

## 1. Contact between Science and Theology:

### 1.1 Contact vs. Conflict. Many view the relationship as one of conflict.

1.11 There are a number of realms in which the two disciplines of science and theology make contact with each other, but their contact is not to be viewed as a conflict.

1.12 This does not exclude instances and possibilities of conflict but just as areas of conflict between branches within science often leads to greater advancement, so areas of disagreement between science and theology should lead to fruitful dialogue. e.g. Conflict of physics with geology and biology over the age of the universe. If we are ready to accept temporarily the existence of inconsistencies within science itself, we ought not to be worried about occasional occurrence of inconsistencies between science and theology for neither is static nor in a state of absolute finality in all aspects.

### 1.2 Causes of Conflict.

1.21 Overweening confidence which nineteenth-century scientists had for the most part in the finality of scientific theories. Adequacy of the Newtonian system eliminated the necessity for the hypothesis of God. The world rich with colour and sound, redolent with fragrance, filled with gladness, love and beauty speaking everywhere of purposive harmony was replaced by a world, hard, cold, colourless, silent and dead; a world of mathematically computable motions in mechanical regularity, with the mind as an epiphenomenon of mechanical processes.

1.22 Assumption that the concepts and theories of science provide the one true and literal description of the real nature of the world.

1.23 Theologians only too often completely missed the real points at issue. Instead of dealing with the doctrinal issues and fundamentals, they picked on minor points as the test cases.

1.24 Theologians failure to differentiate between revelation and interpretations.

"However firmly we are convinced of the uniqueness, finality and irrefragability of the Christian revelation and of the Creeds in which the Church has expressed it, we cannot claim a like authority for the formulations of theologians or for the particular interpretations that have been put upon the revelation from time to time by the faithful."

1.241 Need to avoid here the error also of Liberalism which broke down through its fundamental assumption that the interior content of the Christian revelation can be detached without distortion or mutilation from the outward form in which it was originally given and can be inserted, again without distortion or mutilation, into the thoughtforms of the modern age." In doing so, it evaded the whole problem of historical religion, the problem as to how eternal truth can be manifested at all in the infinitely complex, slow-moving yet ever-changing process of time and space."

1.242 Demands not a rigid dogmatism isolated from new thought or the modern world, but a conscientious checking of all his speculations against the Bible, not the climate of contemporary thought. It demands an openness to confront new discoveries and theories, explore their logical possibilities and test their capacity to contribute to understanding, and not an unanalysed rejection.

### 1.3 Areas of Mutual Help in the past.

1.31 Elimination of the pagan dualism between the earth and the universe, and provision of a unified sublunar and supralunar framework.

1.32 Demolition of astrology. This retained a strong place in the church despite the opposition of the church doctrine.

#### 1.4 Areas of reprochement.

1.41 Nature of matter in relation to the doctrine of the resurrection of the body.

1.411 The reconciliation is not due to contemporary scientific use of electricity and energy to describe matter. Reade - "the naive delight sometimes exhibited by friends of religion when they hear that the solidity of matter is being whittled away by modern physics, as though Materialism would at any rate be less dangerous if only matter could be made decently thin. It makes not the slightest difference whether matter is as hard as adamant, as stodgy as suet, as volatile as gas, as agile as electricity, or as naked as a mathematical formula. The only relevant question is whether it is self-existent or created by God; and this, as we cannot too often remind ourselves, is a question upon which natural science has nothing to say."

1.412 The doctrine of a physical resurrection has profound cosmic implications. In what does the identity consist? Even the question of continuous identity of my body throughout earthly life is a puzzling one. There is not "sameness" of the numerically identical particles, but continuity of spatial extension and association with a continuous mental life. This answers also for Christ's resurrected body, but not for mankind's resurrection.

1.413 Thomas Aquinas - 1) the resurrection of the body involves its transformation into a state vastly different from what it was before, 2) In spite of this transformation it remains fully and totally human.

1.414 There is no agreement among highest theologians on this issue.

1.415 On the otherhand, modern quantum physics has shown us that in science we deal not with the behavior of any individual elementary entity but with aggregates consisting of immense numbers of elementary entities. It is becoming more and more plain that the ultimate laws of physics are not capable of interpretation in terms of physical models at all. Eddington's dictum on ultimate reality: "Something unknown is doing we don't know what." In terms of modern physics it is no longer a question of reassembling dispersed but permanently identifiable material particles.

1.416 The transformation of matter at the last day can only be dimly imagined but it will presumably be of so radical a nature as to make it quite impossible to say of any portion of it, "ah, that bit used to be there."

1.42 Nature of space.

1.421 Semitic concept; geocentric, flat earth covered by hemispherical firmament and hell beneath. Contemporary to N.T. Christianity.

1.422 Greek concept; geocentric, spherical body around which rotated a number of spherical shells bearing the planets. Early Christianity adapted easily to this. What is surprising is that the church seemed so little concerned at the matter, and made the necessary adjustment with so little fuss. The tenth and highest sphere became the throne of God, the heavens composed of a fifth perfect type of matter not changed or decaying while the earth was composed of four which were cursed by sin. It was this qualitative difference also which Newton's theories undermined. One had either to locate God and the angels in space or deny the legitimacy of applying spatial terms to them in any sense whatever.

- 1.423 Newtonian concept: heliocentric, absolute space a reality. Heaven, if it is a space, must be located in it. Otherwise it ~~was~~ hell are seen as "states" a doctrine which has done much to deviscerate modern Christianity.
- 1.424 Relativity and Quantum concepts; Newtonian space discredited. It is no longer necessary to hold that all experiences which involve spatial characteristics must be linked together in one unified extensional spatial continuum. From the standpoint of modern physics heaven, if it is necessarily defined in spatial terms (a theological problem), could be compensated by an absence of spatial connectivity between the heavenly realm and this.
- 1.43 Nature of time.
- 1.431 Newtonian concept: an absolute, ~~true~~ and mathematical time. To Newton, space and time were attributes of God.
- 1.432 Special Relativity has rejected the concept of absolute time and General Relativity brings it back only the universe as a whole as distinct from its parts.
- 1.44 Evolution and Pre-human evil.
- 1.441 The transmission of original sin is not necessarily explained in biological terms
- 1.442 The essence of the fall is moral not intellectual. Adam was not omniscient. He was at the beginning of his but, but he was on the path and going in the right direction.
- 1.443 Immunity from death is in sense part of man's natural physical endowment but ~~can~~ be asserted to be a <sup>a</sup> preternatural gift bestowed upon man - and which in fact he lost before he had time to enjoy it - which would have elevated man's nature to a supernatural condition in which he would have been transformed into a condition analogous to Christ's ~~fall~~ ascended state.
- 1.444 It is possible to assume that pre-human evil - ~~killing~~ and suffering among animals - began not at the fall ~~of~~ man but at the fall of Satan and those angelic forces into whose ~~hand~~ the tending of the material world had been given.
- 1.45 Problem of other races in space:
- 1.451 If it is found that there are other races in space and these are co-equal with man and have also fallen in sin, there is no reason to exclude the possibility of multiple incarnation and atonement of each if we hold the traditional concept of incarnation in which Christ retained his full deity. This is different from appearing twice in the same race. There is nothing that a second incarnation in human nature could achieve that has not been achieved by the first.
- 1.452 It is necessary to keep a perfectly open mind on the question of the existence in the universe of rational corporeal beings other than man. Even if these exist, man may have been the only one to fall and need redemption.

## 2. Nature of Scientific Theories.

### 2.1 Relation of Scientific Theories to the Physical World.

- 2.11 Danger in the tendency to hypostatise the concepts of science which was the besetting sin of the Victorian physicist. Matter was explained away as consisting of invisible atoms and impalpable ether which on analysis were attributed with the very properties which had previously been divested from large-scale matter.
- 2.12 There is a tendency to consider mathematical definition alone as adequate, and to formulate some type of model to correspond to it, though in the final analysis, even the scientists do not consider the "real world". Largely through the quantum phenomena scientists have come to recognize the essentially pragmatic character of scientific language.
- 2.13 Until recently it was held that physical statements professed to give a literal description of the constitution and behaviour of the world. Differences between rival theories in the same field was simply the difference between falsehood and truth. Historically the conflict of Aristotilianism and Ptolemaic systems was partly that the Aristotilian system offered simplicity and conformity with a priori reasoning while Ptolemaic systems sacrificed these for agreement to phenomena. The system of the latter, though in greater agreement with phenomena, was cluttered with epicycles, eccentrics and equants above the circles of Aristotle. The common way of reconciling theory with observation was by the reflection that we who live in this fallen sublunar world cannot expect to know the truth about the incorruptible realm of the supralunar. Even Copernicus' theory ran contradictory to observation i.e. Mars, and Galileo praised him for clinging to it though it contradicted observation. Newton's theories abolished the idea of a qualitative difference between the various parts of the universe and achieved the final secularisation of the supralunar realm.
- 2.14 Under Newtonian frameworks, a hypothesis was advanced, tested and if successful in a sufficient number of cases, was raised to the rank of a theory which was considered to describe the actual "Reality". "The greater the number of facts consistently explained by one and the same theory, the greater the probability of its being true." ~~W. V. Quine~~ Mellor.
- 2.15 Relativity did not disturb this concept, but Quantum theory made it evident that no sort of physical or geometrical picture of phenomena was ultimately sufficient. Ramsey pointed out a theory can never be shown to be simply "false" and therefore a fortiori abandoned, but that it has to be made more and more complicated in order to cover newly discovered phenomena, and ultimately its retention is more trouble than it is worth. Even if a simpler more adequate theory is devised, there is a tendency to retain the old until the inadequacy of the old becomes too great. It is abandoned not because it is proved to be false but because it is useless.

### 2.2 Scientific Theories and "Maps".

- 2.21 Many scientists find the purpose of a theory to make logical inference from observation-reports. To adequately explain existing facts is enough.
- 2.22 Toulmin points out that not only the laws of logical inference, but also certain principles of application which are as much a part of the theory as the model itself are necessary in the application to the method of derivation. Really useful models are those that are capable of wide "deployment", that is to say, those which suggest further questions than those which they were originally devised to answer and which cover a range of phenomena wider than that which they were originally devised to correlate and predict. In this sense it is like a map, one needs to use the map on which the information he seeks is found, and know how to use the map to get around. A detailed physical map may include more information but we use a road map with certain distortions because it helps us go where we want. We must not deduct from a map, information ~~not~~ that it is not

## 2.3 Scientific Theories and "Models"

### 2.31 Braithwaite.

- 2.311 scientific law: a generalisation, a proposition expressing constant conjunction between properties, generalizations of unrestricted range in space and time of greater or lesser degree of unverified law
- 2.312 scientific hypothesis \ complexity and generality.
- 2.313 scientific system; a set of hypotheses which form a deductive system. The highest level or order of hypotheses occur only as premises of deductions. Those on the lowest level occur only as conclusions of deductions and those on intermediate levels occur as conclusions of some deductions and as premises of others. The empirical verification of one or more (but not all) of the lowest-level hypotheses confirms the higher level hypothesis from which its deductively derived, but nothing less than the verification of all the lowest-level hypotheses would be sufficient to prove it; on the other hand, the empirical falsification of any one of the lowest-level hypotheses will be sufficient to refute it.
- 2.314 Complex systems have several high-level hypotheses. Refutation of a low-level derivative falsifies one of these, but which one must be abandoned is largely a matter of choice because in many cases it is possible to maintain the truth of any one of them that we like, if we are prepared to modify the others sufficiently drastically. Generally speaking a hypothesis is not rejected until an alternative hypothesis is available to take its place.
- 2.315 calculus; the manipulation of formulii in accordance with certain rules to derive new formulii. It is defined by its initial formulae and its rules. There are two types, an impure deductive system in which all the propositions are contingent; and a pure deductive system in which they are all logically necessary. These can be combined into mixed calculii. An impure calculus can be transposed into a mixed one. Scientists prefer the mixed for in it the heavy deductive work in the pure section can be performed by mathematicians and the scientist applies the results. Logicians prefer the impure for in it all the propositions are contingent and all the logic lies in the deductive principles.
- 2.316 There is no meaning for the theoretical terms apart from their context which is a calculus i.e. electron. "What is the relation of theoretical terms to reality? Ramsey uses an operational definition. Braithwaite by-passes the question of "existence" by noting that all that is important is that we understand the function of the theoretical terms in the calculus which use. The only contact is through the lowest level deductions which must "fit" experience.
- 2.317 Model vs Theory. Often more than one deductive theory will function as an interpretation of a calculus. In one kind the interpretation of the initial formulae is also epistemologically prior to the interpretation of the derived formulae not containing these terms. This is the model. In the second the interpretation is epistemologically posterior in which case it is a theory related to the model in one to one correlation.
- 2.318 Dangers of models: 1) is to identify the theory with a model for it so that the theoretical concepts will be taken as being the objects of the model. This is the weakness of the 19th century physicists. 2) transferring the logical necessity of some of the features of the chosen model on to the theory, and thus of supposing, wrongly, that the theory, or parts of the theory, have a logical necessity which is in fact fictitious.
- 2.319 Conclusion: rejects the view that there is anything objective in causal necessity over and above constant conjunction.
- 2.32 Braithwaite nowhere shows that his positivistic doctrine is the only alternative to the doctrine of logical necessitation which he has refuted. Many hold that the way is now open for a rehabilitation of the view that there are real causes operating in nature, the view which ~~was~~

- 2.41 This detachment of theory and model from reality ~~may~~ may hold on the sub-atomic level, but can it be postulated for supra atomic science where objects are directly observable? Braithwaite states, "to think in terms of the model is frequently the most convenient way of thinking about the structure of the theory," This is because the logical similarity between the theory and the model is a direct one into which the calculus does not come at all for the calculus has no logical similarity to either the theory or the model.
- 2.42 Mascall : the model plays in our knowledge of the world around us a part similar to that which the sensible species plays in the Thomist doctrine of perception; it is an object quod, through knowledge of which we are able to know under one or another of its aspects the objectum quod which is the real world.
- 2.43 The mistake of the post-Newtonian scientists was to assume that the intelligible structure of the world must simply reduplicate the structure of our sensible experience with the secondary qualities left out and a few mysterious non-sensible qualities brought in i.e. electrons. Perception is nothing more than a refined version of sensation. and sensibility is equated with reality. The world thus becomes a system of sense-data, and physical objects are complexes of sense-data and nothing more. (Russell's early position) Finally, when explanation in terms of sense-data is found to raise its own problems, there is nothing left for philosophers of science to do but discuss the language habits of physicists; and this bring us to the present day.
- 2.44 Better to maintain that intelligibility is something with a wider range than sensibility. Just as the essence of perception is not sensing objects but apprehending them, even if we can only apprehend them through the mediation of sense, so the paradigm of a real world is not its sensible imaginability but its intelligible apprehensibility. If modern physics can not use sensory models to systematise it, but depends on the concepts as used by quantum physics, this does not in the least imply that these are unreal or subjective. It simply means that the formulae of quantum physics express the kind of intelligibility that it has. Models and theories are objecta quibus. Through study of them we deepen our understanding of the intelligible universe which is the objectum quod. These come and go. They are not and cannot be simply images of the real world though they can at times approximate to that status.

## 2.5 Languages of Science and Theism:

- 2.51 Scientific language and hypotheses develop in expansibility and convertibility towards greater comprehension but this is at the cost of increased abstraction. But this is not the only language nor all-sufficient.
- 2.52 A Metaphysical and theological language (historical language) is needed to supplement this for three reasons:
- 2.521 to answer their own "limiting questions". (various languages of science)
- 2.522 to unite them with one another.
- 2.523 to counteract their abstractness by raising their abstractive patterns to a level of concreteness which belongs to the "given fact" which they intend to picture.