²

With regard to the last sentence, the borderland between animate and inanimate nature

¹ Wildon Carr, *Monads*, p. 52.

² *Op. cit.*, p. 53.

has already been instanced as raising a difficulty. The solipsistic position is involved in the opening sentence, and presumably the problem is meant to be solved in what follows—"but the reality I recognize is that what is for me a perspective has in itself a perspective of its own in which perspective I may have a place." The gulf is bridged, therefore, by assuming that which "has in itself a perspective of its own" which is not my perspective. The important point to observe is that starting, as Wildon Carr does, with the private world of the individual, he has to recognize a perspective other than its own. It is difficult to see that this theory can be claimed as an advance on the idealistic position that we must recognize the existence of other minds beside our own.

(c) MONADIC INTERCOURSE.

As the author has claimed that the solipsistic difficulty is overcome by the argument of the second chapter, which is illustrated in the tenth, we now proceed to these illustrations. The important factor in monadic intercourse is, according to Wildon Carr, the formation of mental images. In the preceding chapter he distinguishes two kinds of images—perceptual, which represent the objective reality of the world, and fanciful, which represent the ideal independence of mind of that objective reality. He claims that the essential expression of mind is the formation of images, and that the monad

has power to evoke æsthetic activity in another. Along this line the fact of monadic intercourse is explained. But here the difficulty of the private world already noted occurs again:

“An image is not something which is a common object to two minds. It is wholly private and personal to the mind which creates it. Intercourse therefore must mean that one mind can call forth the activity of another, and the power to do so is intimately connected with the activity which creates the image originally.”¹

The image is a private one and so does not help us in the problem of communication. Wildon Carr has therefore to resort to stating that one monad can evoke activity in another; but is not that a fact which all would admit? It can hardly be claimed that the image, which is private and personal and on which such great stress is laid, gives the key to monadic intercourse:

“In creating the image the mind gives expression to its intuition. But why will not the sensation, or at least, a group of associated sensations, serve the purpose of the image? Simply because the sensation is in its nature and origin purely subjective and internal, and such it must always remain.”²

But does not the last sentence also describe the condition of an image, namely private and personal? This difficulty is recognized by the author and he maintains that the first condition of intercourse is expression—the image—forming

¹ Wildon Carr, *Monads*, p. 245.

² *Op. cit.*, p. 249.

activity or the imagination, but he admits that this of itself is not sufficient for intercourse. The second condition is action:

“It is because expression is continued into action that actions can suggest expression. Intercourse is not action provoking reaction, but expressive action evoking new expression. When the intuition in my mind has found expression in imagery, it leads to action, and the action being expressive and not mechanical, itself evokes new expression and arouses the æsthetic activity in other minds.”¹

According to this view, the bond which makes intercourse possible is to be found in “expressive action” capable of evoking new expression; this expressive action must surely be looked upon in some way as common to the monads concerned. But this is hardly consistent with the private nature of the monad’s universe which was developed earlier. In moving the problem of intercourse from mind to image and from image to expressive action, we are thus led to that which must be described to some extent as common. This, however, is contrary to the whole conception of the windowless monad.

Wildon Carr concludes this chapter with three examples to illustrate the formation of these mental images. Birds on the lawn are frightened away by his appearance, but if he makes a habit of producing crumbs from his pocket, they will flock to the lawn instead of taking flight. But according to Carr there is

¹ *Op. cit.*, p. 252.

no difference in the sense-data, but the difference is wholly in the image the birds have created.¹ But is this method of considering a particular phenomenon fair? Are we justified in isolating these sense-data from those which presumably have preceded it? It is this clear-cut distinction which, as we have already observed,² seems to cause the difficulty and it is reminiscent of the Aristotelian logic of a twofold relation of subject and attribute. We shall see later that there is another view of the influence of relativity on philosophy—namely that of emphasizing the *relatedness* of nature.

The illustration of the birds on the lawn might be replaced by the following description of wild-bird photography, which has the advantage of revealing the action of the monad at various stages. The instructions are to the photographer, who is in position behind a rough camouflaged screen erected near the nest on the previous day.

“Get your assistant carefully to remove obtrusive objects and make sure the lens is clear. Close your shutter, adjust the time, put in your plate and pull out the slide. Get your assistant to make sure that you are entirely covered. Send both your assistants clear away, and tell them not to return. Then wait without a movement. In five minutes or so you may see the bird land on the ground perhaps 50 yards away. You will see her run back and forwards in front of you, gradually

¹ Wildon Carr, *Monads*, p. 254.

² *V. supra*, pp. 87–88.

coming nearer and nearer, always keeping her eye on your tent. She may run behind and all round you, but so long as you remain perfectly still she will be on the nest within a quarter of an hour. Now is the moment of great excitement. Unless you are prepared for a very quick exposure do not press the bulb. Gently click the side of the camera stand with your finger-nail: in a flash the bird will be gone. Do not be disappointed; she will be back in five minutes. Again do the same; again she will go. Do it a third time: she will then only start, perhaps get off the nest and come back again. When she is settled you will probably be able to click the stand as much as you like without disturbing her. Now you can safely expose your plate. The difficulty will be from this point on to get her to move off the nest in order to get a different view, but this can usually be done by showing some slight movement. When she is gone change your plate, adjust your exposure and direction for whatever position you may wish to get her in, and wait. I actually found that by these manœuvres I could get out at the back of the tent, crawl away hidden by it, and eventually get right out of sight without disturbing the bird!"¹

It seems difficult to maintain that the various actions, such as clicking the stand, are not in some way common to the two monads concerned, yet according to Wildon Carr:

"Between one mind and another there is absolutely nothing in common, neither space nor time, neither object nor event."²

¹ G. A. Metcalfe, "Wild Bird Photography," *Discovery*, April, 1924, pp. 17-18.

² *Theory of Monads*, p. 19, and *v. supra*, p. 86. It is equally difficult to reconcile the following facts with this contention

The same criticism applies to the remaining illustrations of monadic intercourse. In the case of the dog, the words which form the command for the animal to remain indoors must in some sense be looked upon as being common to the two monads. In the case of

that there is absolutely nothing in common. The letter appeared in *The Times*, on December 23, 1924.

SIR,—Early the other morning before the sun had melted the hoar-frost, my attention was called by the gardener to multitudes of little fairy tunnels glistening on the lawn. To some of your readers these curious structures may be as little known as they were to me, and as interesting. I therefore venture to send you the following note.

The tunnels measured an inch or two in length and were a little less in diameter than an ordinary pencil. I have called them tunnels, rather than tubes, because they were incomplete below. Their walls were formed of a nearly continuous layer of thin ice. On taking them up they showed quite plainly on their inner surfaces transverse ridges, corresponding to the rings or segments of the earth-worms which lay around on the frosty grass.

At one spot there was a series of these little tunnels forming a broken serpentine line almost 3 feet in length, and at the end, lying in the continuing of this line with its tail within an inch of the last tunnel, lay a large worm, dead and stiff. The worms clearly got caught by the frost while out on the grass at night, and could not get back into the earth, possibly because the ground was too hard for them or because they became numbed with the cold. One pictures them nearly paralysed by the cold, lying still, while a thin layer of ice forms around them and then making a desperate effort to extract themselves from their icy sheets, only to become surrounded again as soon as they have emerged. The cold, however, does not seem to have been generally fatal to them, for the worm already mentioned was the only one picked up dead. The others, though sluggish at first, recovered later when the sun reached them, and within an

Don Quixote and Sancho Panza, it is the affirmation of the former that the two flocks of sheep were armies, which led the latter to believe it; and presumably the affirmation must be looked upon as in some way common to the two. But Wildon Carr's position seems to ignore this affirmation:

"Now wherein lies the difference between the two minds, and in what way are they brought into relation, and what is the basis of their intercourse? Clearly the difference is not in sense-data, nor yet can it be in any supposed independent objects. Both minds have the same data so far as physical reality is the causal source of their impressions. They each actually experience as sense impressions the clouds of white dust, to analyse no further. The sense impression, awoken in one mind the perception of armies, in the other the perception of flocks of sheep." ¹

But the problem at issue is the question of intercourse and here, so far as Sancho is concerned, there are the additional sense-data produced by the words of Don Quixote's affirmation about the armies. Here again we seem to be faced with the tendency to isolate events

hour only one could be found, and that one had buried itself all but its head. The next morning, though equally frosty, only one of these tunnels could be found. The worms had learnt their lesson, and had remained in the earth.

I am, etc.,

LOUIS COBBETT.

Pathological Laboratory,
New Medical Schools, Cambridge.

¹ *Theory of Monads*, p. 256.

and treat them separately; this perhaps is involved in the uncompromising statements made earlier by the author as to the nature of the "windowless monad."

(d) THE ALLEGED SUPPORT FROM RELATIVITY.

We have now examined at length the chapters in which Wildon Carr presents his claim with regard to monadology and the solipsistic problem, and to some extent we have seen how the theory of relativity has been introduced.¹ It is in the last chapter, "The Principle of Relativity," that we find presumably the support which the author draws from relativity for his theory of monads. The preceding chapter deals with the experimental method of inductive science, and it is maintained that there is no rationality in the experimental method unless the reality of the universe be monadic:

"The recognition that the experimental method implies the concept of reality as monadic finds expression in the principle of relativity. The purpose of this concluding chapter is to make this clear."²

It is a little difficult to know exactly what Wildon Carr regards as being included in the Principle of Relativity:

"The principle is: Every law of nature, in so far as it is a quantitative measurement and expressed in mathematical equations, is measurable by co-ordinates chosen

¹ *V. supra*, pp. 83 and 89.

² Wildon Carr, *Theory of Monads*, p. 335.

for a system or frame of reference to which the observer is attached and which consequently for him is a system at rest. The laws of nature are the same for all observers in all systems moving relatively to one another because all observers use the co-ordinates of their own system.”¹

This paragraph is followed by others which presumably are intended as deductions or explanations of the above; but let us examine carefully the last sentence: “The laws of nature are the same . . . *because* all observers use the co-ordinates of their own system.” The word *because* is surely out of place; in the principle of relativity the laws of nature are assumed to retain their mathematical form in different spatio-temporal systems moving relatively to one another.

The deduction that Wildon Carr makes from relativity is clearly seen in the following sentence:

“The adoption of the principle of relativity means, therefore, that the subjective factor, inseparable from knowledge in the very concept of it, must enter positively into physical science.”²

and it is not surprising to find that this statement is followed a few pages later by one which is essentially idealistic in its outlook:

“The new scientific revolution has made it possible to reconcile the concept of the freedom of mind with the necessity of nature. For the principle of relativity is in effect the insistence that reality shall not be taken as an

¹ *Op. cit.*, p. 339.

² *Op. cit.*, p. 340.

abstract nature but as the concrete integration in which they are correlative terms. Hitherto the scientific problem has been to find a place for mind in the objective system of nature, and the philosophic problem to validate the obstinate objectivity of nature, seeing that nature can only affect the mind in the shadowy dream-like form of the idea. Now when reality is taken in the concrete, as the general principle of relativity requires us to take it, we do not separate the observer from what he observes, the mind from its object, the agent from his activity, the subject from the object, and then dispute as to the primacy of the one over the other.”¹

But there are two considerations which must be carefully faced. Although it is true that the principle of relativity demands that the observer and the motion of his spatio-temporal system of reference must be taken into account, it does not imply that for different observers relatively at rest in the same spatio-temporal system, there is a different outlook on nature. We need not deny that there is, so to speak, a personal equation associated with the observer, but it is hardly fair to deduce the subjective nature of the individual's outlook from the Principle of Relativity. In fact, the reason that the modern standpoint of relativity has for so long remained undiscovered in scientific research, is because its manifestations are so minute, owing to the smallness of terrestrial velocities compared with velocities whose magnitudes are of the order of the velocity of light. The

¹ Wildon Carr, *Theory of Monads*, p. 346.

modern mathematical position cannot be claimed as supporting the subjective element as ordinarily understood in human experience. Two terrestrial observers, starting with the axioms of Euclidean geometry, would have to agree that two sides of a triangle are together greater than the third; there is no room for a subjective point of view on such a proposition, although there may be wide diversity of opinion in judgments of artistic design.

The second consideration that must be noted in Wildon Carr's deduction is the association of mind with "its object." Presumably the laws of nature have to deal with these objects of mind and he notes the principle of relativity as demanding that "the laws of nature are the same for all observers in all systems moving relatively to one another." But does not the whole trend of this line of thought presuppose that there is something which must be looked upon as common to the minds of the various observers? Once more then we seem to be faced with the difficulty of harmonizing such a view with the windowless nature of the monad.

There is therefore a twofold difficulty in appreciating the claim which Wildon Carr seeks to establish for his Theory of Monads and the solution of the solipsistic problem. On the one hand, we are constantly reminded of the difficulty of harmonizing anything in the nature of a common objectivity with the restricted character of the monad's private world. On the other

hand, from the emphasis which the Principle of Relativity places on the observer and his system of reference, Wildon Carr seems to deduce the subjective nature of the individual's experience. But the statement of this twofold difficulty is not meant to detract from the importance of such research. Wildon Carr has rendered valuable service in calling attention to the necessity of a sympathetic philosophical investigation. From his point of view, the question of solipsism had to be carefully faced, together with the fact of the subjective nature of individual experience, but the scientific theory of relativity does not seem capable of materially helping in the solution of these problems from the standpoint of Idealism.

PART II

Current Ideas modified by Relativity

CHAPTER VI

THE RELATIVITY OF KNOWLEDGE

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THE RELATIVITY OF KNOWLEDGE

THE WIDE RANGE OF SUBJECTS INCLUDED IN HALDANE'S SURVEY

(a) THE PRINCIPLE OF RELATIVITY IN ITS MOST GENERAL FORM.

Relative Truth.

Relativity of Method of Approach.

The Implications of Mathematical Physics.

(b) THE METAPHYSICAL FOUNDATION OF RELATIVITY.

Knowledge.

Meaning and Reality.

Degrees of Knowledge and Reality.

(c) THE INDIVIDUAL AND HIS ENVIRONMENT.

Relation of Men to Society.

The Individual and the State.

Beyond the State.

NOTE "A."—Dreams and Reality.

CHAPTER VI

THE RELATIVITY OF KNOWLEDGE

ATTENTION has already been drawn to the importance and scope which various writers attach to the theory of relativity. The extracts given in Chapter III show that although the work of Einstein is essentially connected with mathematical physics, yet some doctrine of relativity should be expected in other domains and in the relations of science to philosophy. The attempt to survey the ground has at any rate been made by Viscount Haldane. In two volumes, *The Reign of Relativity*, published in 1921, and *The Philosophy of Humanism*, published in 1922, he deals with the Relativity of all Knowledge and the application of this principle to various branches of thought. The first volume is divided into five parts: The Problem of Relativity, The Metaphysical Foundation of Relativity, Other Views about the Nature of the Real, The Individual and his Environment, The Human and the Divine. The second volume is a continuation of *The Reign of Relativity* and examines in the first place the form of all our knowledge as such, dealing with the Philosophical Significance of Humanism: in Part II the implications of the

standpoints of other subjects—Mathematical Physics, Biology, Psychology—are discussed.

Into this wide range of subject matter we cannot make a detailed investigation, but it is clear that our first task must be to discover “the principle of relativity in its most general form”¹ which underlies Haldane’s treatment in both books, and which is also evident in his Gifford Lectures, *The Pathway to Reality*, 1902–4. A convenient method of treatment will be:

- (a) The Principle of Relativity in its most general form.
- (b) The Metaphysical Foundation of Relativity.
- (c) The Individual and his Environment.

(a) THE PRINCIPLE OF RELATIVITY IN ITS MOST GENERAL FORM.

In approaching the wide domain covered by his books, it is natural that Haldane should make reference to an “almost but not quite obvious proposition” with regard to the nature of truth. The relative nature of truth will, at any rate in theory, be recognized by most people, although some tend to assume that through special channels, they are the privileged possessors of absolute and final truth.² Haldane’s attitude is summed up at the end of the first chapter of *The Reign of Relativity*. “It may therefore be stated generally that

¹ Haldane, *Philosophy of Humanism*, p. 30.

² Contrast this attitude of dogmatism with the task which Goethe assigned to philosophy. “It is in the quality of the

an idea is true when it is adequate, and only completely adequate when it is, from every point of view, true. Each form of test that is applicable must be satisfied in the conception of perfect adequacy; for otherwise we can have only truth that is relative to particular standpoints." It is the latter part of this quotation which really introduces us to the principle of relativity underlying his treatment.

Haldane insists that in its widest sense relativity is a very old and familiar idea. There are three ways in which the term can be used. In the first place, it may only mean that our view of things in the world varies with our personal circumstances: the hills appear to be on fire, though the effect is produced by the light of the sunset. Secondly, relativity may import that our direct knowledge is not of things as they are in themselves, but only as they appear in relation to our minds, and thus, phenomenally; those who hold the principle of Representative Perception would use the word in this sense. But relativity may have yet a third meaning: it may refer to the particular avenue of approach toward what appears; thus we may speak relatively from the standpoint of physics or perhaps from the biological standpoint. Our knowledge is rela-

struggle to attain it, and not in any finality we suppose ourselves to have reached and to be entitled to rest on, that truth consists for human beings. It is only by striving daily to conquer them anew that we gain and keep our life and freedom." *Op. cit.*, pp. 22-3.

tive: but not only our knowledge. "The experience to which it is directed is itself relative, in that its reality involves the variety in level which the totality of the experience presents. The distinction between appearance and reality becomes one of degrees towards full comprehension." ¹ We must apply the proper conceptions to the facts before us and these conceptions must fall within the order in knowledge that is alone appropriate:

"It is, as we shall see, with just this kind of significance that reality is said to-day, in philosophy and science alike, to depend on the principle of relativity. The source of the relativity may sometimes depend, in this new meaning, on conditions which affect observers whose knowledge is governed by a set of common conditions, so long as these conditions remain for them the same. Relativity may be due to such a set of conditions and even be the outcome of the very nature of the mind itself, to such an extent that the imagined line of demarcation between the mental and the non-mental world turns out to be only relatively a true one. It is relativity of this wide nature, further-reaching in its scope than is usually supposed, that I propose to consider in its various aspects throughout what follows." ²

Now this relativity of the method of approach is perhaps using the term relativity in a very wide sense, but it can hardly be called a new meaning. At first sight it would appear that this general relativistic outlook can hardly be looked upon as a special implication of the scientific theory of

¹ Haldane, *The Reign of Relativity*, p. 36.

² *Op. cit.*, p. 37.

relativity; but we must at any rate survey what, in Haldane's opinion, is the philosophical significance of mathematical physics.

Haldane's attitude towards Einstein's theory is merely that the latter is only a special illustration of a wider principle:

"It is to be regretted that the title 'Theory of Relativity' was ever appropriated to the extent it has been for Einstein's doctrine, just as if it belonged to that doctrine in a special way. What he is concerned with is relativity in measurement in space and time only, and relativity extends to other forms of knowledge as much as to that merely concerned with quantitative order. The different orders in experience appear to imply, as determining their meanings, conceptions of characters logically diverse, like those of mechanism, of life, of instinct, and of conscious intelligence. The principle of relativity applies to all standpoints determined by conceptions appropriate indeed to particular orders of knowledge, but thereby of a limiting character. It seems, therefore, accurate to regard quantitative relativity as only a special illustration of a wider principle."¹

A considerable portion (Chapters IV, V, VI) of Haldane's second book, *The Philosophy of Humanism*, is devoted to the philosophical significance of mathematical physics. His chief interest is from the standpoint of the theory of knowledge, and he claims support from Riemann's attitude to Geometry. "It is an epistemological question not less than one which is mathematical, and he says so in his essay on the hypotheses which lie at

¹ *Op. cit.*, p. 129.

the basis of geometry.”¹ In discussing the idea of pure time, Haldane points out that Einstein’s doctrine shows how, for instance, the astronomer never gets to bare time; the transformation in standpoint effected by change in motion and position in the gravitational field shows that this is so. “Whatever be the full truth about Einstein’s doctrine, he seems at least to have established that the measurement of time in physics is relative to particular standards of situation automatically forced on the observer.”²

In the following extract Haldane shows how the theory points to the actual fact beyond the abstractions of time and space:

“In order to understand the real significance of Einstein’s wider doctrine it is essential to have in mind its significance for the theory of knowledge, a subject on which his mathematical exponents are not always clear. Much of the repugnance shown to accepting the principle of relativity in physics is due to the idea that Einstein is trying to resolve reality into relations merely arising out of the standpoint of the observer. But this is not the case. What the principle, properly conceived, does is to resolve in this fashion relations of shape and measurement but not the actual fact out of which they are differentiated. That fact is the Minkowski ‘world,’ with its time-like dimension. Such a world may be capable of further analysis by the methods of mathematical logic, and of analysis still more thorough by methods which are of a metaphysical nature.”³

¹ Haldane, *The Philosophy of Humanism*, p. 112.

² *Op. cit.*, p. 128.

³ *Op. cit.*, p. 136.

Whitehead's treatment of this world which is beyond the abstractions of space and time is dealt with in Chapter VII.

Minkowski saw that in Newton's system insufficient importance had been attached to time; and he recognized that our fundamental consideration must be of a space-point at a time-point, and this must be described through four co-ordinates to give it value as a "world-point," so that what we really apprehend is a "passage of nature"; this is essential also in Whitehead's position.

Haldane points out that mathematical investigation into the character of reality alters for us the significance of what seems to appear and banishes false and distorted images of the possible; an example of this being Einstein's treatment of space.¹ In its wider significance the theory of relativity is a further attempt which science has made towards the interpretation in terms of universals of an actual world, and he continues: "It is a new interpretation of the meaning constitutive of reality towards which we have been driven by observation of the actual. It has brought us to see that the part which mind plays in the fashioning of our knowledge of what we call facts is larger than we had supposed. The relativity of such knowledge becomes everywhere apparent and account has to be taken of it. But the character of such relativity can now be in part explained and its variations can be reduced to principles."²

¹ *Op. cit.*, p. 169.

² *Op. cit.*, pp. 170-1.

Now these statements about the relativity of knowledge are probably fairly widely recognized and they are certainly supported by the attitude of modern science generally; but it hardly seems clear that the deduction should be made from the theory of relativity that mind plays an essential part in reality. Haldane is apparently claiming that relativity demands a special place for mind and presumably for an idealistic position in philosophy. The controversy which centres round whether relativity supports an idealistic or realist view is discussed at the beginning of the next chapter.

Haldane also maintains that the introduction of the method of tensor analysis in Einstein's work enables us to "generalize in a way that would not otherwise be possible, and to gain new knowledge of the intrinsic character of the actual by a resolution into universals of a kind much farther-reaching than was possible before the tensor method was discovered."¹ But it must surely be admitted that, after all, tensor analysis is essentially concerned with mathematical transformations, and the method can hardly be looked upon as the key to the wider generalizations to which Haldane refers.

He concludes the survey of the implications of mathematical physics by pointing out the absence of finality in the concepts or systems of universals which we employ. Enough has been stated to reveal his general attitude. "Knowledge has

¹ Haldane, *The Philosophy of Humanism*, p. 172.

many standpoints from which the object which is relative to it is always moulded, then the conceptions chosen as the bases of hypothesis must be such as are appropriate to the particular standpoint from which we are observing. The entirety of knowledge seems to consist in a plurality of general standpoints which belong to different orders in thought.”¹

This general principle of the relativity of knowledge is well known, and although the theory of relativity emphasizes this principle, it is doubtful whether the principle itself must be regarded as the chief implication of the modern doctrine of relativity.

(b) THE METAPHYSICAL FOUNDATION OF RELATIVITY.

The second part of *The Reign of Relativity* is devoted to the foundation of the principle of relativity (as interpreted by Haldane) in metaphysics. In Haldane's philosophy, Knowledge plays an essential part; in the seventh chapter, "The Self in Knowledge," he maintains at the outset that it is a foundational fact, "A living being that knows seems to belong to an order quite different in kind from that of one that merely lives without knowing. For the first, even though restricted by physical conditions, gives meaning to and has present to it the world within which the second has only a place."² This main

¹ *Op. cit.*, p. 173.

² Haldane, *The Reign of Relativity*, p. 151.

distinction is of course true, but in the border region between living and knowing, and living only, there are real difficulties to be faced with regard to orders "quite different in kind."

This foundational fact of knowledge naturally makes dreams "in one sense as much a reality as anything else," but the dreamed-of position in space and times does not harmonize with what the dreamer thinks on waking or with what other people are thinking. "For I know my world to be real largely because I find that it is presented to me when I fully apprehend it in a way in which I learn that it is presenting itself to other people also." ¹

In dealing with the question of the individual's body, the distinction between man and brute, Haldane maintains that "The human body is mind in external form, mind in the meaning symbolized in it. . . . The body taken at the higher degrees of its reality, seems to be mind and to know itself as such." ² These reservations about the body and its relation to mind are typical of the narrower types of idealistic philosophy; in contrast to this, the advantage of the approach from a realist standpoint lies in its initial attitude of refusing to assign to mind an essential rôle in relation to reality. It seems difficult also to appreciate Haldane's position that "it is not harder to believe that life is more than mechanism than it is to believe that knowledge is more than life." ³

¹ Haldane, *The Reign of Relativity*, p. 156. *V.* also Note "A," *infra*, p. 121.

² Haldane, *op. cit.*, p. 160.

³ *Op. cit.*, p. 166.

Haldane appears to criticize the physicist because in his self-imposed limitation of dealing with the properties of matter he makes nature closed to mind. It will be seen later how science demands a præter-nature into which such entities as thought, imagination and emotion must enter. "The relation of mind to nature is a foundational one, and it lies in this, that there can be no meaning in any object-world that is not object-world for a knower. If there can be no meaning for the object, there can be accordingly no existence for it. For existence involves meaning, and is not a fact unless it is significant."¹ This attitude with regard to meaning, existence and reality appears somewhat confusing. For example, the dog with its restricted universe "knows nothing, for instance, of wars or strikes. What he does not experience because he cannot construct it in thought, is thus for him non-existent."² In contrast to this the human being has capacity for reflection, but it seems difficult to maintain that existence involves meaning, when, for example, a man who knows nothing about electricity receives a shock; surely the live wire exists in a special way for him before he is conscious of attaching a meaning to it and presumably it exists in this way for the dog. In the main, Haldane's distinction between the dog and its master would appear correct. The dog "is confined to what is relatively immediate awareness through sensation in a fashion which I am not." But to

¹ *Op. cit.*, p. 173.

² *Op. cit.*, p. 188.

admit this power of reflection which *homo sapiens* possesses does not necessarily imply that existence and reality are inevitably associated with meaning.¹

The difficulties that have already been raised cluster round the foundational fact of knowledge in Haldane's metaphysics—it is interesting to note, however, that his conclusions agree to a considerable extent with those which will be reached later, starting from the standpoint of realism.² His emphasis on the principle of relativity in its most general form is to provide different orders of knowledge and reality. "The world is there as it seems, and it presents itself to us in orders of knowledge and reality, all of which are in their own places valid and actual. That is why it is essential that we should understand and hold firmly to the great principle of relativity. For it is only by doing so resolutely that we can hope to shake off the effects of the metaphors in which distorted views have been suggested to us. . . . Of course my thoughts do not make the things I individually see, but, on the other hand, the character of the things I see, when I apprehend its full significance and implications,

¹ *V. infra*, pp. 211 ff.

² At the end of Part II of *The Reign of Relativity*, Haldane suggests that Realism may converge to Idealism; this would be true in the broad interpretation of Idealism which Kemp Smith adopts (*v. infra*, p. 123), but there would always be the difference between realism and the narrow idealism which insists that reality cannot be apart from mind.

is not a different one from that of my thoughts. It is only under my abstractions that the two seem foreign to each other, abstractions which are made for various purposes in the progress of an effort towards a more exact understanding of reality, and which, in the course of this effort, come to stand for degrees of unreality. The doctrine of physical relativity is just a special case of the general principle. If we approach nature by what aim at being strictly objective methods of approach, such as that of Professor Whitehead, we seem to come to just the same thing in the end.”¹ But after all the method of approach is important and although the results may be to a large extent in agreement, the method which begins with no reservation as to the relation of reality to mind or the foundational fact of knowledge, must be counted the more valuable when the importance of the respective arguments is being assessed. The development of the realist method of approach is discussed in the next chapter.

(c) THE INDIVIDUAL AND HIS ENVIRONMENT.

There are certain deductions from Haldane's general position which have a practical bearing on the relation of the individual to the universe as a whole. In Part IV of *The Reign of Relativity*, The Individual and his Environment is the centre of thought, while Part V deals with the Human

¹ Haldane, *Reign of Relativity*, pp. 217-18.

and the Divine. It is our immediate task to see how Haldane's general attitude is worked out in the relation of the individual to his environment. To a certain extent he emphasizes the point of view raised in the next chapter—namely the relatedness of nature, but whereas the latter is considered more in its relation to the development of a philosophical system, Haldane deals with his general principle in its application to the daily concerns of life.

Knowledge is more than merely theoretical, it involves action, and Haldane maintains that value in its ethical and æsthetic sense is the outcome of the principle of degrees and differences of level in knowledge and reality. This idea of value naturally leads on to the question of freedom of choice. "What we call conscience is this sense of ends of higher value and obligation than any that are concerned with merely personal interests. Conscience is what, when his sense of it is fully awakened, man recognizes in his private tribunal, his own court for decision between values." ¹

But this subjective sanction is not sufficient for citizenship; society requires binding rules which will embody or express in objective form the common purposes of mankind living in the particular society concerned. Laws contain general rules of conduct, but their context and historical setting must not be ignored in determining their application in any one instance.

But beside the morality associated with the

¹ Haldane, *Reign of Relativity*, p. 354.

individual conscience and the restraint exercised by the laws of the state, there is another kind of obligation which usually has no legal sanction at all and may also fall short of the obligations of conscience. "Good Form," the thing that "is done," the German "*Sittlichkeit*," and it is this sense of obligation towards others, not merely subjective like that of conscience or external like that of law, that is the chief foundation of freedom in a civilized community. This whole attitude of conscience, law, good form exhibits the dependence and inter-dependence of individuals within the society.

The next question considered is naturally that of the individual and the state. There is a common will—our own wills at the social level; the question of sovereignty within the state is discussed whether from the standpoint of the monist or the pluralist. The Constitution and Public Opinion show the manysidedness of the state and its relation to the individual. But there is something beyond even the state. The essential features of "good form" are common within different nations and so there develops a tendency to look to an ideal which may present itself as common to different nations, and Haldane cites the League of Nations as the most recent illustration of how this may be attempted in practice. "But just as the mind of man extends to ends beyond his own private concerns, and beyond those of his family or of his city, so he has latent in his consciousness ends which carry him beyond

the state to which he belongs. . . . In short, there are levels in human purposes in which they rise above the state as a final form of end. Beauty and goodness and truth concern man neither merely as individuals nor as citizens. There is an outlook that is cosmopolitan because no other end than that of humanity simply as such can satisfy it. When our concerns are those of mankind in this higher sense we are still at a level which is that of the finite, but we recognize that our finiteness is pointing beyond itself, and that within unduly limited forms of self-expression mind is not to be confined." ¹

In this brief review of Haldane's position it would appear that although exception might be taken to his belief that knowledge is foundational and that Einstein's Theory is to be regarded as a particular case of the wider relativity,² yet he has undoubtedly brought together evidence from various branches of human thought and activity to show how our modern world is in need of the recognition of the principle of the relativity of knowledge and standpoint in the affairs of men.

¹ Haldane, *Reign of Relativity*, pp. 379-80.

² For example, referring to the principle he has been emphasizing—which he maintains has been brought to the light in ancient and modern thought—he continues: "Its prominence to-day is perhaps greatest in the domain of science. On science it is conferring a new and extended significance, by the introduction of the conception of relativity into scientific method" (*op. cit.*, p. 423).

NOTE "A"

DREAMS AND REALITY

This distinction between the waking and dream-states involves a sort of belief in degrees of reality; most people would agree that the experiences of waking activity have a greater degree of reality associated with them, than even the most vivid nightmares. In fact, we have to judge reality by our waking experience and the thoughts of others. "We are aware of a dominant space-time continuum and that reality consists of the sense-objects projected into that continuum."¹ For example, if we dream of the bedroom window broken by a stone which falls heavily on the floor we subsequently compare this knowledge with our waking experiences of the apparent world and find that it does not agree; our waking experience is the more real. But from a narrow idealistic standpoint, it must be noted that the object which is brought in as conclusive evidence is the apparent window-pane in its unbroken condition. This fact has to correct the mere figment of the dream, so that it does appear reasonable to attach special importance to the appearances of objects; which may possibly signify some sort of existence not associated with mentality.

There is another point to which attention should be drawn. The position has been maintained that dreams afford an example of the power mind has of creating an apparent world; but this is surely arguing in a circle, for the dream experience, as shown above, is itself tested for reality by its agreement with the apparent world and hence cannot be used subsequently as an indication that the apparent world only exists in association with mind.

¹ Whitehead, "Uniformity and Contingency," Presidential Address, *Aristotelian Soc. Proc.*, 1922-3, p. 6.

PART II

Current Ideas modified by Relativity

CHAPTER VII

NEO-REALISM AND RELATIVITY

USE OF TERMS.

(a) IDEALISM AND REALISM.

Berkeley's Line of Argument strengthened.

Its Presuppositions Challenged.

The Observer's Body.

The Many-termed Relationship.

(b) THE RELATEDNESS OF NATURE.

Uniform Significance of Events.

Contingency of Appearance.

Cognizance by Relatedness and by Adjective.

Significance and Patience.

(c) THE DOCTRINE OF TIME.

The Relational Idea of Space and Time.

Duration and Alternative Time-Systems.

Simultaneity and Instantaneousness.

Past, Present, Future.

The Event as Becoming.

CHAPTER VII

NEO-REALISM AND RELATIVITY

AS we have now surveyed the claim made by Professor Wildon Carr with regard to solipsism and also the emphasis laid by Viscount Haldane on the general principle of the relativity of knowledge, it is desirable to approach the question of philosophical implications from the standpoint of neo-realism. At once the difficulty of the use of terms presents itself. Idealism is used with more than one significance. If, for example, we accept Kemp Smith's definition "covering all those philosophies which agree in maintaining that spiritual values have a determining voice in the ordering of the Universe,"¹ then the position developed in this chapter, together with the discussion of theological implications in Chapter XI, may be said to fall within this broad domain of idealist philosophy. On the other hand, idealism is frequently regarded as denying that there can be reality apart from mind; opposing this narrower conception, neo-realists take their stand. With this distinction between idealism and realism, the following philosophical position is developed

¹ N. Kemp Smith, *Prolegomena to an Idealist Theory of Knowledge*, p. 1.

from a realist standpoint. There is no initial reservation with regard to the nature of reality.

We have seen that Whitehead's scientific interpretation of the principle of relativity is bound up with his philosophy of nature. It is indeed an important argument in favour of his views that not only do they agree with experiment, but also they fit into a philosophical system. Some of the salient features of this system, together with an attempt to explain certain of the terms used, will appear as we trace the possible bearing of the principle of relativity on current philosophical problems.¹

(a) IDEALISM AND REALISM.

Much of the controversy concerning the implications of the theory of relativity has centred round the question whether it supports an idealist or realist view. The principle of relativity has shown the importance of taking into account the motion of the observer and his spatio-temporal system of reference. Berkeley emphasizes the way in which the objects of sense perception are essentially personal to the observer, and although the principle of relativity does not take into account differences due to individual mental characteristics, yet it does emphasize the importance of the observer's motion. To this extent then modern relativity definitely supports Berkeley's line of

¹ A convenient statement of Whitehead's views is to be found in his paper, "The Philosophical Aspects of the Principle of Relativity," *Aristotelian Soc. Proc.*, 1921-2, p. 215.

argument; it also yields a further advantage, for hitherto space and time seemed to form the absolute framework common to all observers, but as we saw from the equations of the Lorentz transformation, they can no longer be looked upon as independent and the same for all observers.

Thus the line of Berkeley's argument is strengthened and with it the general idealist standpoint, but as Whitehead points out, although there is no halting-place after the start, we can at least examine the presuppositions of the argument.

Berkeley deals with those who maintain that although ideas themselves do not exist without the mind, yet "there may be things like them, whereof they are copies or resemblances, which things exist without the mind in an unthinking substance."¹ He also deals with those who maintain a distinction between *primary* and *secondary* qualities. In both these cases he is really dealing with the position of some fundamental "stuff" or "matter" and certain attributes by which it is perceived. Berkeley, then, is really pointing out that if you regard objects as consisting of a two-termed relation of subject and predicate, then such an object can only exist as an idea in the mind of an observer. Starting with this hypothesis, Berkeley's line of argument is strengthened by the modern doctrine of relativity. But is this two-termed relation the only or most probable hypothesis?

Now in emphasizing the fact that the *mind* per-

¹ Berkeley, *The Principle of Human Knowledge*, Part I, 8.

ceives objects, Berkeley is really supplying another factor, in this two-termed subject-predicate (or substance-attribute) relation, namely the relation of both terms to mind. At first sight this appears to be a reasonable statement of what happens. The observer is conscious of his own existence and thus supplies the relation between his own mind and the apparent world of objects around him. But further reflection will show that the demands of the case are not met by this simple attitude of mind to a subject-predicate relation. The observer's body, the complicated system of nervous and muscular reactions, all play their part in determining what the observer perceives. We are therefore at once faced with another important relationship, namely that of the observer's body to the apparent world which he perceives. The standpoint of modern science recognizes that in an apparently simple statement of a two-termed subject-predicate relationship, such as "grass is green," not only is the state of the observer's body an important factor, but also the nature of the light falling on the grass, and its general position in regard to other objects in the vicinity. This points to a highly complicated and many-termed relationship, in fact to a doctrine of relatedness which, at any rate, seems to draw support from the modern theory of relativity.

The tendency therefore is to replace the simple two-fold relation of subject and predicate by one which seems to demand an indefinite number of terms, and if we ask how many items of nature

enter into the relation of green to grass we must reply "that every other item of nature enters into it."¹ This would appear to make any knowledge impossible until it could be complete, but we can classify grades of relata in this multiple relation of green to grass (or, in Whitehead's illustration, following Berkeley, the relationship of crimson to cloud):

"The lowest grade sweeps all nature into itself. It is the grade of relata whereby all nature expresses its patience for this relationship of crimson to cloud. There is no such thing as crimson lone and by itself apart from nature as involving space-time, and the same is true of cloud. The crimson cloud is essentially connected with every other item of nature by the spatio-temporality of nature, and the proposition, 'the cloud is crimson,' has no meaning apart from this spatio-temporality. In this way all nature is swept into the net of the relationship."²

(b) THE RELATEDNESS OF NATURE.

This quotation brings us to the doctrine of the relatedness of nature and to the conceptions of uniformity and contingency, underlying Whitehead's philosophy. The many-termed relationship involved in the proposition "grass is green" or the statement concerning the crimson cloud, further presupposes that nature is a system. This demands systematic relations between the various items of nature. Now we cannot find out what

¹ Whitehead, "The Philosophical Aspects of the Principle of Relativity," *Proc. Aristotelian Soc.*, 1921-22, p. 219.

² *Op. cit.*, p. 219.

these relations are by observing *all* the items in nature. "It follows that our partial knowledge must disclose a uniform type of relationship which reigns throughout the system. For if we do not know that, we know nothing: and there is simply nothing to talk about." This is the principle which Whitehead has called "the uniform significance of events."¹

The use of the word significance makes it desirable to define certain terms.² "*Fact*" is to be regarded as a relationship of factors. "*Awareness*" is the consciousness of factors within fact

¹ It is interesting to note the tendency of Duns Scotus, although the weight of Aristotelian tradition is too strong for him and he does not develop the following theme. "But it is in dealing with the problem of induction that Scotus makes his most original contribution to the logic of the Middle Ages. He raises the question as to how it is possible by experiments to establish inductively the existence of universal laws of nature, for induction, to be a logically valid form of inference, presupposes a complete enumeration of all the instances. How is it, then, that a few experiments suffice to establish a necessary connection between two events? It is because all natural (as opposed to volitional) causes are disposed only to one effect, a proposition which Duns regards as self-evident. We clearly have here an attempt to formulate the principle of the uniformity of nature almost in the manner of an *a priori* category. A foundation is laid for a philosophy of science differing widely from that of Aristotle, and Scotus inclines strongly to a theory of physical determinism which differs markedly from the Aristotelian Physics" (C. R. S. Harris, "Duns Scotus and his Relation to Thomas Aquinas," *Proc. Aristotelian Soc.*, 1924-25, p. 227).

² The whole subject is dealt with in Whitehead, *The Principle of Relativity*, Chapter II, "The Relatedness of Nature."

and is in itself a factor within fact. "*Cogitation*" is the consciousness of factors prescinded from their background of fact. A factor cogitated upon as individual will be called an "*entity*." The idea of significance is seen in the following extract:

"It is therefore impossible to find anything finite, that is to say, any entity for cogitation, which does not in its apprehension by consciousness disclose relationships to other entities, and thereby disclose some systematic structure of factors within fact. I call this quality of finitude, the significance of factors."¹

But there is another grade of items in the relationship "*crimson to cloud*" which lacks the uniformity which has been described. In contrast to this we speak of the "*contingency of appearance*," implying that a detailed examination in each particular instance is required.

This means that we regard awareness as a dual cognisance of entities:

"Think of yourself as saying, 'There is a red patch.' You are affirming redness of something, and you are primarily conscious of that something because of its redness. In other words, the redness exhibits to you the something which is red. This is cognisance by adjective, red being the adjective. But your experience has gone further than mere cognisance by adjective. Your knowledge is not merely of something which is red. The patch is there and it endures while you are observing it. Thus you are cognisant of it as having spatio-temporal position, and by this we mean a certain type of relatedness

¹ *Op. cit.*, pp. 17-18.

to the rest of nature which is thereby involved in our particular experience. This knowledge of nature arising from its interconnectedness by spatio-temporal relations is cognisance by relatedness.”¹

Now the uniform significance of events implies that from the standpoint of a factor within fact, there are relationships to other factors; but if we look at the question from the other standpoint, namely that of the relationship of the rest of nature to one particular item of nature, we should say that nature is “*patient*” of that particular item. “Every entity involves that fact shall be patient of it.” The patience of fact for a factor “A” is the converse side of the significance of “A” within fact.

The observer’s body² is a very important item in the contingent grade, so much so that we may say that relativity to an observer is dominated by the physical state of the observer’s body. Now this obstinate indifference of nature to mind surely makes it difficult to assign to mind the important part which it must play, in the narrower idealistic outlook.³ Nature can be thought of as a closed system whose mutual relations do not require the expression of the fact that they are thought about. But this view does not necessarily lead to dualism, or to the denial of a theistic position, for spiritual values (especially in relation to God) may be regarded as having a determining voice in the

¹ *The Principle of Relativity*, pp. 62–63.

² *V. supra*, p. 126.

³ *V. supra*, p. 123.

ordering of the universe. In drawing attention to the fact that mental processes are faced with an obstinately independent nature, so that the correlations of mental processes with natural processes appear as unessential for the course of natural events, Whitehead does not deny "that there are such correlations, or that when they occur the natural and the mental are not the same fact, with different aspects of it emphasized. But what I am denying is that some correlation with mentality can be proved to be essential for the very being of natural fact." ¹

In lending support to Berkeley's general line of argument, the theory of relativity has drawn attention to the fallacy of its presuppositions, namely that items of nature can be expressed in a simple two-termed relationship of subject to predicate on the lines of the Aristotelian logic. This is the most important implication with regard to philosophical thought, but there is also the question of space and time.

(c) THE DOCTRINE OF TIME.

In the development of Whitehead's position it is seen that space and time are both abstractions from that which is more concrete (i.e. embedded), namely "events." The theory of relativity in dealing with these abstractions shows the way in which they are interdependent (as is clearly seen in the Lorentz transformation). Our conceptions

¹ *Proc. Aristotelian Soc.*, 1921-22, p. 222.

then of space and time will require modification. Absolute space and absolute time are fictions, a relational treatment of both is made necessary. With regard to the former, the relational treatment of space has been admitted; but with regard to the latter, time has been treated as having a unique serial nature. It is this unique serial character of time which is especially affected by the modern relativity theory. Alternative time-systems become possible and the question of Past, Present and Future is naturally involved.

The position which has been developed with regard to the relatedness of nature (with its refusal to bifurcate¹ nature into the two divisions of nature apprehended in awareness and nature which is the cause of awareness) implies that we must reject the distinction between psychological time which is personal and impersonal time as it is in nature. From this, two deductions are drawn.² The first is conservative—time is a stratification of nature—“each short duration of time is merely a total slab of nature disclosed as a totality in cognisance by relatedness, and for any individual experience partially disclosed in cognisance by adjective.” The second conclusion is paradoxical; the uniqueness of the temporal stratification of nature has been assumed in human thought, and although this uniqueness for each individual must be admitted, this does not guarantee its consistency for all. Alternative time systems

¹ Whitehead, *The Concept of Nature*, Chapter II.

² Whitehead, *Principle of Relativity*, p. 66.

would entail alternative systems of stratification. Whitehead would maintain the old belief in the fundamental character of simultaneity, but he would also maintain that the meaning of simultaneity may be different in individual experiences, and since what is apparent in individual experience is a fact of nature, it follows that there are in nature alternative systems of stratification involving different meanings for time and different meanings for space.

There are two concepts which Whitehead distinguishes. *Simultaneity*, which is the property of a group of natural elements which in some sense are components of a "duration" (i.e. a certain whole of nature which is limited only by the property of being a simultaneity); a duration retains within itself the passage of nature.

Instantaneousness is the concept of all nature at an instant, where an instant is conceived as deprived of all temporal extension. The method of extensive abstraction applies here, and with the possibility of alternative systems of stratification, there is the possibility that two events, which may be simultaneous in one instantaneous space, for one mode of stratification, may not be simultaneous in an alternative mode.

The distinction between past, present and future, bearing in mind these possible differences of individual experiences of simultaneity, is no longer the simple matter which it used to be on the old idea of the unique seriality of time. The

following analysis indicates the relations between past and future.¹

Whitehead's notation is

$$\omega_{\mu}, [\mu = 1, 2, 3, 4.]$$

defined by

$$\omega_{\mu}^2 = 1 [\mu = 1, 2, 3.]$$

$$\omega_4^2 = -c^2$$

As has already been pointed out,² the constant "c" is not necessarily associated with the velocity of light. The physical meaning of "c" is well known, namely, any velocity which in any time-system is of magnitude "c" is of the same magnitude in every other time-system. No assumption is made as to the existence of such a velocity. A velocity greater than "c" cannot represent any time-system, and so its physical significance must be entirely different from that of a velocity less than "c."³

Let an event particle X in the "x" time-system be determined by the four co-ordinates (x_1, x_2, x_3, x_4) (x_4 being a lapse of time) and let the same event-particle in the "y" time-system be determined by (y_1, y_2, y_3, y_4).

The relations between the two systems of co-ordinates are of the form

$$\omega_{\mu}(y_{\mu} - b_{\mu}) = \sum_a l_{\mu a} \omega_a x_a, [\mu = 1, 2, 3, 4.]$$

¹ The possibility of different time-orders in different systems is also dealt with in Chapter V of Nunn's *Relativity and Gravitation*, starting from the Lorentz transformation.

² *V. supra*, p. 66.

³ Whitehead, *Principles of Natural Knowledge*, pp. 159-60.

where the symbol \sum_a means summation for $a = 1, 2, 3, 4$ successively and the l 's are constants satisfying

$$\begin{aligned} \sum_{\mu} l_{\mu\alpha} l_{\mu\beta} &= 0 \quad [a \neq \beta] \\ &= 1 \quad [a = \beta] \end{aligned}$$

and the b 's are constants.¹

If the co-ordinates of another event-particle P be (p_1, p_2, p_3, p_4) in the "x" system, and (q_1, q_2, q_3, q_4) in the "y" system,

$$-\sum_a \omega_a^2 (x_a - p_a)^2 = -\sum_{\mu} \omega_{\mu}^2 (y_{\mu} - q_{\mu})^2$$

Let $r_{(x)}$ and $r_{(y)}$ be respectively the x -distance and the y -distance between X and P. Then this invariant for X and P can be expressed indifferently either by

$$\left. \begin{aligned} &c^2(x_4 - p_4)^2 - r_{(x)}^2 \\ \text{or by } &c^2(y_4 - q_4)^2 - r_{(y)}^2 \end{aligned} \right\} \omega_{\mu}.$$

We have three cases :

(i) X and P are *co-present* if

$$c^2(x_4 - p_4)^2 - r_{(x)}^2 < 0$$

(ii) P is *kinematically antecedent* to X, if

$$x_4 > p_4 \text{ and } c^2(x_4 - p_4)^2 - r_{(x)}^2 > 0$$

¹ Whitehead, *Principle of Relativity*, p. 77. With regard to the equation $\omega_{\mu}(y_{\mu} - b_{\mu}) = \sum_{\alpha} l_{\mu\alpha} \omega_{\alpha} x_{\alpha}$, compare equation (28) on p. 168 of Whitehead's *Relativity*. In this paragraph

the condition is obtained that $\int_A^B \sqrt{dG^2}$ should be stationary,

G being the Galilean Tensor. Compare also Chapter XIII of *The Principles of Natural Knowledge*.

(iii) X lies in the *causal future* from P, if

$$c(x_4 - p_4) = r_{(x)}$$

In order to bring out the question of the order of events in these three we may consider the simple case in which the line joining X and P is taken as the common x_1 -axis, and velocity of y -system relatively to x -system is v along this axis.

Let r be the distance in the x -system, i.e. $r = (x_1 - p_1)$.

Let T be the time-interval in the x -system and T' „ „ „ „ „ „ „ y -system

i.e. $T = (x_4 - p_4)$

and $T' = (y_4 - q_4)$

Thus $c^2(x_4 - p_4)^2 - r_{(x)}^2$ becomes $c^2T^2 - r^2$

From this simpler form it can be shown¹ that the three cases which have already been mentioned give rise to the following results.

(i) *X and P co-present*, $c^2T^2 < r^2$

An event which occurs after another in the x -system may occur either before or after it in the y -system. Such event-particles cannot be thought of as causally connected.²

¹ Nunn, *Relativity and Gravitation*, pp. 56-60.

² An interesting suggestion of beings in another world whose lives run opposite to our own is made by Bradley. "Death would come before birth, the blow would follow the wound, and all must seem to be irrational. It would seem to me so, but its inconsistency would not exist except for my partial experience. If I did not experience their order, to me it would be nothing. Or, if I could see it from a point of view beyond the limits of my life, I might find a reality which itself had, as such, no direction. And I might there perceive characters, which for the several finite beings give direction to their lives,

(ii) P kinematically antecedent to X , $c^2T^2 > r^2$

Events which occur in a given order in one system occur in the same order in any other system, but simultaneity of events is excluded.

(iii) X lies in the causal future from P , $c^2T^2 = r^2$

The order of events is the same in all systems.

It is hardly necessary to proceed in detail with the special terms which Whitehead has used in developing his system.¹ Enough has been mentioned to reveal the possibilities that present themselves with this idea of alternative time-systems. We shall be ready to agree that the spatio-temporal system with which we are concerned is associated with a definite time-order so that it is reasonable to speak of causality, but even with the systems of reference which we ordinarily employ the question of past and present is not so easily answered as would appear at first. The old theory of the unique seriality of time does not really help when we are dealing, for example, with memory. There is no reason why memory should not acquire the vividness of present fact,²

which, as such, do not fall within finite experience, and which, if apprehended, show *both* directions harmoniously combined in a consistent intuition" (*Appearance and Reality*, p. 215).

¹ *V. The Principle of Relativity*, p. 31, for special diagram and both Chapters II and IV for "spatial" and "historical" routes and "pervasive adjectives" and "adjectival particles."

² Hume draws attention to the difference between memory and imagination. "It is evident, at first sight, that the ideas of the memory are much more lively and strong than those of the imagination, and that the former faculty paints its objects in more distinct colours than any which are employed by the

and at any rate in the case of dreams,¹ vividness is not always lacking. In memory the past becomes present as an immediate fact of mind, "accordingly memory is a disengagement of the mind from the mere passage of nature; for what has passed for nature has not passed for mind."² Is there not here a resemblance to the teaching of Bergson?

On the basis of a materialistic philosophy we have to believe in an instantaneousness present with the Past gone and the Future not yet. But there is no such thing in nature, what is immediate for sense-awareness is a duration, and the temporal breadths of durations are dependent on the individual percipient: "The passage of nature leaves nothing between the past and the future. What we perceive as present is the vivid fringe of memory tinged with anticipation."³

The materialistic view demands a unique temporal series, but the modern principle of relativity with its insistence on the *passage of nature*, its emphasis on the importance of *events* and its *alternative time-stratifications* has opened new possibilities in the doctrine of time:

latter" (*A Treatise of Human Nature*, Part I, Section III). In spite of this statement, imagination can be exceedingly vivid. As Bradley says: "If no phenomenon is 'real' except that which has a place in *my* temporal arrangement, we have, first, left on our hands the whole world of 'Imagination'" (*Appearance and Reality*, p. 213).

¹ V. Whitehead, "Uniformity and Contingency," *Proc. Aristotelian Soc.*, 1922-23, pp. 5, 6.

² Whitehead, *Concept of Nature*, p. 68.

³ *Op. cit.*, p. 73.

“The materialistic theory has all the completeness of the thought of the middle ages, which had a complete answer to everything, be it in heaven or in hell or in nature. There is a trimness about it, with its instantaneous present, its vanished past, its non-existent future, and its inert matter. This trimness is very mediæval and ill accords with brute fact.

“The theory which I am urging admits a greater ultimate mystery and a deeper ignorance. The past and the future meet and mingle in the ill-defined present. The passage of nature, which is only another name for the creative force of existence, has no narrow ledge of definite instantaneous present within which to operate. Its operative presence, which is now urging nature forward, must be sought for throughout the whole, in the remotest past as well as in the narrowest breadth of any present duration. Perhaps also in the unrealized future. Perhaps also in the future which might be as well as the actual future which will be. It is impossible to meditate on time and the mystery of the creative passage of nature without an overwhelming emotion at the limitations of human intelligence.”¹

¹ *Op. cit.*, p. 73.

PART II

Current Ideas modified by Relativity

CHAPTER VIII

SUMMARY OF MODIFICATIONS IN CURRENT IDEAS

OTHER VIEWS.

(a) THE INDIVIDUAL STANDPOINT.

Solipsism.

Troeltsch.

Relativity of Knowledge.

Relativity of Doctrine.

(b) NATURAL LAWS AND RATIONALITY.

Eddington, Rationality.

Otto.

Three Lines of Argument in favour of a Rational Universe.

Teleology.

(c) THE EXTENT OF THE UNIVERSE.

Finitude of the Universe.

The Problem of Nature.

(d) THE CHANGED ATTITUDE TOWARDS NATURE.

The "tidy" Universe.

The Relatedness of Nature.

Aristotelian Logic.

Praeter-Nature.

Dogmatism.

CHAPTER VIII

SUMMARY OF MODIFICATIONS IN CURRENT IDEAS

CHAPTERS V, VI and VII have dealt with three main positions in the relation of the Principle of Relativity to Philosophy. The object of the present chapter is to bring together the results, and also to include some reference to other writers, especially Eddington. This chapter will thus afford an opportunity of indicating the type of problem that may be encountered in Part III—Implications with respect to religious thought.

(a) THE INDIVIDUAL STANDPOINT.

The first problem raised was that of the part played by the individual in his appreciation of the universe. The emphasis which some types of philosophy place on the mind of the observer, makes the solipsistic problem a very difficult one. We have seen that Wildon Carr's monadology, with its insistence on the private world of the monad, fails to solve this solipsistic difficulty. His deduction from the principle of relativity, of the subjective nature of individual experience, also appears to be beyond the scope of the scientific

theory. In fact the position of modern science in no way weakens the obstinate character of nature and its indifference to mind.

But to point out that Wildon Carr's position is not deducible from the theory of relativity, does not of course mean that his line of thought has no value. The argument of Chapter V is only developed to show that there is difficulty in obtaining support for his system of monadology from the scientific theory. On the other hand, it is quite legitimate to point out that the older theory of absolute space and a unique and serial time can no longer be held, but the motion of the observer's spatio-temporal system of reference must be recognized in any question of measurement. To this extent the individual and his frame of reference do play an important rôle. This side of the solipsistic problem has of course its bearing on the individual character of religious thought, and it seemed desirable in view of the discussion of Wildon Carr's views in Chapter V to introduce this religious aspect in Part III. Accordingly the next chapter deals with the problem.

In a recently published work—*Christian Thought*—Troeltsch discusses the place of Christianity among World Religions. The question of final and absolute truth naturally arises, and in this way the discussion is closely associated with that of the Relativity of Knowledge and of Doctrine; but as Troeltsch also insists on the dominating idea of individuality in the sphere of history, it seemed desirable in Chapter IX to

make a separate survey of the individual character of religious thought before discussing the Relativity of Doctrine.

Apart from the emphasis which Wildon Carr places on the individual, we have also seen that Haldane seeks in the scientific principle a particular case of the wider Relativity of Knowledge. Here again it may be urged that Haldane's generalizations cannot be justified from the particular scientific doctrine under discussion; but nevertheless general implications may be made with regard to lack of dogmatism in statements about a theory, and with regard to knowledge as relative to certain standpoints, and these implications of a general nature have a very real bearing on the statement of religious belief. The question of the relativity of doctrine is approached in Chapter X.

(b) NATURAL LAWS AND RATIONALITY.

The individual standpoint may also be emphasized in relation to the expression of natural law; but here the theory of relativity makes the hypothesis that any natural law must preserve its mathematical form, whatever be the spatio-temporal system of reference employed by the observer. This however does not preclude the question being raised as to the meaning of any natural law, even although it does retain its mathematical form. Eddington, using what he calls the Principle of Identification, deals with the

question of how far the mind has selected certain laws from a large number of possible ones:

“This is how our theory now stands. (We have a world of point-events with their primary interval-relations. Out of these an unlimited number of more complicated relations and qualities can be built up mathematically, describing various features of the state of the world. These exist in nature in the same sense as an unlimited number of walks exist on an open moor. But the existence is, as it were, latent unless someone gives a significance to the walk by following it; and in the same way the existence of any one of these qualities of the world only acquires significance above its fellows if a mind singles it out for recognition. Mind filters out matter from the meaningless jumble of qualities, as the prism filters out the colours of the rainbow from the chaotic pulsations of white light. Mind exalts the permanent and ignores the transitory; and it appears from the mathematical study of relations that the only way in which mind can achieve her object is by picking out one particular quality as the permanent substance of the perceptual world, partitioning a perceptual time and space for it to be permanent in, and, as a necessary consequence of this Hobson’s choice, the laws of gravitation and mechanics and geometry have to be obeyed. Is it too much to say that mind’s search for permanence has created the world of physics?) So that the world we perceive around us could scarcely have been other than it is?¹

¹ This summary is intended to indicate the direction in which the views suggested by the relativity theory appear to me to be tending, rather than to be a precise statement of what has been established. I am aware that there are at present many gaps in the argument. Indeed, the whole of this part of the discussion should be regarded as suggestive rather than dogmatic.

“The last sentence possibly goes too far, but it illustrates the direction in which these views are tending. With Weyl’s more general theory of interval-relations, the laws of electro-dynamics appear in like manner to depend merely on the identification of another permanent thing—electric charge. In this case the identification is due, not to the rudimentary instinct of the savage or the animal, but the more developed reasoning-power of the scientist. But the conclusion is that the whole of those laws of nature which have been woven into a unified scheme—mechanics, gravitation, electrodynamics and optics—have their origin, not in any special mechanism of nature, but in the workings of the mind.

“‘Give me matter and motion,’ said Descartes, ‘and I will construct the universe.’ The mind reverses this. ‘Give me a world—a world in which there are relations—and I will construct matter and motion.’”¹

¹ Eddington, *Space, Time and Gravitation*, pp. 197–8. *V.* also, on this Principle of Identification, Eddington, *The Mathematical Theory of Relativity*, pp. 120, 147, 222, 240. The footnote on page 120 states the position with regard to atomicity.

“For a complete theory it would be necessary to show that matter as now defined has a tendency to aggregate into atoms leaving large tracts of the world vacant. The relativity theory has not yet succeeded in finding any clue to the phenomenon of atomicity.”

On the last page (page 240) he leaves the question open: “It may be that the laws of atomicity arise only in the presentation of the world to us, according to some extension of the principles of identification and of measurement. But it is perhaps as likely that after the relativity theory has cleared away to the utmost the superadded laws which arise solely in our mode of apprehension of the world about us, there will be left an external world developing under specialized laws of behaviour.

“The physicist who explores nature conducts experiments. He handles material structures, sends rays of light from point

The question naturally follows: "Are there then no genuine laws in the external world?" Eddington points out that we cannot foretell what the final answer will be; but at present we have to admit that there are laws which appear to have their seat in external nature. "The most important of these, if not the only law, is a law of atomicity. Why does that quality of the world which distinguishes matter from emptiness exist only in certain lumps called atoms or electrons, all of comparable mass? Whence arises this discontinuity? At present, there seems no ground for believing that discontinuity is a law due to the mind; indeed the mind seems rather to take pains to smooth the discontinuities of nature into continuous perception. We can only suppose that there is something in the nature of things that causes this aggregation into atoms. Probably our analysis into point-events is not final; and if it could be pushed further to reach something still to point, marks coincidences, and performs mathematical operations on the numbers which he obtains. His result is a physical quantity, which, he believes, stands for something in the condition of the world. In a sense this is true, for whatever is actually occurring in the outside world is only accessible to our knowledge in so far as it helps to determine the results of these experimental operations. But we must not suppose that a law obeyed by the physical quantity necessarily has its seat in the world-condition which that quantity 'stands for'; its origin may be disclosed by unravelling the series of operations of which the physical quantity is the result. Results of measurement are the subject-matter of physics; and the moral of the theory of relativity is that we can only comprehend what the physical quantities stand *for* if we first comprehend what they *are*."

more fundamental, then atomicity and the remaining laws of physics would be seen as identities. This indeed is the only kind of explanation that a physicist could accept as ultimate. But this more ultimate analysis stands on a different plane from that by which the point-events were reached. The world may be so constituted that the laws of atomicity must necessarily hold; but, so far as the mind is concerned, there seems no reason why it should have been constituted in that way. We can conceive a world constituted otherwise. But our argument hitherto has been that, however the world is constituted, the necessary combination of things can be found which obey the laws of mechanics, gravitation and electrodynamics, and these combinations are ready to play the part of the world of perception for any mind that is tuned to appreciate them; and further, any world of perception of a different character would be rejected by the mind as unsubstantial." . . . "It is one thing for the human mind to extract from the phenomena of nature the laws which it has itself put into them; it may be a far harder thing to extract laws over which it has had no control. It is even possible that laws which have not their origin in the mind may be irrational, and we can never succeed in formulating them. This is, however, only a remote possibility; probably if they were really irrational it would not have been possible to make the limited progress that has been achieved." ¹

¹ Eddington, *Space, Time and Gravitation*, pp. 199 and 200.

This question of rationality is of great importance, and in view of the prominence which Otto's book, *The Idea of the Holy*, has received, it is necessary to discuss the relation of the individual to a possibly irrational universe and to the part that the non-rational element plays in the individual's experience. In an article¹ on the "Numinous," F. L. Cross disagrees with the contention of L. Hodgson that "the presupposition of all thought is the rationality of the Universe."² Cross maintains that the Universe may be partly rational and partly irrational. Now not only is there involved the non-rational element—the "numen"—in the idea of the holy, but this belief in the possibility of a partly irrational Universe deserves careful attention because of its bearing on the whole of the preceding lines of argument.³ Exception might have been taken even if Cross had employed the word *non-rational*,⁴ but if by that term reference is made to that which enters into human experience and which cannot be reasoned out like a mathematical theorem, then few would deny the truth of such a statement; in fact the whole discussion of a praeter-nature leads

¹ F. L. Cross, "The Numinous," *Modern Churchman*, March, 1925, Vol. XIV, No. 12, p. 674.

² L. Hodgson, *The Place of Reason in Christian Apologetic*, p. 51.

³ And *v. infra*, p. 246.

⁴ Non-rational gives the impression of being in a separate and water-tight compartment from the rational, and is thus unfortunate in view of the doctrine of relatedness which has already been developed.

to this position. Cross's claim, however, is that we may be dealing with a Universe which is partly irrational; that is altogether of a different nature and yields a position which affects not merely religious thought but the whole field of knowledge.

There are three considerations which may be held in coming to a decision with regard to the importance attaching to this emphasis on an irrational element in the universe. The *first* has just been mentioned in footnote 4 on the term non-rational. The principle of the relatedness of nature has led to an appreciation of a praeternature, and the whole theory of extensive abstraction presupposes a relatedness and interdependence. Any particular event is significant of others, and every science demands this praeternature. The sunset is an illustration of the possibility of abstracting physical properties regarding optics or spiritual qualities such as beauty or reverence. With this general emphasis on relatedness, emphasized by the theory of relativity and modern science in general, it would be difficult to class one abstraction as rational and the other as irrational. In fact to do so would surely be tantamount to assuming that the mind itself is irrational and capable of relating the same physical phenomenon to both a rational and an irrational category. Such a contradiction certainly supports Hodgson's contention that "the presupposition of all thought is the rationality of the Universe." The tendency to separate the universe into partly rational and partly irrational,

is reminiscent of the mediaeval clear-cut divisions like subject and predicate; the trend of modern scientific thought is to emphasize the importance of treating the universe as a whole. If, as Whitehead has pointed out,¹ we cannot believe in a principle of uniformity, there is simply nothing to discuss and no point in discussing it.

In the last part of the extract already quoted² from Eddington's *Space, Time and Gravitation*, it is pointed out that if laws which have not their origin in the mind are really irrational, then probably it would not have been possible to make the limited progress that has been achieved. This constitutes a *second* consideration, for if the Universe is partly irrational, it is somewhat of a coincidence that what we know of the apparent world leads to the conclusion that nature is significant of mind.³ Ordinarily one would say that it is at any rate reasonable to assume, from the accumulated knowledge and experience of nature, that the Universe is rational; but if the contention of part irrationality is admitted, then we have no right to talk about reasonableness, for the part of the Universe with which we are dealing may, in its essential nature, be irrational.

This leads to a *third* consideration, namely, that a belief in irrationality implies that we have no right to maintain any validity whatever with respect to results gained through human endeavour. For we can never be sure that we are not

¹ *V. supra*, p. 128.

² *V. supra*, p. 147.

³ *V. infra*, p. 222.

attempting to deal with that which is irrational, and which will therefore not yield to treatment by mind. The mind cannot possibly arbitrate as to whether any of its results are rational or irrational, as the irrational part, supposing it to be present, will never yield to investigation by the mind. Presumably a mind of infinite capacity would be able to identify all the rational elements, but there would still remain the irrational part which "ex hypothesi" cannot be investigated even by an infinite mind. The cumulative result of these lines of treatment appears to strengthen Hodgson's contention that "the presupposition of all thought is the rationality of the Universe."

It seems a strange attitude to classify those spiritual values which cannot be discussed after the manner of mathematics, as irrational; it is however sufficient to point out here, that there is another line of approach which does not demand this strange division into rational and irrational. It is the method that leads from the apparent world of nature to a *praeter-nature*, and this is investigated in Chapter XI, especially with reference to the Idea of God.

With this question of rationality there is closely associated the possibility of purpose, for on the assumption made by Cross, with regard to a partly irrational Universe, it would be extremely difficult to attach any meaning to teleology; the question of purpose is discussed in the general scheme outlined in Chapter XI.¹

¹ *V. infra*, pp. 206 ff.

(c) THE EXTENT OF THE UNIVERSE.

The theory of relativity is certainly modifying our ideas about the Universe; the general trend of this change has already been investigated with regard to space and time. The question of the finitude of the Universe receives prominence in some writers on the theory, and so far as current ideas are challenged or modified, this side of relativity demands notice. For example, Part III of Einstein's popular exposition is headed "Considerations on the Universe as a Whole,"¹ and Section XXXI deals with the possibility of a "Finite" and yet "Unbounded" Universe.

The illustration which Einstein adopts is useful for bringing out the difference in meaning between the terms "Finite" and "Unbounded." Two-dimensional beings live on a plane; for them nothing exists outside this plane, but their universe is to them infinite. Now suppose these flat beings are living on a spherical surface instead of on a plane, and we suppose that they fit exactly on this surface, as also do their measuring rods. Now the area of their universe is finite, yet the Universe itself is unbounded.

In order to appreciate the difference in the geometries involved in these two hypothetical universes, consider the notion of a circle in the two cases. In the case of the plane, the ratio of the circumference to its diameter is π . In the case of the spherical surface, a circle would be formed by setting off lines from a point (actually

¹ Einstein, *Relativity, The Special and the General Theory*.

great circles of the sphere) of equal length in every direction and joining the ends of such lines. Now if "r" is the length of one of these lines and "R" the radius of the sphere the circumference of the circle will be $2\pi R \sin \frac{r}{R}$ (the radius of the small circle being actually $R \sin \frac{r}{R}$). But to the two-dimensional beings the diameter of this circle is $2r$ and hence the ratio of circumference to diameter will be

$$\frac{\pi \sin \left(\frac{r}{R} \right)}{\left(\frac{r}{R} \right)}$$

and is therefore less than π .

This is only an analogy, and the question as to whether our Universe can be looked upon as finite and unbounded is one for astronomy to settle. At present no decisive answer can be given. It is not proposed to investigate world theories such as those of de Sitter and Einstein; the idea of physical properties associated with space has been discussed, and we have seen reason for abandoning the heterogeneity involved.¹ It seemed desirable however to make some reference to the distinction between finite and unbounded. Discussions such

¹ *V. supra*, p. 64. For general description of world-building, v. Eddington, *Space, Time and Gravitation*, Chapter X. The Extent of the Stellar Universe is referred to in Nordmann, *Einstein and the Universe*, Chapter VII.

as those on world-building naturally lead on to the problem of Nature as a whole, and we shall conclude this chapter with a reference to the modification of current ideas involved in the general attitude developed in Chapter VII.

(d) THE CHANGED ATTITUDE TOWARDS NATURE.

One of the most significant aspects of modern science, especially of the twentieth century, is its attitude with regard to our knowledge of nature. The break is being definitely made with the mediaeval idea of a "tidy" Universe¹ concerning which we can speak with authority, and in any particular case give the true explanation. The dogmatic assurance of the scientific materialists of the nineteenth century is equally obsolete today. The closing extract at the end of the last chapter might well apply to the advanced problems of any branch of science, although it refers specifically to the doctrine of time.

The principle of relativity, perhaps more than any other scientific theory at the present time, reminds us of the difficulty, indeed impossibility, of believing in a "tidy" Universe and its separate compartments. The most important implication is its emphasis on the Relatedness of Nature. This involves a changed attitude towards our conception of the Universe, in fact a reorganization of thought and a fresh investigation into the

¹ V. Bertrand Russell, *Our Knowledge of the External World*, Chapter I, "A"—Classical Tradition.

meaning and form of propositions. Reference has already been made¹ to the line of severe criticism that has been opened up towards Aristotelian logic; relativity helps us to abandon the idea of a two-termed relation such as subject and predicate as being sufficient to describe an event.

The importance of space and time as abstractions from that which is more concrete, namely the *event*, leads to the idea of *process* as fundamental. Other abstractions, such as truth, beauty, goodness, have greater and more spiritual values and imply the existence of a *praeter-nature* from which the world of nature itself is an abstraction. Thus a fresh philosophic system is involved in the concept of nature which the doctrine of relatedness demands.

The bearing of all this on religious thought may be far-reaching; the immediate task of theology is surely to make an effort to formulate Christianity in relation to this new philosophic background. An attempt in this direction appears with reference to the Idea of God in Chapter XI. The last chapter deals with theological implications, such, for example, as the idea of eternal life in view of the difficulties encountered in the modern doctrine of time. Chapter XII also attempts to form some conclusion with respect to possible modifications in religious thought.

Before leaving this general summary of changes

¹ *V. supra*, p. 125.

involved in our current ideas, it may be well to emphasize once more the attitude of present-day scientists, in their intolerance of the spirit of dogmatic assertion which treats an explanation as infallible, or a hypothesis as final. Scientists are learning their lesson from the bitter and frontal attacks of last century; there is also a lesson for theologians:

Let knowledge grow from more to more
But more of reverence in us dwell.

PART III

Implications with Respect to
Religious Thought

CHAPTER IX

THE INDIVIDUAL CHARACTER OF
RELIGIOUS THOUGHT

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THE INDIVIDUAL CHARACTER OF RELIGIOUS THOUGHT

A SUGGESTION FROM THE THEORY OF RELATIVITY.

(a) TROELTSCH AND INDIVIDUALITY.

His earlier Position.

Christianity among World-Religions (1923).

Modifications.

(b) CRITICISM OF TROELTSCH'S IDEA OF POLYMORPHOUS
TRUTH.

Truth as Monomorphous.

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(c) SUPREME VALIDITY OF CHRISTIANITY.

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NOTE "B."—"Bhakti" and Christianity.

CHAPTER IX

THE INDIVIDUAL CHARACTER OF RELIGIOUS THOUGHT

WE have already seen how the problem of the individual's outlook has been associated with the theory of relativity. Although Wildon Carr's claim can hardly be admitted as solving the problem of solipsism and although it seems inevitable that we must abandon the idea of the monad's private world, yet there is a valuable suggestion underlying the insistence with which the principle of relativity demands that the observer and his space-time system must be taken into account. In general terms, a fair implication seems to be the importance attaching to the observer's position and system of reference and the corresponding emphasis which must be laid on the environment and outlook of the individual. It is not claimed that this deduction follows directly from the modern theory of relativity, in the nature of the problems dealt with this cannot be; but just as the biological theory of evolution has suggested lines of development in philosophy and biblical criticism—subjects somewhat remote from the original province of Darwin's work—so it may reasonably

be held that the theory of relativity suggests the importance of the concept of individuality.

(a) TROELTSCH AND INDIVIDUALITY.

Naturally such an implication should be considered in the realm of religious thought, and, in harmony with this general tendency, it is not surprising that one of the most distinguished teachers and authors of this century—Ernst Troeltsch—should emphasize the importance of recognizing the part played by individuality in a survey of the supreme validity and finality of any one of the great world-religions. A convenient treatment for English readers has been published by R. S. Sleigh and the following extract¹ sums up the significance of individuality for to-day.

“It is the great merit of Troeltsch that he has clearly recognized that what we now call Christianity has its centre in Jesus of Nazareth, in that genuine religious experience of his, whose characteristics were pure spirituality and strong ethical activity (cf. Bd. I, 15 ff.). He will have nothing to do with those who suppose that Jesus himself, or his Church in its various historical forms, can be adequately and exhaustively explained by reference to purely natural, psychological, and sociological factors. Religious experience in Jesus was original and creative, and Christianity has never been a mere syncretism in any of its great historical forms. From this point of view Troeltsch proceeds to point out that the religious thought

¹ R. S. Sleigh, *The Sufficiency of Christianity and Ernst Troeltsch* (1923), pp. 34-5.

and life of Jesus by its impact upon and reception by other hearts had soon to adjust itself to its historical situation, creatively fusing itself with the valuable elements of ancient culture, especially those of Platonism and Stoicism, which resulted in Catholic ecclesiastical civilization. This system, after flourishing for many centuries, began to weaken before the rise of the modern world, and at last broke up in the catastrophe of the Protestant Reformation. This Protestantism, however, was essentially a product of the Middle Ages, as the latter has been of the ancient world. It was a Janus bifrons, looking forward in the direction of the growing individualism, the self-confidence and activity of the time as stimulated by non-Christian causes, but also backwards in the direction of the old Supernaturalism, its objectively given salvation conserved within a Divinely instituted Church. The old Protestantism of the Reformation merely carried the Catholic scheme into the subjective region. Lutheranism was more predominantly a modification of the old Catholicism than Calvinism. The former was more mystical, or other-worldly and aristocratic. The latter was more active and democratic, which in its new type of asceticism within this world, as compared with the Catholic and Lutheran quietistic type, supplied an ethical foundation for the inspiration and control of daily work and duty as something done for the honour of God. This second bloom of the Middle Ages, however, was destined to pass away, and was replaced by something new in the English Revolution of 1688, which is really the watershed of European history. As Catholicism has been shattered by the old Protestantism, so the old Protestantism has in turn been displaced by a new type which, with its emphatic sense of individuality, its humanistic ethic, and its modern scientific outlook, has more and more firmly grasped and become conscious of the implications of the rationalism,

the principles of spiritual autonomy, the self-confidence and the tireless activity of the modern world.”

We have already seen ¹ how Science took over the ideas of matter, and, in fact, the Aristotelian logic in general, from the Schoolmen and how the modern position rejects any notion of absolute rest or absolute space and time. The same line of development must be traced in religious thought, which also seems to be breaking away from the traditions of mediævalism and asserting its right to be placed in vital relation to the modern scientific view of the universe.

There are two questions which at once present themselves, the supreme validity of Christianity, and the possibility of absolute truth. Troeltsch's lecture, *The Place of Christianity among the World-Religions*, which should have been delivered at Oxford in 1923, naturally reveals the latest development of what he himself describes as the centre and starting-point of his academic work. The position maintained in this lecture has called forth a certain amount of criticism by Baron von Hügel with regard to “polymorphous truth,” a conception introduced by Troeltsch in 1907. The question of whether truth can thus be described, or is essentially monomorphous, is of more than academic interest, and the practical bearing of the nature of truth is constantly revealed in Troeltsch's survey of the place of Christianity among the world-religions.

¹ *V. supra*, p. 44.

The fundamental conflict is between the spirit of critical scepticism, generated by the ceaseless flux and manifold contradictions within the sphere of history, and the demand of the religious consciousness for certainty, for unity and for peace. Referring to his book, *The Absolute Validity of Christianity*, which involved an examination of the fundamental concepts of theology, Troeltsch says:

“I believed that I could have determined two such concepts, both of which claimed to establish the ultimate validity of the Christian revelation in opposition to the relativities revealed by the study of history.”¹

The first concept—the Christian truth guaranteed by miracle (inward rather than external)—he rejected, asking whether it is fair to trace the Platonic *Eros* to a natural cause, whilst we attribute a supernatural origin to the Christian *Agape*? The second concept—associated with the idea of evolution, Christianity being *religion* and not a *particular* religion—is also rejected because actual history of religion knows nothing of the common character of all religions, nor of their natural upward trend towards Christianity.

The rejection of these two concepts led Troeltsch to the idea of Individuality which dominates the whole sphere of history. He states the problem as follows:

“Thus the universal law of history consists precisely in

¹Troeltsch, *Christian Thought* (1923)—*Christianity among World-Religions*, p. 9.

this, that the Divine Reason, or the Divine Life, within history, constantly manifests itself in always-new and always-peculiar individualizations—and hence that its tendency is not towards unity or universality at all, but rather towards the fulfilment of the highest potentialities of each separate department of life. It is this law which, beyond all else, makes it quite impossible to characterize Christianity as the reconciliation and goal of all the forces of history, or indeed to regard it as anything else than an historical individuality.”¹

In surveying his position and treatment of the problem, he says that he first endeavoured to show that it was in any case impossible to return to the old miracle-apologetic; he then submitted that the mere fact of the universality of Christianity—of its presence in all the other religions—would, even if true, be irrelevant. The point at issue was whether Christianity possessed ultimate truth. Recognizing the important part that personal experience plays, and that the claim of Christianity to universal validity can only be felt and believed in the first instance, he sought a broader foundation upon actual, objective facts:

“I believed that I had discovered such a foundation for Christianity in the terms in which its claim to ultimate validity finds instinctive and immediate expression; in other words, in its faith in revelation and in the kind of claim it makes to truth.”²

Bearing in mind the distinction between

¹ Troeltsch, *Christian Thought* (1923)—*Christianity among World-Religions*, p. 14.

² *Op. cit.*, p. 17.

National and Universal Religions he compares the naïve claims to absolute validity made by the various world-religions and finds that made by Christianity is of quite a different kind from the others:

“All limitation to a particular race or nation is excluded on principle, and this exclusion illustrates the purely human character of its religious ideal, which appeals only to the simplest, the most general, the most personal and spiritual needs of mankind. Moreover, it does not depend in any way upon human reflection or a laborious process of reasoning, but upon an overwhelming manifestation of God in the persons and lives of the great prophets. Thus it was not a theory but a life—not a social order but a power. It owes its claims to universal validity not to the correctness of its reasoning nor to the conclusiveness of its proofs, but to God’s revelation of Himself in human hearts and lives. Thus the naïve claim to absolute validity of Christianity is as unique as its conception of God. It is indeed a corollary of its belief in a revelation within the depths of the soul, awakening men to a new and higher quality of life, breaking down the barriers which the sense of guilt would otherwise set up, and making a final breach with the egoism obstinately centred in the individual self. It is from this point of view that its claim to absolute validity, following as it does from the content of its religious ideal, appears to be vindicated. It possesses the highest claim to universality of all the religions, for this its claim is based upon the deepest foundations, the nature of God and of man.

* * * * *

“We shall rather strive continually to bring our Christianity into harmony with the changing conditions of life,

and to bring its human and divine potentialities to the fullest possible fruition. It is the loftiest and most spiritual revelation we know at all. It has the highest validity. Let that suffice.”¹

Such, in Troeltsch's own words, was the conclusion reached about twenty years ago, and although he does not wish to withdraw anything from the practical standpoint, yet there are some points which he desires to modify.

“My scruples arise from the fact that, whilst the significance for history of the concept of Individuality impresses me more forcibly every day, I no longer believe this to be so easily reconcilable with that of supreme validity.”²

Troeltsch's difficulty is with the individual, relative nature of Christianity which he claims could only have arisen in the territory of the classical culture and among the Latin and Germanic races; the Christianity of the Oriental peoples being of quite a different type. But although the historical background of any religion must always be taken into account, we must surely guard against the danger of isolating one section of religious experience as being of quite a different type from another, or of occupying a world of its own—as Troeltsch maintains in reference to Russian Christianity. This tendency to separate religious thought into distinct compartments reminds us of the philosophical tend-

¹Troeltsch, *Christian Thought* (1923)—*Christianity among World-Religions*, pp. 19-21.

²*Op. cit.*, pp. 21-2.

ency of making clear-cut distinctions, in some way analogous to the Aristotelian logic; ¹ it is all the more curious in Troeltsch because of his general sympathy with the new Protestantism, seeking to break away from what remained of mediævalism in the old.

The relatedness of nature, which we may regard as the most important implication of the theory of relativity, points in a different direction, and while recognizing the importance of the individual, emphasizes also that which must be looked upon as more concrete than nature, from which the experience of the individual is abstracted. Relativity does not appear to lend any support to the idea of polymorphous truth.

(b) CRITICISM OF TROELTSCH'S IDEA OF POLY-MORPHOUS TRUTH.

The difficulty naturally assumed great importance in the relation of individual historical facts to standards of value; here Troeltsch includes the entire domain of history and reaches the conclusion that in spite of a general kinship and capacity for mutual understanding, what is really common to mankind and universally valid for it, is exceedingly little and belongs more to the province of material goods than to the ideal values of civilization. Even the validity of science and logic, he says, seem to exhibit under different skies and upon different soil, strong

¹ *V. supra*, p. 125.

individual differences present in their deepest and innermost rudiments.

Here we have presumably the idea of polymorphous truth. In the *Separation of State and Church* Troeltsch contended that the old Church alone retains, with full consciousness and final self-commitment, the conception of Truth as essentially monomorphous.

“Against this he holds that while God, indeed, is one and all Truth, as it is in Him, is but one, that Truth as apprehended, or even as apprehensible, by man varies indefinitely from race to race and from age to age, and does so in quality no less than in quantity. We can trace no element in any part of our knowledge, not even in our mathematics, which remains identical through all our earthly space and time.”¹

It is difficult to imagine that with regard to a phenomenon of nature, such as that of gravitation, truth can be polymorphous. True, Einstein's Law is different from that of Newton, but it is, we believe, nearer an expression of truth; it is unthinkable, for example, that Newton's Law is a form of polymorphous truth, valid for Indians, and Einstein's a form valid for Europeans. We look upon this new law as a modern development of the old, and the tendency in the theory of relativity to connect gravitational and electromagnetic phenomena seems to point to the idea of monomorphous rather than polymorphous truth. The spirit of scientific research, whether

¹ Baron von Hügel, *Introd.*, p. xix, to Troeltsch's *Christian Thought*.

biological or physical, assumes that there is some definite truth which may be discovered. The racial background will, of course, reveal itself in expression, but this is different from insisting that the nature of truth itself is polymorphous. The theory of relativity, although recognizing the part played by the observer and his particular system of reference, insists that physical laws must preserve their mathematical form for different spatio-temporal systems of reference moving relatively to one another. To maintain a polymorphous nature of truth in this direction at any rate would be contrary to the principle of relativity.

We must therefore grant the nature of monomorphous truth in the realm of the mathematical and physical sciences; where can we introduce this concept of polymorphous truth? Clearly chemistry and physics are so closely allied that we must regard truth from both these standpoints as of the same nature—monomorphous. Biochemistry itself reminds us of the difficulty of drawing the line between animate and inanimate nature, can there here be a sudden break in the nature of truth? Biology, Psychology, Ethics, Religion—where will the nature of truth change from being monomorphous to polymorphous? If we are wrong in claiming law and unity in nature, can we maintain any supreme and abiding values for truth, beauty or goodness?

It may be urged that the obvious difference between, say, mathematical and religious truth will

account for the polymorphous nature of the latter. But is not the difference rather one of *value*? If we emphasize the importance of the spiritual side of existence, then religious truth will have more value in our judgment than the truth associated with the physical sciences; but unless we are using the word "truth" with a different meaning in the two cases, we must be prepared to admit that truth retains its nature, although its value may vary considerably.¹

In the realm of religion it would appear that the difficulty which Troeltsch experienced between say East and West, could be met by recognizing *relative* aspects of truth, rather than insisting on the *polymorphous* nature of truth. The historical and cultural background leads to value-judgments being made with regard to the importance of the various relative aspects of truth.

Baron von Hügel has pointed out how this

¹ Whitehead, at the beginning of *Principles of Knowledge*, shows how the traditional view of a distribution of material throughout all space at a durationless instant of time, not only leaves no room for velocity and other essentially physical quantities, but also is incompatible with the biological conception of an organism, which cannot be expressed in terms of material distribution at an instant. "This argument does not in any way depend on the assumption that biological phenomena belong to a different category to other physical phenomena" (*Principles*, p. 3).

With regard to truth, the category to which a truth belongs does not suggest a change in the nature of truth such as the use of the term polymorphous suggests,

conception of polymorphous truth gives a curiously double aspect to Troeltsch's general outlook. The concluding paragraph of Troeltsch's lecture on *Christianity among World-Religions* reveals something of the twofold nature of the position:

"This is what I wish to say in modification of my former theories. I hope you feel that I am not speaking in any spirit of scepticism or uncertainty. A truth which, in the first instance, is a *truth for us* does not cease, because of this, to be very Truth and Life. What we learn daily through our love for our fellow-men, viz. that they are independent beings with standards of their own, we ought also to be able to learn through our love for mankind as a whole—that here too there exist autonomous civilizations with standards of their own. This does not exclude rivalry, but it must be a rivalry for the attainment of interior purity and clearness of vision. If each racial group strives to develop its own highest potentialities, we may hope to come nearer to one another. This applies to the great world-religions, but it also applies to the various religious denominations, and to individuals in their intercourse with one another. In our earthly experience the Divine Life is not One, but Many. But to apprehend the One in the Many constitutes the special character of love."¹

(c) SUPREME VALIDITY OF CHRISTIANITY.

The extreme individualistic outlook cannot be perpetuated indefinitely, and Troeltsch himself suggests that the special character of love is to apprehend the One in the Many. Love, at any rate, then must be looked upon as mono-

¹Troeltsch, *Christian Thought*, p. 34.

morphous. Troeltsch's earlier work finds in Christianity the loftiest and most spiritual revelation, and love, of course, plays a fundamental part in this revelation. If, then, Christianity is most vitally concerned with love, whose special character Troeltsch claims is to apprehend the One in the Many, is it not fair to conclude that Christianity successfully passes the test, which Troeltsch himself lays down, namely that of possessing ultimate truth? For if, as Troeltsch pleads, the key to progress and mutual understanding is to be found in the special character of love, then the world-religion which emphasizes the use of that key, which has as its ideal love to God and love to man, and which claims that this ideal must always be associated with the solution of our racial as well as our international, social and individual problems—such a world-religion, in emphasizing the use of the key, is in possession of that which will in the end unlock the door of ultimate truth.

This, of course, does not mean an absolute possession of truth by Christianity, for even its most ardent supporters would not deny the contributions that India and China and Africa, as well as modern Western thought, are making towards the knowledge of the truth. But in its insistence on the Christ-like spirit amid the mutual relations of the world-religions and in the spread of the special character of love, the claim to supreme validity may be realized. "I am the Way, the Truth and the Life." It is,

indeed, a great task and a great responsibility to guide mankind in sympathy and in patience along the pathway that leads to very Truth and Life:

That God, which ever lives and loves,
One God, one law, one element.

NOTE "B"

"BHAKTI" AND CHRISTIANITY

In connection with Troeltsch's work and, in particular, his later views, it may be worth while raising the question as to whether it is really necessary to maintain his extremely individualistic outlook, as revealed in the following extract:

"Whether you regard it (Christianity) as a whole or in its several forms, it is purely historical, individual, relative phenomenon, which could as we actually find it, only have arisen in the territory of the classical culture and among the Latin and Germanic races."¹

The expression of Christianity in the West is naturally dependent on the background of the classical culture, but within that culture itself there can be found points of contact, for instance, with the general attitude of Indian religious thought. The esteem, devotional faith and adoration associated with *bhakti* in Hinduism does not seem to belong to an entirely different order from the contemplation that Aristotle associates with the gods.

¹ Troeltsch, *Christian Thought*, p. 22.

"We may go through the whole category of virtues, and it will appear that whatever relates to moral action is petty and unworthy of the Gods. . . . If, then, action and, still more, production is denied to one who is alive, what is left but speculation? It follows that the activity of God being pre-eminently blissful will be speculative, and if so, then the human activity which is most nearly related to it will be most capable of happiness." ¹

There are certainly resemblances between the idea of "bhakti" and Christian religious thought. As a religious term "bhakti" is defined in the Aphorisms of Sandilya as "an affection fixed upon the Lord," but the word "affection" itself is further defined as that particular affection which arises after a knowledge of the attributes of the Adorable One.

"The writer further states that it is not knowledge, though it may be the result of knowledge. Even those who hate the Adorable may have knowledge of Him. It is not worship, etc. These are merely outward acts, and *bhakti* need not necessarily be present in them. It is simply and solely an affection directed to a person, and not a belief in a system. There is a promise of immortality to him who 'abides' in Him. 'Abiding' means 'having *bhakti*.' *Bhakti* is not a wish. A wish is selfish. Affection is unselfish. It is not a 'work' and does not depend upon an effort of the will. The fruit of 'works' is transient, that of *bhakti* is eternal life. Works, if they are pure, are a means of *bhakti*. To be pure, they must be surrendered to Him, i.e. the doer must say, 'Whatever I do, with or without my will, being all surrendered to Thee, I do it as impelled by Thee.' Good actions, done for the good results which they produce in a future life, do not produce *bhakti*, but are bondage." ²

¹ Aristotle, *Nic. Ethics*, Book X, Chapter VIII (trans. Welldon).

² Grierson, art. "Bhakti-Marga," Hastings, *Enc. Relig. and Ethics*, Vol. 2, p. 539.

Descriptions of this nature have naturally raised the question of the relation to Christianity. Grierson maintains that it must now be taken as settled that the idea of "bhakti" is native to India, but it is still open to consider the possibility of influence "by the cognate teachings of the Western form of belief."¹ Estlin Carpenter draws attention to the attempt made fifty years ago (by Lorinser) to prove the dependence of the Bhagavad-Gita on Christian teaching by parallels drawn from the New Testament (Gospels, Acts, Epistles of Paul, James and John, and the Apocalypse). "Doubtless there are striking correspondences in thought, feeling and even in expression, between the Song and the Fourth Gospel. But these seem to receive an adequate explanation from similarities of religious belief and experience without resort to hypothesis of direct influence. And many of the alleged resemblances really lie on quite different planes of thought."² Carpenter points out that the independence of the Gita has been emphatically vindicated. For the present purpose it is not necessary to enter into such a discussion, but there are two lines of thought which seem to make some modification in Troeltsch's position necessary.

If on the one hand, where we find definite traces of correspondence between Indian and Christian thought, we also deny any dependence, then we are confronted with the phenomenon of two similar but independent ideas appearing in Eastern and Christian thought. Such a phenomenon can hardly support Troeltsch's contention that Christianity is a purely historical, individual, relative phenomenon.

On the other hand, if we admit Christian influence of

¹ *Op. cit.*, p. 548.

² Estlin Carpenter, *Theism in Medieval India*, p. 264, footnote 1.

one kind or another, then we are faced with a world-religion which proves itself capable of modifying, if not actually introducing, one of its own ideas in another world-religion. Thus in the two cases which we have been considering, there is reason to doubt Troeltsch's position that Christianity is a purely historical, individual, relative phenomenon, which, as we actually find it, could only have arisen among the Latin and Germanic races.

PART III

Implications with Respect to
Religious Thought

CHAPTER X

THE RELATIVITY OF DOCTRINE

CHAPTER X

THE RELATIVITY OF DOCTRINE

DEGREES OF IMPORTANCE.

(a) THE ESSENCE OF CHRISTIANITY.

The Ancient Church.

The Reformation.

The Mediæval Heritage.

Voltaire, Kant, Locke, Lessing; Schleiermacher,
Hegel, Ritschl.

(b) DOCTRINES OF PRIMARY IMPORTANCE.

Essentially concerned with Praeter-Nature.

(i) God, Transcendent and Immanent. Love.

(ii) Man, Recognition of Spiritual Values.
Jesus Christ.

(iii) Relation between God and Man, Sin,
Fellowship.

(iv) Immortality.

(c) DOCTRINES OF SECONDARY IMPORTANCE.

I. Theories of Doctrines of Primary Importance.

(i) The Nature of the Godhead.

(ii) The Place of Man in the Universe.
Christology.

(iii) Theories of Atonement.

(iv) Eschatology.

II. Theories concerning Institutions.

The Sacraments.

The Ministry.

The Church.

(d) AUTHORITY.

The Church.

The Bible, Revelation and Inspiration.

Reason.

Conscience.

Consensus of Christian Opinion.

(e) FINALITY.

The Permanent Element in Christianity.

Progress.

CHAPTER X

THE RELATIVITY OF DOCTRINE

IT has already been pointed out that the value of Haldane's work consists largely in emphasizing the general principle of the relativity of knowledge. This naturally has a corresponding place in the sphere of Christian doctrine, which after all is an attempt to summarize what we know concerning Christian thought and belief. The statement of doctrine soon became inevitable in the history of the early Church, both for the purpose of teaching those *within* the Church, and for the purpose of explaining to those *without* what Christianity really meant. Something of this distinction can be seen in the Catechetical and the Interrogatory forms early associated with Baptism.¹

Now with the idea of relativity which Haldane emphasizes, it is quite possible that a statement or interpretation of religious belief in one century may be quite opposed to a central theme which is being emphasized at a later time; and though both may be partial or relative aspects of a supreme belief, yet with the added knowledge and progress

¹ V. B. J. Kidd, *A History of the Church to A.D. 461*, Vol. I, p. 260.

in other fields of thought, it is quite likely that we shall feel justified and even obliged to attach greater importance to the statement of the later century than to the statement of the earlier. The acceptance, then, of degrees of importance seems natural, otherwise religious belief must be marked off into a separate compartment, in which progress cannot be allowed. Such a view would not be held even by those who recognize the Church as the supreme authority, for in theory, the Church in its pronouncements, would be guided by the Holy Spirit. There is a possibility that some extreme supporters of a theory of Verbal Inspiration might maintain that statements contained in the Bible are to be looked upon as the supreme unalterable standards of religious belief and that all doctrines are of equal importance. The Roman Catholic would also presumably have to regard all doctrines of equal importance; for since the Church has indicated what is orthodox, there can be no private opinion as to relative importance.

(a) THE ESSENCE OF CHRISTIANITY.

Christian history has, however, revealed various efforts to state the relative importance of different doctrines and so to arrive at an estimate of the essence of Christianity. A passing reference must suffice with regard to these attempts. The task of classification has been ably under-

taken by Adams Brown.¹ Before the beginning of modern theology he traces two periods of questioning about the essence of Christianity, namely at its birth—the *Ancient Church*, and then again when organized worship had grown corrupt—at *The Reformation*. In the first period Christianity had to be distinguished from Judaism and in the second from the corrupt and secular type which had forced itself into prominence by the close of the Middle Ages. The earlier attempts at definition assume God as the Absolute and their phrases naturally emphasize His Transcendence.² This idea is not wholly absent from the Reformation theology, but with the added emphasis on Faith there is also the corresponding implication of Immanence. Zwingli defines religion as “that system which includes the entire piety of Christians, as, to wit, their faith, life, laws, rites, sacraments.”³ This problem of the definition of Christianity finds conciliar expression from Nicaea and Chalcedon to Trent, and also in such formularies as the Thirty-Nine Articles and the Westminster Confession.

As in Science so also in theology, the break associated with the Renaissance and the Reformation did not entirely discard the language and thought of the Middle Ages. Hence the tendency, prevalent during the last three centuries

¹ W. Adams Brown, *The Essence of Christianity: A Study in the History of Definition*.

² *Op. cit.*, p. 73.

³ Quoted *op. cit.*, p. 88.

in orthodox theology, of retaining much of the Aristotelian logic especially associated with the Schoolmen and much of the metaphysics of the early centuries of the Christian era. In Science the twentieth century is witnessing the effort to break with the old conceptions which have lingered on from mediæval thought; perhaps the twentieth century is also witnessing the struggles of theology in the attempt to free herself from similar shackles, which make it sometimes so difficult for the man "outside" to appreciate, in the Church, the freedom and liberty of the Spirit of Christ.

With regard to modern attempts, we cannot enter into a detailed study. Adams Brown¹ recognizes two influences which have necessitated a restatement of the question; on the one hand, the increased horizon of intellectual activity and, on the other, the important growth of the science of Comparative Religion, and in order to understand the new world of thought in which nineteenth-century theology moves, he cites Voltaire, Kant, Locke and Lessing as spokesmen of four tendencies of philosophers in their treatment of religion. The four tendencies in this order are: (1) The view which regards Christianity as a corruption of the true religion; (2) The view which identifies Christianity with the religion of nature; (3) The view which distinguishes historic Christianity from natural religion as constituting a higher type; (4) The tendency

¹ Adams Brown, *The Essence of Christianity*, p. 128.

to regard Christianity as but one historic stage in the approach to a perfect or absolute religion, still to be revealed.¹

The latter half of Adams Brown's work deals successively with definitions of Schleiermacher, Hegel and Ritschl. For *Schleiermacher*, dogmas and rites are only the garments in which, for the time, religion has chanced to clothe itself. Religion is experience. There must live immediately in the individual the eternal unity of Reason and Nature, the universal existence of all finite things in the Infinite. Christianity is that historic religion founded by Jesus of Nazareth and having its bond of union in the redemption mediated by Him, in which the true relation between God and man for the first time finds expression, and which still maintains itself as the religion best worthy of the allegiance of thoughtful and earnest men.

¹ *Op. cit.*, pp. 130-32.

Page 136. *Voltaire* emphasizes the religion of reason, which has but two articles, love to God and love to one's neighbour.

Page 137. *Kant* maintains that true religion, as the outgrowth of ethics, must be such, and such only, as each man may construct for himself without historic mediation.

Page 145. *Locke* claims that the distinctive feature of Christianity is that Jesus is the Messiah. Other doctrines, such as the Trinity, may belong to historic Christianity in the larger sense, but they are not necessary to the existence of Christianity.

Page 149. *Lessing* combines the idea of Jesus as the teacher who adds to the unity of God which Moses taught, the new dogma of immortality; but, in addition, Christianity is to be looked upon as one of many religions in the long process of educating the human race.

The principle of thesis, antithesis and synthesis naturally plays an important part in the attitude of *Hegel*. Religion is the union in thought of the infinite and the finite, and in the Christian dogma of the Incarnation we have the perfect union of the divine and the human. The Trinity becomes the supreme Christian dogma.¹

In the outlook of *Ritschl*, religion is neither knowledge, nor feeling, but power. The influence of Lotze can be discerned in his emphasis on value-judgments and his estimation of Christ. Christianity, the religion of redemption, is revealed by Christ who is at once the Saviour from sin and the founder of that kingdom of brotherly service in which the ethical ideal of humanity is for the first time realized, and into which it is God's plan to gather more and more of the sons of men.

From this brief survey one thing stands out significantly, it is the insistence with which leaders of thought throughout Christian history have demanded some definite attitude towards what may be regarded as the essence of Christianity. From the present point of view an en-

¹ An interesting illustration of the possibilities of the Hegelian principle is found in the 'Projection' idea of God in which Feuerbach maintains that religion is the disuniting of man from himself. The man who loves for the sake of man, who rises to the love of the species, he is a Christian, is Christ himself.

The work of John and Edward Caird should be mentioned in reference to the unity of religion; Christianity being looked upon as existing between objective and subjective religions and embodying in itself ideas both of immanence and transcendence.

deavour will be made in the light of the scientific approach, to indicate a possible method of discrimination between essential and non-essential, between doctrines of primary and those of secondary importance.

(b) DOCTRINES OF PRIMARY IMPORTANCE.

The general demand of science is for the recognition of a *praeter-nature*; ¹ this is essentially involved in the idea of the relatedness of nature which the scientific theory of relativity at any rate emphasizes. Now the laws concerning *praeter-nature* appear to be somewhat different in permanence from the laws affecting the apparent world. To take an instance—the law which we all accept concerning the spirit of self-sacrifice—the expression of the law with reference to subordinating one's own selfish interests in the service of others—has at any rate been recognized for centuries and this expression of the law does not vary materially from age to age. But on the other hand, a law affecting the apparent world, such as the law of gravitation, is a hypothesis which changes in its expression with the progress of physical and mathematical science. Now religion is the attempt to live in harmony with the universe as a whole and is especially concerned with these laws of *praeter-nature*; hence in trying to solve the question of primary and secondary

¹ *V. supra*, p. 155, and especially the line of argument developed in Chapter XI (*infra*, pp. 201 ff.).

importance with regard to religious doctrines, it is reasonable to suppose that those which seek to state the laws of praeter-nature must be regarded as of especial importance. While, on the other hand, theories concerning the laws of praeter-nature and theories concerning religious institutions, though of importance, must be classed as of secondary importance.

First among the doctrines of primary importance is the idea of God. This is developed more fully in the next chapter. For our present purpose it is sufficient to point out that the history of Christian thought makes it appear necessary that both ideas of transcendence and immanence must be included in any statement of praeter-natural law which attempts to reveal God. The Christian idea of love as dominating the sphere of praeter-nature and Fatherhood as best expressing the nature of God, seem to be the most satisfactory hypotheses; the alternatives being beset with greater difficulties.¹ In view of the problem of suffering and of life's inequalities, the doctrine of a God Who is Love and Who has a great purpose of good, becomes the central act of Christian faith.²

¹ A denial of the Love of God would also lead ultimately to the denial of all those human values which we hold most sacred—the love of parent and child, honour, self-sacrifice. It would further lead to a position in social relationships in which nothing was worth while and all effort toward progress and amelioration of conditions, merely mockery.

² *V. infra*, p. 230, footnote 1.

But in introducing the problem of suffering, and indeed in the language in which we have been describing God, we are already face to face with the relation of man to praeter-nature. Whatever else may be said about the Christian doctrine of man, it does emphasize the fact that he is capable of recognizing certain spiritual values such as truth, beauty and goodness. Above all in the life of One Man has been recognized perfect manhood and in that Life there is in concrete form the primary doctrine of man.

This, however, leads us naturally to the relation between God and man; the harmony in which man is seeking to live with regard to the universe as a whole, is constantly broken by the fact of sin. In other words, man's fellowship with God is impaired or interrupted. Now the central theme of the Christian Gospel is that in spite of sin this fellowship can be restored. Here again the conception of God as a Father becomes of supreme importance. The sincerity of repentance on the part of the child is the necessary condition of a restored relation of friendship and fellowship with the parent; here is a parable of that deeper law which deals with the relation of men as members of a family in which God occupies the place of Father.

There is yet another doctrine which must be included in this group of primary importance. It deals with the question of permanence of this relation of man to praeter-nature. Does it affect this life only? Is death the final victor?

The Christian answer is emphatically No. The doctrine of Immortality is the complement of the Christian doctrine of God and man and the relation of man to God.¹

(c) DOCTRINES OF SECONDARY IMPORTANCE.

Having indicated something of the laws of praeter-nature which we must regard as of primary importance, we must be prepared to recognize that theories about these laws should be regarded as of secondary importance. The scientific analogy is, for example, the importance of the fact of gravitation compared with a theory of gravitation. It cannot be too strongly emphasized that in using the term secondary it is not suggested that the doctrines or dogmas concerned are of minor importance.

Corresponding to the first doctrine of primary importance, namely that of God as being transcendent and immanent and essentially a God of Love, we have the attempt of Christians to formulate a dogma as to the nature of the God-head which shall retain a unity and yet recognize a diversity. The God of natural law, the God

¹ It is interesting to note how the general attitude of this section on doctrines of primary importance agrees with Bishop Gore's definition of Christianity. "Christianity is faith in a certain person Jesus Christ, and by faith in Him is meant such unreserved self-committal as is only possible because faith in Jesus is understood to be faith in God, and union with Jesus union with God" (Bampton Lectures, 1891). (*The Incarnation*, p. 1.)

of the social order, the God of reason is One Lord.¹

The second doctrine of the importance of spiritual values in man's life leads to a discussion of the place of man in the universe. For example, this doctrine together with a belief in the central position of the Cross of Christ led to a theory, of which Dante stands as a representative, placing Jerusalem as the centre of the world and the earth as the centre of the Universe. Modern astronomy which regards our Earth as a dwarf planet, of a dwarf sun, naturally cannot support the mediæval doctrine as to man's place in the Universe. With the perfect manhood and sinlessness of the Jesus of history there arise speculations as to His uniqueness and so can be traced the whole Christological controversy from the second to the twentieth century.

The question of man's relation to God and the way in which Jesus has revealed that a state of fellowship may be restored, although the individual is conscious of sin, have given rise to a whole group of theories with regard to Atonement. This question could not, of course, be kept separate from those already raised—the nature of the Godhead and the nature of Jesus. One theory, for example, suggests that the doctrine of the Trinity is made necessary in

¹ For treatment of the doctrine of the Trinity along this line, see C. F. Russell, *Hulsean Lectures*, 1922-3, Lecture I.

order to allow for fellowship among equals in the Godhead.

It is hardly necessary to mention the speculation which has been made possible in admitting the doctrine of Immortality. Theories of Eschatology must always remain of secondary importance although they should be in harmony with that fundamental doctrine of the Christian God of Love. We may here point out that Love includes justice. The words of Richard Baxter sum up the attitude of the Christian on this and also on other doctrines of secondary importance:

My knowledge of that life is small,
The eye of faith is dim;
But 'tis enough that Christ knows all
And I shall be with Him.

This central position of Christ and His teaching with regard to the laws of praeter-nature does not of course preclude the desirability of our trying to state hypotheses to explain the doctrines of primary importance, but it is very necessary to remember that such theories must be classed as of secondary importance.

In addition to the fundamental doctrines of Christianity, we are also faced with certain institutions—the Sacraments—the Ministry—the Church, and in so far as these relate rather more to the apparent world than to praeter-nature we must class them as of secondary importance and likewise any doctrines concerning their nature. Those who regard every meal as sacramental,

and every Christian as a minister, and the invisible fellowship of all who are trying to follow Christ, as the Church, are perfectly justified in maintaining that their position is associated with the doctrines of primary importance already indicated. But in using the term secondary with regard to the Sacraments, the Ministry, and the Church, reference is made to those who claim one or all of these institutions to be of vital importance to Christianity.

The Sacraments may be regarded as symbolic of those spiritual laws associated with praeter-nature, and many Christians find the solemn service of Holy Communion a real inspiration in life. It must not, however, be forgotten that equally sincere Christians do not find the same source of inspiration in that Office; but both groups are attempting to live in a harmony with praeter-nature, which finds expression in fellowship with a God of Love. Within this position of secondary importance room can be found for the experience of the Quaker and also for those who appreciate the uplifting atmosphere of the Eucharist.

The inevitable consequence of the proclamation of the fundamental doctrines which centre round the teaching of Jesus of Nazareth, was that certain men gave up much of their time to making known the Good News that had changed their outlook on life. The early disciples and Paul at any rate seem to have retained a living interest in their respective callings. As years

passed and the organization became more elaborate, whole-time officials were necessary and so the Ministry as a definite vocation was made possible and for centuries this included the work of scribe and teacher. The interpretation of this fact of the Christian Ministry varies widely, but it is, at any rate in many circles, being admitted more and more that such a doctrine as Apostolic Succession can hardly be classed as of vital importance. There is an increasing desire to recognize the Christian Ministry as one demanded by law and order, rather than a question of Orders. That such a view is controversial will not, of course, be denied, but it is supported by many sincere Christians—clerical as well as lay—and this together with the controversy which has centred round the idea of the Christian Ministry seems to suggest that here once more we are dealing with a doctrine of secondary importance.

If we are correct in maintaining that the doctrines of the Sacraments and of the Ministry are of secondary importance, then the only vital view of the Church that we can take is the all-embracing one which includes those whom Christ Himself would include. For any theory of the Church that deals with external institutions or with doctrines of secondary importance is admittedly itself of secondary importance. In the sense of primary importance the Catholic Church is the invisible fellowship of all those who seek to live in harmony with the laws of

praeter-nature along the line of the fundamental Christian doctrines.

(d) AUTHORITY.

In any discussion which raises the relative importance of Christian doctrines, the question of authority must sooner or later be faced. Historically *the Church* is the great authority which had gradually come to a place of precedence before the Reformation, and if one can make the initial mental presupposition, that the dictum of the priest as the mouth-piece of the Church, shall be an infallible guide in any particular circumstance of life, then the question of authority has been faced once and for all and no further discussion is necessary or even possible. But there are many, especially among English-speaking peoples, who cannot take this initial step; in fact, their attitude is a protest against the mediæval conception of placing religion beyond the sphere of lay questioning. The syllabus of Pope Pius IX condemns "whoever says that the Roman Pontiff may and must reconcile himself, and come to an understanding with progress, liberalism and modern culture." It is this attitude of checking modern mentality with the *ipse dixit* of mediæval scholasticism that the spirit of science is prepared to challenge. Ecclesiastical authority, which refuses to recognize the progress of modern knowledge, and which persists in nailing its doctrines to the mast of discarded philosophic and scientific theories, can never

win the respect and allegiance of those who are prepared to go forward in the quest of truth at whatever cost.

But it has become a commonplace of history that if the Roman emphasized an infallible *Church*, the Reformer transferred his allegiance to an infallible *Bible*. Here, however, it is necessary to point out that the subjective element also became evident, because the individual interpreted the Bible which he read for himself. But in the Bible is there to be found this authority which had been claimed for the Church? The question is closely allied to the more comprehensive one of Revelation and Inspiration in general, which includes the authority of the Church, of Reason and of Conscience as well as that of the Bible. It is not proposed to follow the meaning of Revelation further, but to emphasize the place that development and freedom play in any adequate interpretation.¹ The doctrine of an infallible Bible appears to be fraught with as many difficulties as that of an infallible Church.

¹ For a survey see *The Idea of Revelation*, W. R. Matthews. There are three lectures discussing Revelation in relation to Religious History, Development and Freedom. The conclusion reached is that revelation is not theory or formulation or philosophical doctrine, though it may be material for all these. It is, primarily, a doctrine, a part of the presented reality. "Loyalty to revelation may press upon us the duty of revising its expressions, for not only in times past, but to-day and to-morrow, the Christian community has to fulfil its ministry of creative interpretation" (p. 54).

The authority of *reason* has frequently been challenged and we have already seen that those who would support a non-rational basis for religion are placed in a precarious position with regard to the possibility of affirming anything definitely.¹ Aquinas does at any rate recognize this danger in maintaining that the truths of Revelation are beyond reason, but not contrary to reason.²

There is also the authority of the individual *conscience* which must be discussed. In the Liverpool Lecture for 1923 the then Bishop of Ripon considers five propositions. "It is morally wrong to commit murder. It is morally wrong to gamble. It is morally wrong to consume alcoholic drink in any form. It is morally wrong to go to war. The human conscience is an infallible guide."³ The mere statement of these is almost sufficient to show the diverse results which the individual conscience would maintain. Clearly authority cannot be found ultimately in a particular verdict of an individual's conscience.

We are then faced with the failure of an infallible external authority and the failure also of the individual pronouncement—the reasonable position seems to be that of a concensus of Christian opinion. Here at once it will be observed that the individual is sometimes right and the majority wrong; but if this is so, ultimately the individual's point of view becomes the

¹ *V. supra*, p. 149.

² W. R. Matthews, *Idea of Revelation*, p. 18.

³ T. B. Strong, *Authority*, p. 11.

concensus of opinion of a later age (for example, the attitude of Christians to the Slave Trade). But what is the concensus of Christian opinion? Here we are apparently come back in a circle to the Doctrines of Primary Importance with which we began, for in these doctrines of God, of man, of the relation of man to God and of Immortality, Christian opinion at the present day would be fairly unanimous. But such a position raises a further question of finality.

(e) FINALITY.

Are we here dealing with what may be described as the permanent element in Christianity? William of Auvergne recognized the possibility of progress and permanence.

“With Judaism and Mohammedanism William contrasts Christianity as the perfect and final religion. Here alone we find realized the two conditions of a strictly universal religion; the permanence which comes from simple yet unchanging doctrines, the variety which allows the freest play to the changing capacity of the individual. In the Catholic Church there is room for every virtue and for every gift, for the simple believer as well as for the most learned sage. Uniting thus in itself both progress and permanence, Christianity shows itself to be the final religion.”¹

Presumably most Christians will admit a permanent or final element in their religion, but it is interesting to read the following extract in the *Rationalist Press Association Annual* for 1919.

¹ W. A. Brown, *The Essence of Christianity*, p. 81.

“The Gospel miracles . . . are the veriest trifles compared with the authentic, undeniable miracle of Christianity’s mere existence. . . . Subjected to a bombardment of unexampled violence from every point of the material and moral universe, it shows never a sign of surrender. . . . Blown sky-high to-day, it presents an unbroken and smiling surface to-morrow. . . . No other religion, be it remembered, is subjected to anything like the same ordeal. . . . It is the survival of Christianity in the realistic atmosphere of the West that is such an amazing and impressive phenomenon. Defences it has none; its last bastions were pulverized at least a generation ago. But still it rears its head, serene, arrogant, undismayed. . . . It is just here that we find ourselves face to face with the miracle. Discredited beyond expression—historically, intellectually, morally bankrupt—Christianity is nevertheless as prosperous to all appearances as ever it was.”¹

Does not the concensus of opinion reveal the permanent nature of those doctrines of primary importance which set forth the laws of praeter-nature in their relation to human conduct? And is not this the abiding authority for which we have been looking? But further, besides permanence there must be progress and there is the task of interpretation and application in different ages, and among different types of individual. As the horizon of Western knowledge increases and as the mysticism of the East brings her contribution, so will the Spirit

¹ Quoted in the Introduction to Bouquet, *Is Christianity the Final Religion?*, pp. 7-8.

of Love and Service and Humanity, which Jesus proclaimed, find its consummation in a world which has learned to treat men as brothers because it has also learned to cry Abba Father.

PART III

Implications with Respect to
Religious Thought

CHAPTER XI

THE IDEA OF GOD

CHAPTER XI

THE IDEA OF GOD

(a) THE APPARENT WORLD.

Abstractions of Space and Time.

(b) THE RECOGNITION OF VALUE.

Abstractions of Truth, Beauty and Goodness.
Praeter-nature.

(c) THE IDEA OF PURPOSE.

Present Positions in Cosmology.
Atomic Theory.
Evolution.

Restrictions of Science.

Purpose.

NOTE "C."—Purpose and Personality.

CHAPTER XI

THE IDEA OF GOD

THE idea of God must occupy an important position in any attempt to place religious belief in a definite philosophical background. It is the purpose of the present chapter to indicate a line of approach to the theistic position, starting from a realist rather than idealist outlook, and assuming the implications of Chapter VII with regard to Whitehead's philosophy and the relatedness of nature. We shall find that the position reached can best be described under the broader designation of idealism suggested by Kemp Smith.¹ Starting then from the realist outlook, the following method of treatment will be adopted:

- (a) The Apparent World.
- (b) The Recognition of Value.
- (c) The Idea of Purpose.

(a) THE APPARENT WORLD.

The use of this term is not meant to raise, at the outset, the problem of appearance and reality. By apparent world is to be understood the world of events (i.e. happenings) in which

¹ *V. supra*, p. 123.

we find ourselves—tables, animals, sunsets, accidents.

Our first impulse in describing this apparent world is to refer to a two-termed relationship such as grass is green, and in so doing we are following the general lines of the Aristotelian logic. But Whitehead has pointed out that this simple treatment with its emphasis on subject and attribute is far from accurate. Our cognizance of events may be by adjective or by relatedness, and it is the second which receives support from the philosophical aspect of the theory of relativity. This tendency to break with the philosophical background of mediæval thought is characteristic of the modern scientific outlook as a whole.

Cognizance by relatedness and by adjective correspond respectively to the uniform significance of events and the contingency of appearance. Bearing in mind this distinction, which was developed in Chapter VII,¹ we must also remember the method of extensive abstraction which should be employed in our attitude toward the apparent world. Starting with this apparent world, we may make abstractions such as those indicated in the illustration of the moving train.² We saw that there are different types of extrinsic character of convergence which lead to the approximation to different types of intrinsic characters as limits. The ideal minimum limits

¹ *V. supra*, pp. 127-130.

² *V. supra*, pp. 53-54.

of events were called "event particles." Space and time themselves are abstractions from the more concrete event. So from this apparent word with which we are faced, we make abstractions of space and time, and we can arrive at results of a physical nature such as densities, specific gravities and types of material.

This is, of course, very different from the absolute space and time of Newtonian mechanics, but is in agreement with the outlook of modern relativity which insists on the interconnection of space and time. But this abstraction of space and time from the world of events is by no means the only abstraction that can be made. Whitehead's illustration of the method of extensive abstraction with regard to the moving train has already been quoted. Let us consider the background of the events of the moving train and attempt to describe this part of the apparent world in greater detail.

(b) THE RECOGNITION OF VALUE.

Let us suppose that the train is passing over a viaduct which crosses a deep gorge in the midst of well-wooded, mountainous country. In addition to the abstraction already described, we may be conscious of the usefulness of the viaduct from a commercial standpoint, or of its reliability in withstanding the storms of winter. From the apparent world spread out before us our abstractions no longer deal with merely quantitative measurements, but the idea of value

becomes prominent and we make certain judgments as to usefulness and reliability. From the point of view of a commercial proposition we come to the conclusion that the spread of events before us justifies the description of the viaduct as useful. But we cannot describe usefulness as an event, for we cannot assign to it time and place in the ordinary spatio-temporal continuum of nature. We are thus aware of an entity which is an abstraction from something more concrete (i.e. embedded) than the events of the apparent world.¹

We may go further and try to appreciate the relation of this particular building to the general knowledge of natural law which it presupposes; for example, the efforts of man's reason in attempting to understand the relations between stresses and strains in various kinds and shapes of material. We may, on the other hand, attempt a classification of flora or fauna in the vicinity with the intention of testing their support of, say, a theory of evolution. In both cases our judgments of usefulness and reliability have been replaced by something more embedded—the idea of truth. Truth is not an event, it is not a happening, it cannot be associated with a definite place and time in our

¹ Hitherto we have been dealing with sense-awareness; in this section (The Recognition of Value), awareness is used in its broadest sense for consciousness of factors within fact. Whitehead puts the distinction thus: "Divest consciousness of its ideality, such as its logical, emotional, æsthetic and moral apprehensions, and what is left is sense-awareness" (*The Principle of Relativity*, p. 20).

spatio-temporal continuum—we are dealing with an entity which although connected with the apparent world of events is not an event; it is beyond nature, more embedded or concrete.

The same admission must be made in the case of beauty. There is the æsthetic admiration of the majesty and grandeur of the whole panorama, and, perhaps, the added awe and reverence frequently experienced when the distant mountains are tinged by the rays of the setting sun; there is also with many, the sense of nearness to some great spiritual presence, and these emotions cannot be described as events, although they are associated with events. Here again the ideas which have emerged in the development of the doctrine of the relatedness of nature, suggest that as in the case of truth, this sense of beauty must be associated with the beyond or *praeter-nature*.

Suppose now that we become aware of the following incident—a man deliberately places an obstruction on the line with the intention of wrecking the train, a railway employee working at a considerable height in the cutting sees what has taken place, and in order to save time, risks life and limb by clambering down the almost impossible gradient and clears the line just as the train approaches, but is himself hurled back and killed as the express rushes past. What do we abstract from the events in this case? We have a definite feeling of right and wrong with regard to the two actions. We despise

the bad and admire the good; but this judgment of goodness cannot be placed accurately in space or time, but together with truth and beauty must be described as beyond nature. In the good act there are also other entities involved—such as love, self-sacrifice and honour; the man may not be conscious of them at the time, but they presuppose the ideals of the civilized community in which he lives and which have guided the moulding of his character. Love for others is prepared to give even life itself in the spirit of self-sacrifice, and honour demands that having seen the need of help an attempt must be made to answer the call. But all these can only be associated with the events of our daily lives, they are not capable of being accurately “placed” in our spatio-temporal continuum.

The twofold cognizance of the events of the apparent world with which we began, involving the general idea of relatedness and consciousness of factors within fact, have led us to a “praeter-nature” and the recognition of values. “Nature is an abstraction from something more concrete than itself which must also include imagination, thought and emotion.”¹

(c) THE IDEA OF PURPOSE.

We have seen how the theory of relatedness implies a praeter-nature, and our knowledge of the apparent world, together with the recognition of value, lead us to raise the question of the

¹ Whitehead, *The Principle of Relativity*, p. 63.

possibility of purpose, the word being used in its everyday sense. It is important to bear in mind that the apparent world and the world of value cannot be separated but are both involved in awareness.¹

With this idea of the relatedness of nature to a praeter-nature, it will be convenient to survey briefly the present position of science with regard to cosmology, atomic theory, and evolution.

It is, of course, impossible to give any detailed description, but it is worth while pointing out how the outlook of the eighteenth century differs from that of the twentieth. Astronomers of the former period were mainly concerned with verifying Newton's law of gravitation; the planets of the solar system and their orbits afforded material for so doing; the unity of this system at any rate was in process of being realized. The foundations of the modern outlook were laid by Herschel; he discovered that the sun and his planetary system, including the Earth, were moving through space relatively to the so-called "fixed stars"; and so the recognition of the Sun as a star among a vast number of stars (a minimum estimate is 75,000,000, a maximum 1,000,000,000) has come to be accepted. Work like that of Kaptegn with regard to two main directions of stellar drift, and H. N. Russell's division of stars into giants and dwarfs, and Dr. Shapley's researches into stellar distances,

¹ *V. supra*, p. 204, footnote.

have all emphasized the immensity and complexity of the stellar Universe in which the status of the Earth may assume that of a "dwarf planet revolving round a dwarf star."¹

The gradual extension of the application of Newton's law throughout the stellar system and the important discoveries by means of the spectroscope, of elements in gaseous form in individual members of the system, which are also present here on the earth, have led to an emphasis on the *oneness* of the Universe. As we have already seen, the formulation of the principle of relativity has solved hitherto unexplained astronomical observations, but it also has emphasized the idea of unity:

"The theory of relativity has passed in review the whole subject-matter of physics. It has unified the great laws, which by the precision of their formulation and the exactness of their application have won the proud place in human knowledge which physical science holds to-day. And yet, in regard to the nature of things, this knowledge is only an empty shell—a form of symbols. It is knowledge of structural form, and not knowledge of content. All through the physical world runs that unknown content, which must surely be the stuff of our consciousness. Here is a hint of aspects deep within the world of physics, and yet unattainable by the methods of physics. And moreover, we have found that where science has progressed the farthest, the mind has but regained from nature that which the mind has put into nature.

¹ A short description is given in Dr. Macpherson's paper on "The Universe as revealed by Modern Astronomy," *Modern Churchman*, Vol. XIV, p. 257 ff.

"We have found a strange footprint on the shores of the unknown. We have devised profound theories, one after another, to account for its origin. At last, we have succeeded in reconstructing the creature that made the footprint. And Lo! it is our own." ¹

This relation of the Universe to mind has already been discussed; ² at this stage, so far as cosmology is concerned, we are dealing with traces of mind; nature may be described as significant of mind. ³

The position in atomic theory is equally complex; the tiny atom in itself is something of a miniature reproduction of the solar system; the nucleus corresponding to the sun, and the electrons to the planets, the separation between them in proportion to their size being greater than the separation between the planets and the sun:

"During the latter half of the nineteenth century it was generally accepted that the atoms of the chemist and physicist were permanent and indestructible, and were uninfluenced by the most drastic physical and chemical agencies available. The existence of elements in the earth that appeared to have suffered no change within periods of time measured by the geological epochs, gave a strong support to the prevailing view of the inherent

¹ Eddington, *Space, Time and Gravitation*, pp. 200-1.

² *V. supra*, pp. 143 ff., "Principle of Identification."

³ Compare Whitehead, *Principle of Relativity*, p. 20. "So it is perfectly possible to hold, as I do hold, that nature is significant of ideality, without being at all certain that there may not be some awareness of nature without awareness of ideality as signified by nature."

stability of the elements. The discovery at the beginning of the twentieth century that the radio-active elements, uranium and thorium, were undergoing a veritable transformation, spontaneous and quite uncontrollable by the agencies at our disposal, was the first serious shock to our belief in the permanency of the elements. The essential phenomena which accompanied the series of transformations soon became clear. The disintegration of an atom was accompanied either by the emission of a swift atom of helium carrying a positive charge, or of a swift electron.”¹

The theory of relativity is applicable in physics as in astronomy and the words of Eddington already quoted include both sciences. The modern conception of the structure of the Universe and the structure of the atom and the unifying of gravitational and electrical phenomena give the impression of oneness and of an apparent world which is significant of mind.

There still remains the question of the origin of man and how he came to an appreciation of value, and so far as religious thought is concerned, of moral value in particular. The word evolution has certainly been used to explain nearly every phenomenon in the Universe and it is necessary to realize the modern position in anthropology with regard to the application of this principle. Some idea of the meaning of this principle has already been indicated.² The differentiation of

¹ Rutherford—abridged report of a lecture delivered before the Physical Society on June 10, 1921. Quoted in *Cambridge Readings in the Literature of Science*, p. 161.

² *V. supra*, p. 39.

man from the Anthropoids has, according to Professor Carveth Read, been due to the way in which man has become a hunter. "From the addiction of some ancestral ape to animal food, and to the life of a hunter in order to obtain it, then, the special characteristics of Man seem to be natural consequences." ¹

The position of Professor G. Elliot Smith with regard to the part that evolution has played during the historical period, is particularly interesting with reference to the possibility of the emergence of a perfect man during that period.² In *The Evolution of Man* he emphasizes the importance of the cultivation of vision in the evolution of man's intellect. Dealing with the scope of evolution, he writes:

"In 1911 Dr. W. H. R. Rivers uttered a protest against the tendency, to which anthropologists of the present generation seem to be peculiarly prone, to read so-called evolutionary ideas into many events in Man's history and the spread of his knowledge and culture, in reference to which careful investigation reveals no indubitable trace of any such influences having been at work.

* * * * *

"I suppose it is inevitable in these days that one trained in biological ways of thought should approach the problems of anthropology with the idea of independent development as his guiding principle. But the conviction must be reached, sooner or later, by every one who conscientiously, and with an open mind, seeks to answer most of the questions relating to Man's history and achievements

¹ Carveth Read, *The Origin of Man*, p. 28. ² *V. infra*, p. 235.

—certainly the chapters in that history which come within the scope of the last sixty centuries—that evolution yields a surprisingly small contribution to the solution of the difficulties. Most of the factors that call for investigation concerning the history of Man and his works are unquestionably the direct effects of migrations and the intermingling of races and cultures.

“But I would not have you misunderstand my meaning. Nothing could be further from my intention than to question the reality of evolution, as understood by Charles Darwin, and the tremendous influence it is still exerting upon mankind.

* * * * *

“If all the factors in his emergence are not yet known, there is one unquestionable, tangible factor that we can seize hold of and examine—the steady and uniform development of the brain along a well-defined course throughout the Primates right up to Man—which must give us the fundamental reason for ‘Man’s emergence and ascent,’ whatever other factors may contribute toward that consummation.”¹

The ability to profit by experience implies some organ of associative memory; such an organ is actually found in the brain of mammals and this cortical area has been designated by Elliot Smith, the “neopallium.” He regards it as fulfilling all the conditions of the *sensorium commune* and he maintains that “it is unquestionably a ‘unitary organ the physical processes of which might be regarded as corresponding to the unity of consciousness’ (Wm. MacDougall).”²

¹ G. Elliot Smith, *The Evolution of Man*, pp. 17–20.

² For further details *v. op. cit.*, pp. 26–7.

The power of discrimination resides, so to speak, in this neopallium. This ability to learn by experience gave scope for adaptation to varying surroundings and also tended to produce specialization with its consequent committal to one particular kind of life. "But the race is not always to the swift. The lowly group of mammals that took advantage of its insignificance to develop its powers evenly and very gradually without sacrificing in narrow specialization any of its possibilities of future achievement, eventually gave birth to the most dominant and most intelligent of all living creatures." ¹

When a small land-grubbing animal—judging the outside world primarily and predominantly by its smell—left the ground and took to an arboreal life the guidance of the olfactory sense lost much of its usefulness, but such a life would be favourable to the high development of vision, touch and hearing.

With the diminution of the olfactory apparatus there is the development of a considerable neopallium. The increased power of sight would be accompanied by curiosity in examining objects and hence would arise "an organ of attention which co-ordinated with the activities of the whole neopallium so as the more efficiently to regulate the various centres controlling the muscles of the whole body." ²

Professor Elliot Smith develops his argument with regard to the origin of man, and the following

¹ *Op. cit.*, p. 28.

² *Op. cit.*, p. 32.

extract is significant with regard to the acquisition of a sense of value:

“Out of the experience gained in constantly performing acts of skill the knowledge of cause and effect is eventually acquired. Thus the high specialization of the motor area, which made complicated actions possible, and the great expansion of the temporo-parietal area, which enabled the Ape-Man to realize the ‘meaning’ of events occurring around it, reacted one upon the other, so that the creature came to understand that a particular act would entail certain consequences. In other words, it gradually acquired the faculty of shaping its conduct in anticipation of results.”¹

The essential difference between Man and the Apes is not so far as instincts and emotions are concerned, but in virtue of his enormously heightened powers of discrimination and his ability to profit by experience, Man has learned control to a greater degree than the rest of the mammals. “So far as one can judge, there has been no far-reaching and progressive modification of the instincts and emotions since Man came into existence, beyond the acquisition of the necessary innate power of using the more complex cerebral apparatus which he has to employ.”²

The development of the power of speech and inter-communication is a consequence of this increased power of discrimination, for while still in the simian stage of development Man’s ancestors were already equipped with the

¹ G. Elliot Smith, *The Evolution of Man*, pp. 39-40.

² *Op. cit.*, p. 64.

specialized muscles. Thus traditions and beliefs have grown up to which every human being is exposed.

Professor Elliot Smith tells us that one of his aims in this chapter on Primitive Man is "to protest against the practice of ignoring the vast mass of unimpeachable evidence supplied by human structure and institutions in proof of the reality of the movements of people and the diffusions of culture in the unrecorded past simply because the 'bills of lading' of the ancient shippers who carried these cargoes have not been preserved.

"There is a continuity in the stream of civilization: but it is not by any such 'psychic unity' as the ethnologists have invented that men's efforts have been linked together in a common purpose. The intellectual progress of the world in general has been brought about by the handing on from one people to another of discoveries and inventions, as well as ideas and beliefs, each of which originated in one definite locality." ¹

Such early records as "the representation upon the walls of the Magdalenian Salon noir de Niaux of a bison with four arrows stuck in its flank, pointing towards the heart, proves that the early hunters recognized that the flank was a peculiarly vital spot in the bison's anatomy. But it was not merely the flank as a whole, but the heart in particular, that was regarded as the centre of vitality." ² These early records

¹ *Op. cit.*, pp. 117-18.

² *Op. cit.*, p. 122.

show how beliefs have gradually emerged which have exercised a great influence on the working of the human mind and its recognition of value.

Professor Smith discusses the important part that agriculture and irrigation played in Egypt and Babylonia and man's consequent greed for wealth and power, leading to war and the exploitation of his fellow-men (the works of personal aggrandisement such as the Pyramids are instanced).

The summary at the end of this chapter is of the greatest significance from the religious standpoint:

"In this chapter I have roamed over a very wide field of research; and perhaps the reader may think that I have devoted an undue amount of attention to the business of emphasizing perfectly obvious and commonplace facts. But those who are familiar with the recent literature of anthropology will realize that these matters are precisely those which hitherto have been overlooked in the discussion of Man's early history. The attention of most anthropologists has been so concentrated upon technical matters of controversy that the wider bearings of the knowledge gained have not received the consideration they deserve.

"But the point that I want especially to emphasize is the conclusion which emerges from the investigation of every one of the many aspects of Man's achievements. The explanation of the intellectual and moral outlook of every individual and community is to be sought mainly in his or its history, and not in some blind mechanically working force of evolution. Throughout the course of human history Man's attitude has been determined,

not by the alteration of the structure of the mind, but by the intellectual and moral influences which have been impressed upon each individual's mind by the community in which he lived. Whatever the inborn mental and moral aptitudes of any individual, whatever his race and antecedents, it is safe to say that if he were born and brought up in a vicious society he would have learned, not merely to converse in the language distinctive to that particular group of people, but in all probability to practise vicious habits. The fact that his skull was long or broad, or his hair blond or dark, or the matter of his ancestry, whether he belonged to the Alpine, the Nordic, or the Mediterranean races, would count for little in this process in comparison with the potent moulding force of the atmosphere of the family and the society in which he grew up during the years of his mental plasticity.

“The great factor in all human history has been determined by the consideration that each individual has not really had to work out his own salvation. There has gradually been accumulating throughout the ages a body of arts and crafts, and customs and beliefs, from which each group of human beings has adopted its social equipment. For every human being there has been provided a ready-made supply of opinions and ways of thinking and acting; and in the vast majority of cases these have been accepted without question as proper and natural to accept at their face value. There has been no general or even widespread tendency on the part of human societies to strive after what by Europeans is regarded as intellectual or material progress. Progressive societies are rare because it requires a very complex series of factors to compel men to embark upon the hazardous process of striving after such artificial advancement.

“The history of Man will be truly interpreted, not by means of hazardous and mistaken analogies with biological

evolution, but by the application of the true historical method. The causes of the modern actions of mankind are deeply rooted in the past. But the spirit of Man has ever been the same: and the course of ancient history can only be properly appreciated when it is realized that the same human motives whose nature can be studied in our fellow-men to-day actuated the men of old also." ¹

We have now surveyed briefly modern positions in cosmology, atomic theory and evolution. Is purpose possible?

"The mere fact that the stars can be arranged in an evolutionary sequence from the simple to the complex, from the shapeless cloud of cosmical dust to the steady star, fitted to be the centre of a system of worlds, strongly suggests purpose, cosmos-wide in its scope. What Professor Arthur Thomson says of the organic realm is equally true of the inorganic—"Only a system with order and progress in the heart of it could elaborate itself so perfectly and so intricately. There is assuredly much to incline us to "assert Eternal Providence and justify the ways of God to men." If the Universe hints at the existence of a great causal Power, one Power, one understandable Power, it hints as strongly that this Power is working with purpose according to plan.'" ²

The physicist also finds nature significant of mind:

"He is impressed with the orderliness and beauty of Nature. When he finds that certain things happen in a way he did not expect, he concludes that the laws which

¹ G. Elliot Smith, *The Evolution of Man*, pp. 133-4.

² Macpherson, "The Universe as revealed by Modern Astronomy," *Modern Churchman*, Vol. XIV, p. 268.

he formulated to express how things happen must have been faulty or incomplete; and that it is possible to formulate a law which shall express the facts more accurately. Experience supports him in his view.”¹

The verdict of one qualified to speak with authority on evolution is:

“In conclusion, we may say that all life is essentially striving or struggle, and that evolution in the true sense is the result of an increasing endeavour of living things to adapt themselves to a changing material environment. It has nothing to do with the so-called evolution of Herbert Spencer—the collapse of an unstable homogeneity into a more stable heterogeneity such as he supposes took place when a nebula gave rise to a solar system; true evolution is a vital phenomenon and is not capable of any mechanical explanation whatever.”²

The discussion of purpose rightly lies outside the provinces of the various branches of science. Although the astronomer may be impressed by the order of the Universe, the science of astronomy deals with observation and theory concerning phenomena rather than the purpose or personality behind them.

Mr. Calvert tells us that the physicist “does not consider the question of a Creator and His

¹ Calvert, “The Development of Modern Ideas of the Structure of Matter,” *Modern Churchman*, Vol. XIV, p. 370.

² MacBride, “Evolution a Vital Phenomenon,” *Modern Churchman*, Vol. XIV, p. 245. For discussion of the position that evolution can never lead to finality, see a Paper by W. R. Matthews, “The Finality of Christianity,” *Modern Churchman*, Vol. XII, pp. 365 ff.

purpose; not because he does not believe in a Creator, but because he feels that he will make more progress in his work by confining himself to observing what happens, and trying to correlate it. He feels that he cannot apply the only sort of test which he recognizes in physics, to the question of the existence and nature of a Creator; no such proof is available, and he must approach that question in a different manner by way of religious experience. I think the best expression of this attitude is given by the words of Tyndall in speaking of perhaps the greatest physicist, Michael Faraday:

“He believed the human heart to be swayed by a power to which science or logic opened no approach, and right or wrong, this faith held in perfect tolerance of the faiths of others, strengthened and beautified his life.”¹

The same restriction with regard to the nature and content of his work is maintained by Professor Elliot Smith:

“In attempting to attain conciseness of expression I have used teleological phraseology in many places merely as a matter of convenience, and not from any idea of accepting Teleology.”²

But although the various branches of science have their self-imposed restrictions, it is a duty of philosophy to collate their results and to venture into a discussion of the praeter-nature which has been found necessary.

¹ Calvert, *Modern Churchman*, Vol. XIV, p. 370.

² G. Elliot Smith, *The Evolution of Man*, Preface, p. vi.

At this stage a useful survey of the results of scientific investigation may be made:

“(1) Each branch of science finds something beyond its own proper range, which will not yield to its methods, but which *may*, on the other hand, contain the explanation of what goes before.

“(2) We know purpose in ourselves as a directive which shapes our activities towards ends, and we treat it as if it were conscious. That these activities are also shaped by influences of which we only become conscious subsequently or not at all is true, though not till lately have we begun to realize in how great a measure. We find this purpose directed to our own comfort and well-being, though the criteria of these change entirely as we develop. At first individual desires are paramount, but at last they come to be merged in something else—in love and unselfishness.

“(3) In the lower organisms we find a similar desire to control circumstance instead of being controlled, unconscious at first, but becoming more and more individual, and gradually crossing the threshold of consciousness.

“(4) But side by side with this tendency to an individualism, in the lower organisms, directed to self-ends, we find a race-phenomenon directed towards the evolution of the race. Not being individual this remains necessarily unconscious, though it is altruistic. Only in man do these two diverging streams, which spring from the very character of life in its simplest manifestations, converge again, being unified by the activity of consciousness, and issuing in unselfish love and public spirit.

“(5) We see the origin of both streams in the basal tendency of living matter to utilize the fact that no physical system is completely closed in arresting in part

the katabolic tendency of the physical world, storing up energy for its own advantage." ¹

Now in using the term purpose we are expressing something which corresponds to a part of our own experience. We are conscious of doing certain things with an end in view; mind and purpose are inter-related. One of the characteristics of mind might be described as the ability to use the phrase "in order that" and it is equally true that purpose without a mind that purposes is unintelligible. We may go further: purpose presupposes personality, for in every case in our daily lives when we use the term purpose, we presuppose a person associated, possibly remotely, with the purpose in question.²

The various sciences find that nature yields to treatment by mind—nature is significant of mind—but mind and purpose cannot be dissociated, and hence it seems reasonable to adopt a teleological view of the Universe. Again, it seems a reasonable step to the deduction that behind the purpose there is a Personal God, "Who purposes something, and makes its achievement possible, leaving the living organism free to achieve it if and as it will. If there be a Personal God this is what one would expect, for personality

¹ S. A. McDowall, "The Possibility of Purpose," *Modern Churchman*, Vol. XIV, pp. 250-1. The reference in para. (5) is to the contrast between the physical system which is katabolic, and organic life which tends to build up and which is capable of adaptation and evolution.

² V. Note "C," *infra*, p. 223.

seeks fellowship, or love; and love cannot be compelled or made, but must grow and move of its own free volition. Personal beings who shall love God cannot be made; they must make themselves in their environment. But the purpose they themselves achieve helps them to see the bigger purpose in the whole, and leads them to closer understanding of, and union with, the Personality of God." ¹

NOTE "C"

PURPOSE AND PERSONALITY

The position adopted in this chapter, namely that purpose presupposes personality, has of course been challenged. Julian Huxley refers to "a common fallacy—the ascription of personality to God on the ground that a purpose exists in the Universe." ² Let us examine this "fallacy" more closely. As an example, consider the problem of the form of the cells of bees. Gregory (*Examples*, p. 106) makes the following interesting remark:

"Maraldi was the first who measured the angles of the faces of the terminating solid angle, and he found them to be $109^{\circ} 28'$ and $70^{\circ} 32'$ respectively. It occurred to Réaumur that this might be the form, which, for the solid content, gives the minimum of surface, and he requested Koenig to examine the question mathematically. That geometer confirmed the conjecture: the result of his calculations agreeing with Maraldi's

¹ McDowall, *op. cit.*, p. 255.

² Julian Huxley, *Essays of a Biologist*, p. 215.

measurements within z' . Maclaurin and L'Huilier, by different methods, verified the preceding result, excepting that they showed that the difference of z' was due to an error in the calculation of Koenig—not to a mistake on the part of the bees.”¹

This is an illustration of the way in which nature is significant of mind, and it is reasonable to use the word purpose with reference to the economy of material used in closing the hexagonal prism. The very use of the word purpose really implies that, from a theistic position, God can be thought of in relation to our space-time system, in the same way that human personality is regarded with reference to purposive action in the same space-time system. This is surely a reasonable view, for after all, in the nature of things, we can only be concerned with the aspect of reality in relation to our present space-time system. What, therefore, Christian theism maintains is that so far as this spatio-temporal system is concerned, God is to be thought of as Personal. With regard to appreciation of reality more concrete than that with which we are concerned in this system, we do not expect to speak with finality as to the ultimate way of describing God. We may agree with Huxley when he says:

“Where we experience only phenomena of one order we cannot hope to reach behind them to phenomena of another order, or to the Absolute.”²

But the statement which precedes these words may be challenged, namely that purpose is a psychological term and “to ascribe purpose to a process merely because its results are somewhat similar to those of a true purposeful process, is completely unjustified, and a mere projection of our own ideas into the economy of nature.”³

¹ V. J. Edwards, *Differential Calculus*, pp. 404-5.

² J. Huxley, *Essays*, p. 216.

³ *Op. cit.*, pp. 215-16.

This position seems to be beset with greater difficulties than the Christian idea of a Personal God. For when we start divorcing the idea of purpose from a process whose results certainly seem similar to those of a true purposeful process, we surely do not know where we stand with regard to the meaning and the use of our terms.

Unless we are prepared to give up the idea of discussion altogether, we must accept this present order as we find it; we cannot remove ourselves from our spatio-temporal system, and our only way of progress is to realize that we must inevitably use language which relates to the present order.

Huxley's introduction of the "projection" idea does not seem to carry us very far, for it suggests that somehow we are *outside* the system, and where we thought we had discovered purpose and the personality of God, we are really only projecting into the system ideas of our own with regard to purpose and personality. But really we are *in* the system, so we cannot talk about the "mere projection of our own ideas into the economy of nature." Presumably Huxley would admit there must be something to project; what Christian theism submits is that in reference to the Universe as a whole, it is reasonable, so far as this spatio-temporal system is concerned, to believe in a personal God, in order to explain the traces of purpose in nature and its significance of mind. Such a position makes possible both the feeling of awe and consciousness of the Unseen which is sometimes experienced, for instance in the sunset,¹ and also the doctrine of fellowship with God which we have seen to be of primary importance in Christianity.²

The doctrine of "projection" and of the mind merely reading into nature its own ideas, seems only to be of

¹ *V. supra*, p. 205.

² *V. supra*, p. 187.

importance in connection with the statement that nature is significant of mind; these are certainly not arguments against a theistic position. It would appear more reasonable to think of these matters along the line of Eddington's Principle of Identification.¹ The boy who has studied geometry up to Pythagoras' Theorem, may, in a work on higher mathematics, identify some trace of the properties of the squares on the sides of right-angled triangles; but only in a very restricted sense would it be reasonable to suggest that his ideas were projected into the book or that the reference was imposed by his mind. But it would be reasonable to say that the book on higher mathematics was significant of mind so far as he was concerned.

The treatment of purpose by Sorley² rather suggests the emergence of purpose at some stage in development, but the line adopted above, namely that of making the whole of nature significant of mind and purpose, seems to present less difficulty than maintaining merely a mechanistic view with regard to certain quantitative phenomena.

¹ *V. supra*, pp. 143 ff.

² Sorley, *Moral Values and the Idea of God*, Chapter XVI.

PART III

Implications with Respect to
Religious Thought

CHAPTER XII

THEOLOGICAL IMPLICATIONS AND
THE FUTURE

CHAPTER XII

THEOLOGICAL IMPLICATIONS AND THE FUTURE

ATTEMPT TO SUMMARIZE.

(a) THE FACT OF SIN: RELIGION.

Broken Harmony.

Forgiveness.

Fellowship.

(b) THEOLOGICAL METHOD.

Inclusiveness. Mater Scientiarum.

Dogmatism.

The Place of Reason.

Emphasis on Spiritual Values.

(c) THEOLOGICAL CONCLUSIONS.

The Individual.

Relativity of Doctrine.

Statements about God.

(i) Rationality.

(ii) Transcendence and Immanence.

(iii) Providence and Prayer.

(iv) Eternal Life.

(d) THE FUTURE.

Simplicity.

Creeds.

Reunion.

CHAPTER XII

THEOLOGICAL IMPLICATIONS AND THE FUTURE

IN the previous chapter an attempt was made to develop the theistic argument with a background of philosophy based on the theory of the relatedness of nature. The object of the present chapter is to summarize the implications of the principle of relativity on the theological side, both as to method and conclusions. There is however one central fact which must be recognized in any attempt to give a philosophical background to religious thought in the language of the twentieth century; this fact is the consciousness of sin.

(a) THE FACT OF SIN: RELIGION.

The line of approach which we have traversed so far, leading from a consideration of the Apparent World to Recognition of Value and the Idea of Purpose, has suggested a reasonable theistic position, which seems to involve belief in a Personal God. Our own judgments of values and our ideas concerning purpose suggest further that this Personal God is good and purposes

good.¹ Such a theistic position must be closely related to what science demands, namely, a praeter-nature which must include imagination, thought and emotion.² The way in which man's ancestors adapted themselves to a physical environment is seen in the story of evolution. With the consequent development of the brain, discrimination, skill and recognition of value

¹The following extracts from Julian Huxley's essay on *Progress, Biological and Other*, are significant.

"St. Paul wrote that all things work together for good. That is an exaggeration: but they work together so that the average level of the good is raised, the potentialities of life are bettered. In every time and every country, men have obscurely felt that although so much of the world, taken singly, was evil, yet the clash of thing with thing, process with process, the working of the whole, somehow led to good.

"This feeling is what I believe is clarified and put on a firm intellectual footing by biology. The problems of evil, of pain, of strife, of death, of insufficiency and imperfection—all these and a host of others remain to perplex and burden us. But the fact of progress emerging from pain and battle and imperfection—this is an intellectual prop, which can support the distressed and questioning mind, and be incorporated into the common theology of the future" (*Essays of a Biologist*, p. 61).

He comments on Dean Inge's Romanes Lecture, *The Idea of Progress*: "He has been so concerned to attack the dogma of inherent and inevitable progress in human affairs that he has denied the fact of progress—whether inevitable we know not, but indubitable and actual—in biological evolution; and in so doing he has cut off himself and his adherents from one of the ways in which that greatest need of man which we spoke of at the outset can be satisfied, from by far the greatest manifestation in external things of 'something, not ourselves, that makes for righteousness'" (*Essays of a Biologist*, p. 62).

² *V. supra*, p. 206, footnote.

emerged and gradually man was faced with the task, not merely of adapting himself to a physical environment but also to an environment which was beyond the apparent world. His ancestors would adapt themselves to the *laws of the physical Universe*—such as gravity—by long and doubtless painful experience of the effects of disregarding these laws (in the same way that an infant learns to walk). With regard to adaptation to the *laws of praeter-nature* (which, by the way, could only be attempted when a recognition of value had been reached) involving sense of right and wrong, the process must have been very gradual. During the last sixty centuries we have some record of man's effort to adapt himself to the Universe as a whole, including praeter-nature, and Professor Elliot Smith has shown how the effect is due to the influence of environment and migration, rather than by analogy with biological evolution.¹ In this human record one thing stands out very clearly, namely that in the effort to adapt himself to the praeter-nature as well as to the visible Universe, man has been conscious of a distinction between right and wrong. In other words, the fact of sin has obtruded itself. The religious side of man's nature has attempted to deal with this consciousness of sin. Religion has been defined as "the attempt to live in harmony with the Universe as a whole,"² and the unpleasant fact of sin which makes he

¹ *V. supra*, pp. 211 ff.

² *V. supra*, p. 2.

harmony difficult, if not impossible, is naturally dealt with in the great world religions.

Judgments of value, and especially moral value, would lead to speculation about the unseen forces in life and to the characteristic features of animism.¹ Ultimately with belief in gods

¹ J. Estlin Carpenter, *Comparative Religion*, pp. 54-5: "From continent to continent a multitude of observers have gathered an immense range of facts, which show that amid numerous differences in detail the religions of the lower culture may all be ranked together on the basis of a common interpretation of the surrounding world. Philosophy suggests that man can only explain nature in terms of his own experience. He is encompassed by powers that are continually acting on him, as he to a much smaller extent can in his turn act on them. By various processes of observation and reflection (page 85) he comes to the conclusion that within his body lives something which enables it to move and feel and think and will until at death it goes away. To this mysterious something many names are given, and for purposes of modern study they are all ranked under the term 'spirits.' This explanation is then applied to the behaviour of all kinds of objects within his view; though it does not at all follow that this was actually the first explanation. The animals that are stronger and more cunning than himself, the trees that move in the wind, the corn that grows so mysteriously, the bubbling spring, even the things that he himself has made, his weapons, tools and jars, all have their 'spirits,' so that the entire scene of his existence is pervaded by them. To this doctrine, with its many branches of belief and practice, Sir E. B. Tylor, in his classical work on *Primitive Culture* (1871) gave the name of 'Animism' and the religions founded upon it are called 'animistic' or sometimes, from the multitude of unorganized spirits which they recognize, 'poly-daemonistic' religions.

"Such religions belong to no specific ethnic group. They appear either in existing practice or in the shape of occasional

there would emerge the desire to propitiate an offended deity and the piacular element in sacrifice would be prominent.¹ During this period of striving to live in harmony with the Universe as a whole, various thinkers and leaders (like the prophets of Israel) would tend to direct the thought and life of their times; particularly would guidance be needed with regard to praeter-nature and consciousness of sin.

At this point it is desirable to look more closely at this question of sin and its consequences, and also at the meaning of punishment and forgiveness.² Regarding sin as failure to live in harmony with the Universe as a whole, we see that a man who breaks a law associated with praeter-nature which he recognizes, may have some physical disability in consequence, but in any case there is the consciousness of having failed to live in harmony with that particular law demanded by praeter-nature. Or in other words, whatever physical results there may be, fellowship with God is felt to be difficult or

survivals in all of the three great racial divisions of mankind—the white or Caucasian, the yellow or Mongolian, the black or Negroid. They are to be found under the Equator and among the Arctic snows.”

¹ The influence of the Canaanitish sacrificial element on the religion of Israel is strongly denounced by eighth-century prophets (*v.* R. H. Kennett, art. “Israel,” *Enc. Religion and Ethics*, Vol. 7, pp. 440 ff.).

² V. C. F. Russell, *Religion and Natural Law*, Hulsean Lectures, 1922–23. Lecture III, “The Doctrines of Punishment and Forgiveness.”

impossible. The punishment is not an arbitrary reward, but the inevitable consequence of breaking faith with the Universe as a whole (just as the punishment of touching a live cable is the shock received and is quite apart from an arbitrary award for violating the warning "Danger. Do not touch.") Forgiveness does not directly affect the physical consequences of sin, but it has a profound bearing on the sense of failure, loss of self-respect and interruption of friendship with God, consequent on having broken a law of praeter-nature. The teaching of Jesus is that God forgives when man is truly penitent, and it is along this line that His Life can be looked upon as making atonement possible rather than along the line of His death being an "offering" for sin.

But this brings us to a discussion of the Doctrines of the Incarnation and the Person of Christ and the place which they occupy in the scheme developed so far.

The natural way of dealing with the uniqueness of Christ's sinless life would be to regard Him as the ultimate expression and goal of evolution. But a difficulty arises at once as to why such a goal should be reached in the course of the process rather than at its end. Simpson in dealing with this difficulty quotes Joseph Le Conte:

"In organic evolution *species* are transformed by the *environment*. In human evolution *character* is transformed by *its own ideal*. . . . Organic evolution is *pushed* onward and upward from behind and below. Human

evolution is *drawn* upward and forward from above and in front by the attractive force of ideals. Thus the ideal of organic evolution cannot appear until the end; while the attractive ideals of human evolution *must* come—whether only in the imagination or realized in the flesh—but must come somehow *in the course*. The most powerfully attractive ideal ever presented to the human mind, and therefore the most potent agent in the evolution of human character, is *the Christ*.' ”¹

This position would appear to correspond to the distinction already drawn between adaptation to the physical universe and adaptation to praeternature. And if, as Professor Elliot Smith maintains, evolution has not played an important part during the period of recorded human history, then there is *a priori* no apparent reason, given suitable environment, why a Perfect Man should not appear at some stage in this period. For the power of human discrimination having been developed, and given a helpful environment, there is a possibility that in every way—through boyhood, youth and manhood—an individual should battle successfully against temptation and act rightly in every situation. There is only one Life in which this has been accomplished, but the fact of this Life does fit in with the scheme already adopted and with the idea of a Personal God who purposes good. Such a Life would be lived in complete harmony with the Universe as a whole, and this would involve

¹ J. Y. Simpson, *Man and the Attainment of Immortality*, p. 316.

perfect fellowship with God; above all, this Life would be one in which the praeter-nature was not merely recognized, but its laws respected and obeyed. Or, approaching the matter from another standpoint, if God proposed to reveal Himself in human form, the Life which we have been considering would be such a manifestation of Godhead. In other words, Very Man and Very God (in human form) must be identified. This is, according to Dr. Raven, what was overlooked by the Church in its attitude to Apollinarianism:

“What was wanted was a frank recognition that their preconceptions were wrong, a recognition that Very God and Very Man are neither contradictory nor separable, that man is only perfect if perfectly united with God, that Very God for us men at least (and with this alone we are concerned) is necessarily Very Man.”¹

The Divinity of Christ follows then along the line of argument which has been adopted, but, what is equally important, the Humanity of Jesus has been safeguarded, for in the perfect Life which we have contemplated the Individual has Himself “won through.”

The message of such a Life insists, as we should expect, on the importance of those spiritual values such as Truth, Beauty and Goodness, and above all on allegiance to the supremacy of Love. Christ's life, in its self-

¹ C. E. Raven, *Apollinarianism: An Essay on the Christology of the Early Church*, p. 67.

sacrificing love for others, in its sympathy with all the nobler ideals of life which man is capable of discriminating, provides the key to the character of praeter-nature. In His insistence that at the heart of things there is a purpose of love, He was prepared to make the supreme sacrifice. His Life is not only the perfect example, but it can go further, for He can point out the Way that leads to a heavenly Father Who is always ready to restore into the Fellowship of Love the individual who is truly penitent. The Gospel of His Life is surely the way of Atonement. Who is it, after all, who really believes in the Divinity of Christ? Is it necessarily the man who recites the great creeds of the Church? Is it necessarily the man who is associated with one particular form of religious worship? Is it not rather the man whose "whole soul goes out in unreserving acceptance of the supremacy of love"?¹ For he finds, in Christ's life, perfect Manhood, God's purpose and nature expressed in human form.

The question of the permanence of such a Life is really the one at issue in the Doctrine of the Resurrection. An interesting survey of the traditional belief in a bodily resurrection has recently been made:

"Fortunately, in the case of the Resurrection story, we can get behind the Gospel records to an earlier tradition. St. Paul wrote the first Epistle to the Corinthians possibly thirty years before St. Luke's Gospel appeared in its

¹C. F. Russell, *Interpreter*, Vol. 18, p. 114 (Jan., 1922).

present form. In the fifteenth chapter he speaks about the appearance of Christ to himself and to others. 'He appeared to Cephas; then to the twelve; then He appeared to about five hundred brethren at once, of whom the greater part remain until now, but some are fallen asleep; then He appeared to James; then to all the apostles; and last of all, as unto one born out of due time, He appeared to me also.' St. Paul has not one word to say about an empty tomb or a bodily resurrection. On the contrary, to him the Resurrection meant not the resurrection of a corpse but a vision of Christ (*ὄφθη*)—not something material, but something spiritual. The empty tomb, the visit of the women to the tomb, the appearance to the women—all of which play the most prominent part in the Gospel stories of the Resurrection—are not even mentioned by St. Paul. The inference is that he knew nothing about them because they had not, at that time, become part of the traditional story of the Resurrection. St. Paul saw a vision, and that vision convinced him that Jesus had triumphed over death and was with His disciples in spiritual form.

* * * * *

"St. Paul believed that Christ was alive because he and others, like St. Stephen, had had visions of Christ. The evangelists believed that Christ was alive because they believed that the tomb was empty. It was the latter tradition which drew to itself the legendary details of a bodily resurrection and, in course of time, well-nigh ousted the earlier view. 'The empty tomb,' said De Pressense, 'was the cradle of the Church.' That is good rhetoric but bad history. Is it not truer to say that the Church was founded, not upon an empty tomb, but upon a spiritual experience? No man ever had a more intense faith in the Resurrection than St. Paul. If his faith was independent of a legendary story, ours can be equally

independent of that story. If he built his faith on spiritual experience, surely ours can need no other foundation." ¹

The permanence of the higher values of life seems to be required if life is to be at all intelligible, and the permanence of a perfect Life would be exceptionally manifest. Whatever else the phrase "in Christ" may mean to Paul, it does at least denote that the spiritual reality of Christ in his own life made all the difference in his relation to God and the Universe. The verdict of the centuries is that this spiritual reality (the Spirit of Jesus or Holy Spirit in the Acts of the Apostles) can change men's whole outlook on life. Men have felt that He understands the power of temptation in a way which they do not; for they have withstood only up to a certain point and then yielded—He has withstood beyond that point and has not yielded.

Value, Purpose, a Personal God, Incarnation, Divinity, Atonement—these beliefs can be interpreted in relation to the praeter-nature which science demands. Religion, in its fullest sense of being an attempt to live in harmony with the Universe as a whole, finds its highest expression in fellowship with One Who is the Way, the Truth and the Life, and Whose words are still the hope of the modern world. "I am come that they might have Life and have it more abundantly . . . He that hath seen Me hath seen the Father."

¹ J. Todd, "Our Lord's Resurrection," *Modern Churchman*, Vol. XIV, pp. 531-3.

The attempt to place Christian thought in definite relation to modern scientific theory and philosophical outlook has occupied Chapter XI and section (a) of the present chapter. Something of the attitude of realism has been adopted especially with regard to the apparent world; the subsequent treatment of values and praeternature would bring the whole under the term "idealism," provided we use this term in the very wide sense indicated by N. Kemp Smith as covering all those philosophies which agree in maintaining that spiritual values have a determining voice in the ordering of the Universe. In the section dealt with in this chapter, theological implications have become especially prominent. Before attempting any summary of the implications discussed in Part III as a whole, which may have an effect on theological conclusions, it is desirable to discuss the modifications which seem to be indicated in theological method.

(b) THEOLOGICAL METHOD.

The Principle of Relativity has emphasized a theory of relatedness; the "water-tight compartment" method of thought and the division into separate and independent branches of study can no longer be regarded as reasonable. The complex inter-relations and inter-dependence which have become apparent in the doctrine of "significance" and "patience" emphasize what might be termed the *inclusive* method of theological research. It stands in contrast to the

natural and revealed branches of scholastic theology, it responds to the atmosphere of Professor Nairne's inaugural lecture *Mater Scientiarum*. It recognizes the contributions towards ultimate problems which science and philosophy can make, and recognizes that it too can help in solving the difficult and vexed questions of human personality and its relation to the Universe as a whole. This spirit of tolerance and sympathetic outlook is revealed in the concluding paragraph of J. Huxley's Essay on Religion and Science:

"That moulding of matter by spirit is, under one aspect, Science; under another, Art; under still another, Religion. Let us be careful not to allow the moulding forces to counteract each other when they might be made to co-operate."¹

But if the main implication of the principle of relativity is to emphasize this theory of relatedness, another aspect of life has also been revealed. The quotation at the end of Chapter VII² reminds us of the limitation of human intelligence. The achievements of modern science as a whole confirm this, but in the doctrine of time we are faced with one of the most baffling aspects. This attitude challenges any *dogmatism* concerning theories of ultimate reality, and has a distinct bearing on the appeal to *ex cathedra* statemen as such. Is it too much to hope that this may

¹ Julian Huxley, *Essays of a Biologist*, p. 304.

² *V. supra*, p. 139.

be remembered in theological method in the future? It gives the Church an opportunity of re-thinking its position of what must be regarded as the essence of Christianity, so that all sections will be able to recognize the doctrines of primary importance, perhaps along the lines indicated in Chapter X. In this way, recognizing the limitations of human intelligence, Christians may emphasize the teaching of One Who is able to supply human need.

Now these two implications, namely, the theory of relatedness and the limitations of the human mind, raise the whole problem of the *place of reason* in theological method. We have seen ¹ that the only hope of progress is to maintain belief in the fundamental rationality of the Universe; nature is significant of mind, and if we introduce the idea of the irrational at any point, then we simply do not know where we stand, for we are only capable of judging rationally, and hence we are not capable of dealing at all with the irrational. This does not of course mean that theology should necessarily follow the line of proof used in the exact sciences, but it does imply that theological method must not violate belief in the fundamental rationality of the Universe.

Before we leave this subject of theological method, there is an emphasis which is suggested by the *praeter-nature* demanded by the realm of science. It is a reminder of the fact that theology

¹ *V. supra*, p. 149; *v. also infra*, pp. 245 ff.

is essentially dealing with *spiritual values*, and is concerned with the laws of praeter-nature. Recognition of this would certainly have prevented some of the unfortunate dogmatic assertions to which reference has been made in Part I.

(c) THEOLOGICAL CONCLUSIONS.

The claim that was made by Wildon Carr with regard to the problem of solipsism and the principle of relativity suggested the question of the individual character of religious thought; the conclusion was reached that the extreme position taken up by Troeltsch in his later works can hardly be justified.

We saw in Chapter X that the relativity of knowledge which has been emphasized in Haldane's writings has its counterpart in the relativity of doctrine, together with the attempt to define the essence of Christianity and the division of doctrine into those of primary and secondary importance.

It has however become evident in dealing with the works of Carr and Haldane that it is only in the nature of suggestion or general outlook that we can use the word implication with regard to the theory of relativity¹; the same

¹ Bertrand Russell, in the Introduction to the recent translation from the Russian of Professor A. V. Vasiliev's *Space, Time, Motion*, supports the general attitude taken above in dealing with Wildon Carr's and Haldane's positions:

"The theory of relativity—like all sound science—is not based upon any philosophical doctrine but merely upon the

may be said of the corresponding positions in religious thought. When, however, we are dealing with the theory of relatedness and the search for a comprehensive account of observed facts. Nevertheless it gives support to a philosophical doctrine, which is partly old, partly new. The old part of the doctrine is that space and time consist merely of relations; the new part is, that there are not two sorts of relations, one constituting space, the other constituting time, but only one, which will be differently analysed into a spatial and a temporal part according to the point of view of the observer. A good deal of confusion has been introduced into popular conceptions by the name 'relativity,' since Einstein's innovation consists not in the relational theory but in the unification of space and time.

* * * * *

"It must not be supposed that, in the theory of relativity, space and time become 'subjective' in the sense, for example, of Kant's philosophy. The old realism said: Two bodies have a spatial distance, and two events have a distance in time. The old idealism said: These two relations, spatial and temporal distance, do not belong to the bodies or events in themselves, but depend upon the way in which they are perceived. The modern theory says: Both distance in space and distance in time must be taken to be between *events*, but neither is between two events alone; each is relative to some standard string of events which can be interpreted as the motion of a body of reference. This is still within the physical world, and does not involve a percipient. The only intrinsic quantitative relation between two events is their spatio-temporal interval. The arguments as to 'subjectivity' are not affected one way or the other, but they must now be applied to space-time, not to space and time separately. The new physics, like the old, proceeds on a realistic assumption, but the possibility of an idealistic interpretation remains exactly as it was; it is neither facilitated nor rendered more difficult by anything in the modern theory. The only change is that the controversy must be about space-time, not about space and time separately."

general philosophical aspect of Whitehead's treatment of the Principle of Relativity we can use the term implication with fuller meaning, both in the region of philosophy and correspondingly in that of theology. We attempt therefore some description of possible changes in theological conclusions which may be required. As the philosophical system which we have traced is essentially related to the Universe as a whole, it is natural that modification in religious thought will tend to centre round statements about God. In order to show the implications of the theory of relativity we shall consider their bearing on—

- (i) Rationality.
- (ii) Transcendence and Immanence.
- (iii) Providence and Prayer.
- (iv) Eternal Life.

(i) *Rationality*. The position adopted with reference to possible irrational laws,¹ seems reasonable with regard to the nature of God. The traces of mind which we have discovered in the Universe are certainly traces of rationality, and research has been conducted on rational lines. Hence, if we use the argument from design at all, in establishing a theistic position, then God in so far as He is revealed in the present space-time system is rational.

There is the further question of part rationality and part irrationality, as there was in the case of a universe partly rational and partly

¹ *V. supra*, p. 147.

irrational. Here, in relation to God, the same difficulties confront us. If there is the possibility of an irrational element occurring, then we simply do not know how we stand in regard to it. On the one hand, we are part of the Universe and if we are involved in the irrational part, we should not know whether to trust our judgments at all. On the other hand, man has experienced fellowship with God, and if God is partly irrational, the man is once more faced with the position of doubting his own judgments as to whether his fellowship is rational or irrational.

The simplest way out of the difficulty is to recognize that rationality is the presupposition of all thought¹ about the Universe and that God Himself is rational.

(ii) *Transcendence and Immanence.* The line of argument which has been followed, particularly with reference to the relatedness of nature, and the demand of science for a praeter-nature has led to a theistic position. It is not suggested that the implications of the theory of relativity provide solutions to the many complex problems of human life and suffering and their relation to God; indeed, it has already been pointed out² that belief in a God of love is the central act of the Christian's faith. But there has, however, emerged in the discussion involving purpose and personality, a theistic position, in which

¹ *V. supra*, p. 148.

² *V. supra*, p. 186.

God can only be described as transcendent. The significance of nature for mind and the human analogies of purpose and personality make it difficult to believe in a God Who is merely emerging; in fact, our outlook on life can never be satisfied with this idea of development; we insist on attempting to get behind the development. In this way the doctrine of the relatedness of nature and the importance of praeter-nature seem to indicate the theistic position in which God may be described as transcendent.

But the same doctrine of relatedness also suggests emphasis on a theistic position in which God stands in special relation to the spiritual aspects of the Universe. We should expect that the God Who purposes good and Who is in relation to the Universe as a whole, would be manifest in various ways throughout the Universe. The possibility of something corresponding to the friendship and fellowship experienced by the human spirit in relation to others, can hardly be denied in the relation of the human to the divine. To such a God we must also ascribe the idea of immanence. At the end of the *Reign of Relativity* Haldane refers to Spinoza's belief, *Est Deus in nobis*. "Words like these do not call for the recognition of what is supernatural. They relate to what is in final truth natural, and all they claim at our hands is the recognition that what is natural falls within differing orders of reflection, all of which are found to be in ultimate harmony. It is this that seems to have been in substance the

creed, varying in expression but ever indicative of a common faith, proclaimed by some of the greatest guides of mankind in ancient and in modern times. It is a creed that if it be true helps those who can make it their own to dispel obscurities, and to lighten for themselves and for others the burden and the apparent mystery of human life. It is a creed that stimulates the practice of unselfishness in social and religious life, interpreted as fully harmonizing with the dictates of philosophical thought. 'If any man shall do His will, he shall know the doctrine.'"¹

(iii) *Providence and Prayer.* The position of transcendence and immanence just described, naturally raises the question of Providence and Prayer. Does God so control and direct that the individual is guided and protected in answer to prayer? Now prayer in the sense of fellowship with God is, as we have just seen, made possible in the outlook adopted; but the difficulty raised here is rather on the line of intercessory prayer. The mother praying for the son away from home; the story of Monica and Augustine. Does the scheme allow for such results? In this connection the doctrine of relatedness seems to be particularly helpful. The researches of psychology reveal how little we really know at present as to the influence of spirit on matter, mind on mind; but at any rate it has become clear, that in this sphere there is a very important principle of relatedness. Rufus M. Jones deals with the

¹ Haldane, *Reign of Relativity*, pp. 430-1.

possibilities in this direction in *Spiritual Energies in Daily Life*.

The attitude of prayer and fellowship may bring into action forces of praeter-nature of which at present we have but little knowledge; and in this way, along perfectly "natural" lines the lives of others may be affected. If in the progress of research there is discovered something of the way in which prayer acts on the individual—such as by auto-suggestion—the reality of prayer is not thereby affected, any more than gravity is modified by the discoveries of a Newton or an Einstein. Tennyson may still be right in maintaining

More things are wrought by prayer
Than this world dreams of.

(iv) *Eternal Life*. The implications with which we have been dealing have taken into account the significance, so far as religious thought is concerned, of the new doctrine of time. We saw in Chapter VII¹ the way in which the old idea of the unique serial character of time has been modified by the principle of relativity, with its alternate time-stratifications. This at once raises the question of the meaning of the idea of eternal in any temporal sense of "everlasting." For so long as we insist on the temporal idea, to which we have become accustomed in our present spatio-temporal system, we can hardly maintain that we are dealing with ultimate

¹ *V. supra*, p. 132.

reality. The latter is certainly more concrete (or embedded) than the events of the apparent world associated with the present space-time system.

There is no need to point out the significance of this with regard to those doctrines of Christianity which emphasize the temporal aspect; they must surely be classed as of secondary importance. Such a difficult theological question as the pre-existence through all time of the "Logos" assumes a new aspect, for, as Whitehead has pointed out, the doctrine of time brings us face to face with the limitations of human intelligence,¹ and we can hardly expect to describe in adequate terms the precise meaning of the temporal element in a different space-time system from our own.

It may be objected that we have no right then to place the doctrine of immortality in a position of primary importance. But in answer it is pointed out that this does not imply emphasis on the temporal element, any more than on the spatial. The doctrine merely asserts that this life is not the end, and that death is but the entrance to a fuller life. Certainly when we begin to discuss the nature of existence after death, our doctrines of eschatology are rightly placed in the category of secondary importance.

But our Lord uses the term "eternal life" in special reference to life here and now, as being something that the Christian can experience

¹ *V. supra*, p. 139.

while associated with the present order. We have seen how we cannot maintain the unique seriality of time in attempting to deal with ultimate reality.

To-morrow, and to-morrow, and to-morrow
 Creeps in this petty pace from day to day
 To the last syllable of recorded time.

Macbeth¹ is only describing the unsatisfactory thought of a series of successive steps. Eternal life must surely go deeper than such a temporal conception.² There was a time, especially in the Middle Ages, when the spatial idea of a physical resurrection was prevalent. It is, of course, recorded in art; the remarkable series of frescoes portraying a bodily resurrection on the walls of the Santa Campa at Pisa afford a good illustration. We have now given up belief in such a spatially extended existence hereafter; has not the time also come for ceasing to emphasize a temporally extended view also?

The theory of relativity has shown the importance of the event—a combination of space-time; the demands of praeter-nature indicate something more embedded still; can we reasonably expect to find the abstractions of space and time as we know them, in ultimate reality? Is there not profound truth in Von Hügel's idea of Eternal Life?

¹ Act V, Scene 5.

² Compare Bradley, *Appearance and Reality*, p. 207. "By its inconsistency time directs us beyond itself. It points to something higher in which it is included and transcended."

“Eternal Life, in the fullest thinkable sense, involves three things—the plenitude of all goods and of all energizings that abide; the entire self-consciousness of the Being Which constitutes, and Which is expressed by, all these goods and energizings; and the pure activity, the non-successiveness, the simultaneity, of this Being in all It has, all It is. Eternal life, in this sense, precludes not only space, not only clock-time—that artificial chain of mutually exclusive, ever equal moments, but even *duration*, time as actually experienced by man, with its overlapping, interpenetrating successive stages. But Eternal Life precludes space and clock-time because of the very intensity of its life. The simultaneity is here the fullest expression of the Supreme Richness, the unspeakable Concreteness, the overwhelming Aliveness of God; and is at the opposite pole from all empty unity, all mere being—any or all abstractions whatsoever.”¹

Time and space play important rôles in the attainment of this eternal life and they help in the fellowship with God which expresses itself in a life of unselfish action here and now,

¹ Baron F. von Hügel, *Eternal Life*, p. 383. Compare A. T. Swaine (*Expositor*, Eighth Series, No. 118, p. 273), who discusses the bearing of the Principle of Relativity on the Deity of Christ. After a general survey of the implications of Einstein's Theory with regard to the conceptions of space and time, he leads up to the conclusion that “The Deity of Christ has been unconsciously established. ‘Before Abraham was I am,’ and ‘Lo, I am with you always even unto the end of the ages,’ are the unpremeditated observations of One who embraces all events in time and space in His ever present and eternal self. They are the perfectly natural statements of One who is omniscient and omnipresent—very God.”

This conclusion might be challenged, although the idea contained, in reference to God, suggests that of eternal life.

in this present spatio-temporal system. "This is life eternal to *know* Thee the only true God and Jesus Christ Whom Thou hast sent." "If a man will *do* His will, he shall know of the doctrine whether it be of God." As, in this space-time system, we recognized God as Personal and both Transcendent and Immanent, so we realize eternal life as knowledge and love of God revealing itself in love and service of man. "Thou shalt love the Lord thy God . . . and thy neighbour as thyself."

(d) THE FUTURE.

Our survey, brief though it has been, has indicated how, from an unexpected quarter, light may be thrown on some of the obscurities that confront us when we contemplate the spiritual realities and values, of which men become conscious at some period or other in their lives. But what of the future? In what relation do we stand to the challenge of the twentieth century? How will the implications which we have been tracing affect the organized Christianity that is to be?

"What the theology of the future will be like in its detail it is too soon to predict. But of one thing we may be sure. It will be a theology for the people. It will have its roots deep in life, and will utter its message in language so simple and direct that the layman as well as the theologian can understand it. It will address itself to permanent human interests, and present Christ as the Lord and the light of all life. Believing in a present

God, it will find evidences of His presence in the movements of the time, and will take up into its catalogue of sanctities the familiar experiences and duties now too frequently relegated to a lower sphere. Like its Master, it will seek to hallow all of life by carrying into everything the Christian spirit. Above all, it will emphasize service as the true bond of union between God and man—the pathway along which every one must walk who would know the joy which God has reserved for those who love Him.”¹

These words apply with increased force to the present situation of organized Christianity. Simplicity of statement and emphasis on the vital doctrines and their relation to daily life must be the watchwords of the new advance. Yet with this simplicity, there must also be welcomed those researches into the problems of human life and personality which form common ground in the realms of science, philosophy and theology. The function of creeds must not be looked upon so much as a test for excluding persons from membership of a Church, as an expression of religious truth and values. We shall therefore expect modification and re-interpretation in the thought-forms of succeeding ages. There may be something in the suggestion that the creeds of the future will be hymns, like the *Te Deum*, linking the value of the best in the tradition of the past, with the responsibility of the living Church of to-day to interpret its own standards.

The division into doctrines of primary and

¹ W. Adams Brown, *The Essence of Christianity*, pp. 317-18.

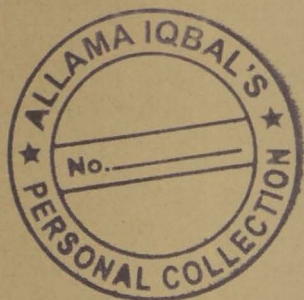
secondary importance which was surveyed in Chapter X has a real bearing on the re-union of Christendom. If some such division could be recognized, then the unity of one Catholic Church, amid the diversity of worship demanded by different environment and individuality, would become more than a Utopian dream. For the immediate present a mutual sympathy and toleration are required, together with a recognition that in the quest for truth which mankind refuses to abandon, there will be needed all the resources of intellect and devotion, that the best in art and science, philosophy and religion, can produce.

In the cemetery of Père Lachaise at Paris, there is the tomb of Blaise Pascal; the visitor may stand at the entrance and peer through the iron bars, and in the dull light there can be discerned lying on the altar, relics indicating the varied interests of the well-known philosopher and mathematician; surmounting the whole is a Crucifix. The building of the City of Truth demands the devotion of the whole of life—mental and physical as well as spiritual. For this, as for the holy city, "They shall bring the glory and the honour of the nations into it."

In the process many theories are being discarded and new hypotheses are taking their place, but still we believe that One Who claims to be the Way, the Truth and the Life, has indeed revealed the Love of a Heavenly Father

which abides through the changing scenes of human activity:

Our little systems have their day;
They have their day and cease to be;
They are but broken lights of Thee
And Thou, O Lord, art more than they.



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