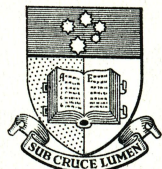


Series 121



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THE UNIVERSITY OF ADELAIDE

R. A. FISHER LABORATORIES
SOUTH AUSTRALIA

DEPARTMENT OF GENETICS

Fisher's copy of his 1912 paper on Evolution and Society.
(Reproduced in Chapter 2 of Natural Selection, Heredity
and Eugenics (ed. J.H. Bennett) Oxford University Press,
1983.) - J.H.B.

One of the most interesting things about Darwin's explanation of the origin of species is that scarcely anything need be assumed about the actual nature of species, or evidence that natural selection occurs; the same process is in progress with respect to languages, religions, habits, and customs, rocks, beliefs, chemical elements, nations and everything else to which the terms stable and unstable can be applied.

CAMBRIDGE UNIVERSITY EUGENICS SOCIETY

Paper on "Evolution and Society" read by Mr R.A. Fisher, Caius, (Chairman of Committee) at sixth Undergraduate meeting of the Society in Mr W.B.G. Batten's rooms, 8, Tree Court, Caius, on Wednesday, March 13th, 1912, at 8.30 p. m. Those which are suitable to survive shall survive; those which are unsuitable, unstable we may call them, shall cease.

Instances are familiar enough; there is a parasitic worm which infests the gullets of parrots; the worm tickles the parrot's throat, the parrot coughs over its food, and other parrots become infected; the worm, I imagine, had no intention of making the parrot cough, but the fact that it does so is a vital point gained in its struggle for existence.

The habit of playing bridge survives in a very similar way;

SOCIAL SELECTION.

One of the most interesting things about Darwin's explanation of the origin of species is that scarcely anything need be assumed about the actual nature of species, as evidence that natural selection occurs; the same process is in progress with respect to languages, religions, habits, and customs, rocks, beliefs, chemical elements, nations and everything else to which the terms stable and unstable can be applied. The only things required of a species are the capacities of variation and inheritance; and although in examining and analysing these two capacities we may come across the most complicated properties in fact, and the most delicate distinctions in theory, yet the only thing necessary for natural selection is that those which are suitable to survive shall survive, and those which are unsuitable, unstable we may call them, shall cease.

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the habitual player finds himself driven quite involuntarily to infect others with a similar passion. The game of bridge cannot be said to have any desire to recruit fresh adherents, but I have no doubt that cards would never have come into use at all, if they could only have been used for solitary games of patience.

When dealing with the matter in such a very general manner as is illustrated above, we may use the idea of an organism in a very wide sense; a habit like smoking may be said to be parasitic on an individual, or on a class, or on a nation in which it has become habitual; on the other hand, the hosts which support an institution like family prayers are the household, the family or the religious sect which encourages the institution. In speaking of parasites too it is clear that these parasitic institutions are not necessarily evil; this is true even of animals; for instance, I believe the human stomach could not digest cellulose were it not for the action of a colony of bacteria, which performs the necessary katabolism. Besides this, parasitism is not a sufficient term to apply to the general relations of organisms; indeed we may say that every form of symbiosis found in the animal kingdom, is paralleled, usually with greater complexity, and more perfect development, in human society. The terminology too in the latter case is so much

more varied and complete, that it is at first difficult to see that all the modern social problems for instance of centralisation or decentralisation, of personal freedom or regimentation, of differentiation of the sexes and specialisation of the classes, have been faced under other conditions in the animal kingdom, and solved in Nature's provisional, tentative way by the simple, pragmatic method of trial and error. And it is worth noting that the solution which commends itself to Nature, and which is of interest to us, as that which will be adopted by the future, is characterised not by the greatest happiness, or by the most magnificent realisation of human ideals, of this age or of any other, or by any other such considerations, but solely by its stability and power of survival.

An instinct from the external point of view is a tendency to perform some definite act or series of actions under the stimulus of a suitable train of circumstances; the term is rightly restricted to those acts which have some purpose by which the animal benefits directly, or indirectly in furthering some symbiotic alliance. From the psychological point of view it is a motive or desire depending on the idea that the man's state is more desirable, more pleasant, more happy if the instinct is obeyed than if it is not. Pleasure is Nature's bribe to persuade a conscious mind to obey its

instincts. The terms pleasure, happiness, contentment refer to states which differ in their duration, and differ in their activity; it is as well to emphasise the similarity of their origin as due to the need of persuading a free will to conform to the courses which selection has shown to be best.

Now if our object were the greatest human happiness would we succeed by producing a race whose instincts exactly coincided with their economic needs? It will help us to answer this question if we observe that the more complicated an instinct is, and the more difficult to perform, the greater is the pleasure derived from it. Indeed it is necessary that an animal's interest should be centred on those objects which are hardest to obtain; the greater effort requires the greater reward. Among carnivorous mammals the great problem is to obtain food, and their highest pleasure seems to be in hunting and eating; among men selection seems to have acted most ruthlessly by failure to obtain a woman, especially during the immense periods over which female infanticide, often combined with polygamy, seem to have prevailed, and the result is that half our poets devote their labours to the pleasures of love. This consideration by itself suggests that our pleasures will be of a tepid nature if ever our instincts become easy to obey, but we have another side light on the problem. The very existence, real or apparent, of Free Will implies a multiplicity of possible

courses, a conflict of instincts; if ever the instincts become so perfectly adapted to economic needs that the wisest course ^{is} was inevitably followed, we should have no choice, no need for motives, and rewards and penalties, nothing but an automatic reflex action. ~~any rate, the great problem of re-~~

Although we may agree that this economist's paradise with its utilitarian instincts would be a thoroughly undesirable arrangement, it remains to be considered whether or not it is an inevitable one. A society of amoebae in some dim pre-Laurentian age, might well be imagined as discussing how undesirable it would be if free-swimming protozoa with all their faculties intact, contractile, irritable, capable of absorbing food, and of reproduction by division, should ever bind themselves together to form a many-celled animal, should degrade or lose one or more of their faculties in specialisation for some particular function, should lose their free motion, and live out a sterile life cramped in a wall of cells as inert as themselves. They might have argued thus and yet overlooked the fact that if these organised societies were more efficient in the struggle for existence than disorganised units, they would certainly come into existence and increase in organisation and perfection by competition with one another, until their cellular structure ^{was} ~~is~~ barely recognisable. And further that associated with these societies would arise a mind, not associated with one cell or another,

but with the whole society, beside which the mind of an amoeba would be, as it is, utterly indiscernible.

This process of coördination, of integration of units into societies has been carried a step further among the social insects; here, at any rate, the great problem of reproduction has been solved in precisely the same manner as in the self-fertilising hermaphrodites of the animal kingdom. Queens and drones are produced which by their union cause an immense increase in the number of insects and finally ^[lead] to the production of a fresh hive. In these respects an ant hive is very similar to, for instance, a fresh water polyp. The subjection of the ants on the one hand, and the cells on the other, to the needs of the whole, has in both cases been established by inter-communal competition. The complicated and highly perfected instincts of the workers, has been produced by the natural selection of those hives in which these instincts were well developed. There is no conflict between the interests of the family and the nation, which in human society constitutes the central problem in Eugenics; where those individuals who are of most use to the state, and who will sacrifice themselves most readily for the common good, are often prevented by that very sacrifice from procreating their valuable kind. Among social insects the instinct of self-sacrifice may be completely developed, since the only chance of reproduction lies in the survival of the hive.

Human societies are not so far developed as those of insects, and are very far from the complete cell-socialism of the animal body; still it is obvious that the best organised will survive; those in which every class is well cared for, and correspondingly every class performs its functions regularly and without interruption; the nations in which moreover there exist highly skilled and efficient specialised members will reach a higher degree of organisation than those in which the members are unskilled although efficient in a general way. The great problem is how far will the individual come to act as a mere part of the social machine, with his instincts perfectly adapted to his life of social service.

We may admit that efficiency in the petty duties prescribed for him by the state is an economic factor which may determine the usefulness of the ordinary man in times of peace; and it is possible that as armies become more elaborately organised no higher qualities will be required of him in time of war. Although here history is against our argument in showing several instances of enormous, wealthy, highly organised nations having broken themselves in trying to subdue some small, poor, high-spirited race, to whom such social organisation would smack too much of servility, and who valued their personal liberty more than wealth. If, however, this is not so in the specialised armies of the future, we can only look for the qualities which men admire to some small ruling

caste who may limit the energies of the great national machine. And here too the question arises, "Will this great organised nation, so like an animal organism in its mode of origin, acquire a Mind, not residing in this man or in that man, but in the whole community of men?" It is possible that some such instinctive groping after the idea of common obedience that constitutes the social value of ~~the idea of~~ Theism, and it certainly is related to the Catholic notion of the corporate unity of the Church. If this is the fact, that a Mind will come and take control of an organism as soon as it is sufficiently organised to obey, as one animal; just as minds have taken possession of those colonies of cells which we call men; then there will be no need of a ruling caste, with phenomenal intelligence, but all men will act instinctively as parts of the vital mechanism of a Greater Being.

There is another point of view from which we may follow the same analogy; the original free-swimming cell was composed entirely of different forms of that strange substance called protoplasm, which is practically speaking live matter; in the animal and vegetable bodies, although they are made of cells, all sorts of other materials of organic origin come into use in the structure; much dead matter is deposited as carbonate and phosphate of lime in our bones, the wood fibres in trees are principally dead cellulose, and a hundred more

cases might be cited; but still the body is built out of cells and their products, and cells have to devote themselves to special purposes, such as nerves, or to ~~the~~ secreting the material needed in building. In a hive of insects quite foreign matter is utilised in building the combs for honey, and for other purposes; showing that living matter has extended its dominion to substances outside living organisms. Finally, among men all manner of inorganic material has been added to the dominion of the life-force, so that we have houses of stone instead of cell-walls of cellulose; wires of insulated copper instead of living nerves. Indeed it is the lack of communication which seems the great bar to a communal mind among insects; if their sense impressions could be received at a central exchange, there would be a coordination in the movements of the hive which would resemble, at any rate, the working of a single intelligence. But it should be noted that this external material besides aiding coordination, to some extent renders degradation unnecessary. As an organic substitute for the telegraph we might have to post men, like the Earl of Queensbury's cricketers, along the route, to throw the message one to another. Men bred and specialised for this purpose might be contented, but they would not be men.

After all we may still hope, that the magnificent qualities and capabilities of the best type of man will render specialisation unnecessary. And that the small spirited nations were right in believing that Liberty was better than regimentation.