

a strong proof of the wisdom which bids one hesitate before rashly forming a judgment as to any hypothesis or its bearing upon any other order of thought.

Turning to the other side of scientific investigation, I must dwell for a few moments on the so-called

Darwinian Theory,

and in doing so, it may be well first to clear up the misapprehension under which so many persons labour, that Darwin was the originator of the doctrine of transformation, of the view, that is, that certain living things were derived from other living things, the theory of what we should call Derivative Creation. Darwin, of course, did nothing of the kind, for such a solution of the condition of affairs in the world of living things was proposed centuries before Darwin was born. To take only our own theologians, such a view was in essence put forward by St. Augustine, by St. Thomas Aquinas, by Cornelius à Lapide, and by Suarez, as has been shown by Mivart in a now almost forgotten book, 'The Genesis of Species,' and by Father Wasmann in his splendid treatise, 'Die Moderne Biologie und die Entwicklungstheorie,' so that, whether true or not, the doctrine in one shape or another has a very respectable antiquity. What Darwin did was to suggest a means by which the transformation might have taken place, and his great factor was Natural Selection. The title of his most celebrated work—a title unknown to many who talk and write about the subject, at least, so it would appear—is 'The Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life,' and this makes it clear that it was the method, not the fact, of transformation which he desired primarily to expound. Now many hold that Natural Selection does not exist, and Professor T. H. Morgan, a most distinguished American authority in biological matters, says that the discoveries of the Augustinian Abbot Mendel have given that theory its coup de grace. But if Natural Selection exists, it is nothing, and can be nothing, but a sieve by which certain changes, which have in some way or another arisen, are tried and retained or lost. It postulates an internal force of variation following some law, and that again demands the existence of a law and of a law-giver. But let that pass. Darwin called these variations spontaneous, and he insisted particularly that they were individually slight, minute, and insensible. On such an hypothesis most biologists, and at first all, have pursued their work.

But of recent years another school has arisen which declares that these slight, almost unnoticeable changes on which Darwin relied, are utterly powerless to bring about any transformation, and that it is only by the occurrence—the sudden occurrence—of large and considerable changes or 'mutations' that a new species is produced. De Vries, the distinguished Dutch botanist, claims that he has been able to observe the birth of new species in the vegetable kingdom, and he and Bateson and others proclaim that Variation is discontinuous and not continuous; in other words, that the accumulation of small variations which Darwin counted on, and the efficacy of which Mivart doubted, have nothing to do with the process. It is true that others have cast doubt on the reality of these species, so that the matter

Must Still be Considered sub judice,

but in any case, if these 'mutations' really occur, we are brought back to the imperative necessity for some internal cause which produces these large spontaneous departures from the normal condition, and to the equally imperative necessity for a law to regulate them and for a law-giver who has established them and set them in motion.

I take this instance because the hypotheses of Natural Selection and of the efficacy of small variations in the production of species really lie at the bottom of the whole of the Darwinian edifice. These theories were supported with all the marvellous skill and with all the industry and research which were the attributes of that truly great man, yet we now find them controverted, and learn that it is possible that they too may have to find their way to the scrap-heap of which I have spoken, a scrap-heap on which will be found also Darwin's beloved 'pangenesis' theory, and perhaps some other of his hypotheses.

That these theories should have found their way there in no way detracts from the greatness of the man or

the remarkable power which his work has had in stimulating scientific research. It merely proves that fresh facts, of which he was not cognisant, have come to light, facts which upset or seem to upset his theories. But it affords another proof of the extraordinary caution which we should adopt in dealing with scientific hypotheses, the scepticism with which they should be received, and the importance of constantly keeping before one's mind the fact that the hypothesis, however alluring, is only a working hypothesis, and that it must not be estimated at a higher value than that which it really possesses.

On the whole, then, I hope I have been able to show by the examples which I have chosen, and I might have added many others to them, that

A Scientific Hypothesis is by no Means Necessarily a Scientific Truth.

I also wish to emphasise the point that this is a matter which is perfectly well understood by men of science, and that the reason why there is any doubt at all about it in the minds of the public, is that the public relies for its information upon unreliable manuals and articles which, for effect, pick up a theory and flaunt it in the face of that public as if it were a fact as undeniable as sunrise and sunset, and moreover often draw from it deductions which are frequently unwarrantable and almost always absent from the minds, or at least the books, of the real originators of the main hypothesis.

And so, to any one worried by the bearing, or supposed bearing, of any scientific hypothesis upon matters close to his heart, I would say, 'Do not be worried;

Theories come and go, but God remains for ever, and there can be no possible ultimate contradiction or difference between the tenets of His Church and the laws of His creation.'

There is just one other point which I should wish to dwell upon for a moment. The extraordinary results of science during the past fifty years, the remarkable fecundity of observation in all branches, the almost incredible progress which has been made, all tend to show the wonderful complexity of the problems with which we have to do and the truly amazing extent of our ignorance. If there is a science in which it might be supposed that really definite knowledge had been arrived at it is that of physics, yet it is not, perhaps, too much to say that physicists are beginning to come to the conclusion that they know nothing of the underlying physical facts of which ordinary things and phenomena are the symbol and the manifestation. The same is true on the biological side. The greater the improvements in the microscope, the more subtle the methods of microscopic preparation, the more delicate and searching the experiments undertaken, the greater are the mysteries which are found to surround us.

There is nothing on which greater pains and study have been expended than on the

Structure and Physiology of the Cell,

and, to us as Catholics, I may add that it is matter of congratulation that some of the most important and fruitful of this work has been done in the University of Louvain.

It is a small thing—the cell. It might have been supposed by the casual observer that no very great amount of labour would be necessary to clear up all that could possibly be known of such a very limited field of investigation. Yet after so many years of work, after the unceasing toil of hundreds of observers in all parts of the world, the leading authority on the subject finds himself compelled to write, 'The recent advance of discovery has not tended to simplify our conceptions of cell-life, but has rather led to an emphasised sense of the diversity and complexity of its problems.'

The sea by the side of which Sir Isaac Newton picked up his pebbles is a much greater one than even he imagined, and the pebbles which remain to be picked up are a million for every one on which a discoverer has as yet laid his hand. How can we then, in the presence of such a confession of ignorance, feel any great confidence in the foundation or longevity of a scientific theory when we know not the day in which some new pebble may not be picked up which will shatter that theory into fragments, as that fine pebble, radium, has shattered so many pre-existing views.

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