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DARWINISM AND NATIONAL LIFE

THE Darwinian theory has a practical side of infinite importance, which has not, I think, been sufficiently considered. The process of natural selection among wild animals is of necessity extremely slow. Starting with the assumption (now no longer a mere assumption) that the creature best adapted to its local conditions must prevail over others in the struggle for existence, the final establishment of the superior type is dependent at each step upon three accidents—first, the accident of an individual sort or variety better adapted to the surrounding conditions than the then prevailing type; secondly, the accident that this superior animal escapes destruction before it has had time to transmit its qualities; and, thirdly, the accident that it breeds with another specimen good enough not to neutralise the superior qualities of its mate. In the case of domesticated animals the progress is incomparably more rapid, because it is practicable, first, to modify the conditions of life, so as to encourage the appearance of an improved specimen; next, to cherish and protect it against disaster; and, lastly, to give it a consort not altogether unworthy of the honour of reproducing its qualities. The case of man is intermediate in rapidity of progress to the other two. The development of improved qualities cannot be insured by judicious mating, because as a rule human beings are capricious enough to marry without first laying a case for opinion before Mr. Darwin. Neither would it be easy, nor, perhaps, even allowable, to extend any special protection by law or custom to those who may be physically and intellectually the finest examples of our race. Still, two things may be done: we may vary the circumstance of life by judicious legislation, and still more easily by judicious non-legislation, so as to multiply the conditions favourable to the development of a higher type; and by the same means we may also encourage, or at least abstain from discouraging, the perpetuation of the species by the most exalted individuals for the time being to be found. Parliament, being an assembly about as devoid of any scientific insight as a body of educated men could possibly be, has not as yet consciously legislated with a view to the improvement of the English type of character. Without knowing it, however, the Legislature has sometimes stumbled on the right course, though it has more often blundered into the wrong. Our free trade policy has furnished special scope and special advantages to the energetic enterprising character, and so far has tended to perpetuate and intensify the type which has given to little England her wonderful prominence in the world. On the other hand, the steady refusal to make a career for scientific men has drained away most of our highest intellect from its proper field, and has subjected the rest to an amount of discouragement by no means favourable to increase and improvement. Our laws and customs practically check the growth of the scientific mind as much as they tend to develop the speculative and energetic commercial character.

We do not expect for a long time to hear an orator in the House of Commons commence his speech by announcing, (as a distinguished member of the Austrian Reichsrath recently did, in a debate on the relation of the different nationalities in the empire), that the whole question is whether we are prepared to accept and act upon the Darwinian theory. But even an average English M.P. may be brought to see that it may be possible, indirectly, to influence the character and prosperity of our descendants by present legislation, and none will deny that, if this is practicable, a higher duty could not be cast upon those who guide the destinies of a nation.

A glance at the operation of Darwinism in the past, will best show how potent it may be made in the future. Look at English progress and English character, and consider from this point of view to what we owe it. There were originally some natural conditions favourable to the growth of our commercial and manufacturing energy. We had an extensive coast and numerous harbours. We had also abundance of iron-stone in convenient proximity to workable coal. Other nations either wanted these advantages or were ignorant that they possessed them. These favourable conditions developed in many individuals a special adaptability to commercial pursuits. The type was rapidly reproduced and continually improved until England stood, in the field of commerce, almost alone among the nations of the world. And what is there now to sustain our pre-eminence? Nothing, or next to nothing, except the type of national character, which has been thus produced. Steam, by land and sea, has largely diminished the superiority which we derived from the nature of our coast; and coal and iron are now found and worked in a multitude of countries other than our own. Our strength in commerce, like our weakness in art, now rests almost exclusively on the national character which our history has evolved.

Take another example of the character of a people produced partly by natural conditions of existence, but far more by the artificial conditions to which evil legislation has exposed it. What has made the typical Irishman what he now is? The Darwinian theory supplies the answer. Ireland is mainly an agricultural country, with supplies of mineral wealth altogether inferior to those of England, though by no means contemptible if they were but developed. This is her one natural disadvantage, and it is trifling compared with those which we in our perversity created. For a long period we ruled Ireland on the principles of persecution and bigotry, and left only two great forces at work to form the character of the people. All that there was of meanness and selfishness and falsehood was tempted to servility and apostacy, and flourished and perpetuated itself accordingly. All that there was of nobleness and heroic determination was drawn into a separate circle, where the only qualities that throve and grew were irreconcileable hatred of the oppressor and resolute but not contented endurance. The two types rapidly reproduced themselves, and as long as the external conditions remained unaltered, they absorbed year by year more and more of the people's life; as, if Darwinism is true, they could not but do. And what is the result now? A great part of a century has elapsed since we abandoned the wretched penal laws, and yet none can fail to see in Ireland the two prevailing types of character which our ancestors artificially produced, the only change being that the two types have become, to a certain extent, amalgamated in a cross which reflects the peculiarities of each. Whether future legislation may so far modify the conditions

of Irish existence as to work a gradual change in the national character, is a question of much interest, but too large to be discussed just now. In any case we can scarcely expect the results of centuries upon a national type to be reversed in less than a succession of generations.

Still confining myself to the past, let me point again to the very marked qualities which the conditions of their existence have produced in the people of the United States. They started with a large element of English energy already ingrained into them; they have been reinforced by millions of emigrants presumably of more than the average energy of the various races which have contributed to swell the tide. Added to this, the Americans have enjoyed the natural stimulus of a practically unlimited field for colonisation. Only the resolute, self-reliant settler could hope to prosper in the early days of their national existence; and self-reliance approaching to audacity is the special type of character which on the Darwinian hypothesis we should expect to see developed, transmitted, and increased. How far this accords with actual experience, no one can be at a loss to say. There is probably not a nation in the world whose peculiarities might not be traced with equal ease to the operation of the same universal principle. And the moral of the investigation is this: Whenever a law is sufficiently ascertained to supply a full explanation of all past phenomena falling within its scope, it may be safely used to forecast the future; and if so, then to guide our present action with a view to the interest and well-being of our immediate and remote descendants. Read by the light of Darwinism, our past history ought to solve a multitude of perplexing questions as to the probable supremacy of this or that nation in times to come in the field of commerce, as to the effects of emigration and immigration on the ultimate type likely to be developed in the country that loses and in that which gains the new element of national life, and many another problem of no less interest to ourselves and to humanity.

The subject I have thus slightly indicated seems to me to deserve a closer investigation than it has yet received: and, strange as it will sound to the ears of politicians, I cannot doubt that, in this and other ways, statesmen, if they could open their eyes, might derive abundant aid from the investigations of science, which they almost uniformly neglect and despise. H.

THE PROGRESS OF NATURAL PHILOSOPHY

[We have been favoured by Professor Tait with the following extracts from his Introductory Lecture to his class at Edinburgh University, the object of the Lecture being "to show that Natural Philosophy is a *real* science, as tested by steady growth and progression, compared with other so-called Philosophies, which have periodic cycles, and come back after a generation or two into the old, old groove, with the same old rope of sand to be spun over again."—ED.]

TO enumerate in detail all the advances effected in natural philosophy during even the past year would take more time than is usually devoted to a lecture, so that I shall confine myself to a mere mention, not exposition, of a very few of the more interesting discoveries in cosmical science which have recently been made.

First. We have obtained an immense amount of new information as to the constitution of the sun. The total eclipse which was visible in India in the autumn of last year, was singularly well fitted for applying to the strange phenomena of the sun's atmosphere the comparatively novel powers of the spectroscope. Another total eclipse has recently been carefully observed in America, and the results obtained on these two occasions agree well with one another.

One of the most marked phenomena observed in a total solar eclipse is that which, first carefully described some thirty years ago, was called the "red flames;" very singular protuberances issuing apparently from the dark body of the moon, but which were conclusively proved in 1860 to belong to the sun. Had they been lunar phenomena, their dimensions would have been considerable; but it is easily shown that, belonging to the solar atmosphere, their dimensions are *enormous*, a hundred thousand miles being often no exaggerated estimate of their diameter. They must evidently be masses of extraordinary tenuity, else they could not rest in the solar atmosphere, which must be excessively rare at such an elevation. When the spectroscope was directed to them last year, it was at once perceived that they are fiery clouds, consisting mainly of hydrogen gas, heated so powerfully as to become self-luminous. This discovery once made, the total eclipse was seen to be unnecessary, and observations of these singular phenomena are now carried on every day. In fact, in anticipation that such would prove to be their nature, they had actually been sought for before the date of the eclipse. The reason why we can see them, in spite of the comparatively overwhelming light of the sun, is simply this, that the sun's light, which may be said roughly to consist of rays of all degrees of refrangibility, can by a sufficient number of prisms be spread over any desired extent, and thus weakened throughout; while the light from the red flames consists of but a few perfectly homogeneous rays, which may be indefinitely separated from one another, but cannot be individually weakened, by increasing the power of the spectroscope. The process, in fact, closely resembles that by which, with powerful telescopes, astronomers are enabled to observe stars in the day-time. The powerful telescope diminishes the apparent brightness of the sky; but the star has no sensible diameter, and remains undimmed. A singular fact observed is, that while the bright rays in these red flames, which are due to hydrogen, correspond exactly to well-known dark lines in the solar spectrum, due to absorption by the sun's atmosphere; there are others, especially a curious one in the yellow, which have no counterpart among the dark lines. Also the hydrogen lines are sometimes broader, sometimes narrower, than the normal spectrum of incandescent hydrogen requires; sometimes they are slightly displaced from their normal positions in the spectrum. The explanation (on purely physical grounds) of all these phenomena is now being carefully sought, and the connection of the red flames with sun-spots, as well as the singular peculiarities of the spectra of spots, are being recorded for future explanation. In this one direction alone a field has been opened up for inquiries which, even with our present appliances for observation, may well occupy the world for a generation to come.

Another striking phenomenon of a total solar eclipse is the (so-called) Corona of whitish light which appears to surround the dark body of the moon to a considerable angular distance. This also has been proved to belong