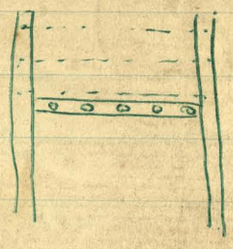

~~The origin of species as described in Darwin's most lucid masterpiece~~

The theory of the origin of species unfolded in Darwin's ~~most lucid masterpiece~~ work finds its strongest support in such indirect evidence as the origin of useful varieties of animals and plants by the conscious or unconscious application of selection by breeders and gardeners, as the classification of the animal and vegetable kingdoms according to morphological resemblance, ~~by~~ as the existence of useless rudiments, ~~by~~ the similarity of the embryonic forms of related classes, and the facts of geographical distribution, which was to some extent familiar to evolutionists of the Lamarckian school; the argument was however not wholly inductive; the tendency of all living things breeding unchecked to increase in numbers without limit necessitates a struggle for existence and a natural selection, not of "points" as in the case of the human breeder, but of every quality in the nature, instincts or development of the organism which assists the survival of the species; further it was assumed, from the strong principle of heredity, that this selection involves a progressive change in the ~~species~~ nature of the species so long as useful variations occur. There is nothing in modern investigations of heredity which contravenes this fundamental assumption, and although the argument, on the deductive side, must still be considered as incomplete, the position must be regarded as considerably stronger even than Darwin left it.

Perhaps the most noteworthy circumstance of the deductive argument is its universal applicability; in its essence it is simply that stable conditions persist and unstable conditions cease; for an organism greater efficiency or fitness for its environment means greater stability, or stability in a wider range of circumstances, and a greater proportion ~~continue to be~~, of such types continue to be, that is they survive in the individual or its offspring. In just the same way the elements of a radioactive series occur in quantities proportional to their stability, and a newspaper will find imitators in proportion to its popularity.

~~How~~ Remarkable in their ingenuity and diversity as are the adaptations of organisms to their physical conditions, the cooperative relations which we find established with their organic environment are even more wonderful. It is to the interest of the majority of animals to render themselves inconspicuous to their prey or to their pursuers; ~~they seemed imitating~~ in this way the lion simulates the colour of the veldt, the tiger is inconspicuous

among the grass thickets where it is found; arctic animals assume coats of white hair or feathers, and many arboreal insects, tree frogs and parrots, are green; the most remarkable resemblances are however special, that is to say the animal does not imitate the general background but some particular object familiar in its habitat. Thus we find (Wallace, Poulton, Bates, Weismann) caterpillars which mimic sticks, butterflies which, when at rest resemble the whole or part of a leaf; insects, and, indeed reptiles, which are dangerous or unpalatable, immune as they are called often adopt a striking coloration as a warning to possible enemies; these are often imitated by others ~~which~~ occupying the same region in order to share their immunity.

Weismann (Darwin ~~Century volume~~ and Modern Science III) describes an immunity ring of four different butterflies from Eastern Brazil, all of which are immune, but which prosper by their mutual resemblance in that it assists in the education ~~of young and inexperienced birds~~ of a serious enemy in the shape of young and inexperienced birds. Such a ring is a mutual advantage to all its members, but an immune species or ring may suffer from the imitation of a palatable species, since it may become less generally recognised as immune; as this disadvantage increases with the ~~num~~ proportionate number of the mimic species, so will the advantage gained by imitation decrease; ~~in this way~~ for this reason ~~several~~ polymorphic ~~species~~ butterflies are found which mimic several different immune species, so as always to be in a numerical inferiority; and doubtless also many have been driven by circumstances to become immune and ~~contribute to~~ help to build up the reputation of ~~the~~ a ring.

The phenomenon of parasitism is closely analogous to that of mimicry; the parasite relies on his host not for a formidable reputation, but for food and shelter; the chief difficulty is often to infect fresh hosts. This is all the more essential for parasites which cause the death of their host or which cannot be transmitted from parent to offspring. The transference is often effected by means of a second or intermediate host; ~~which is~~ the two hosts must have some sort of mutual intercourse, and one is often a parasite of the other. A familiar example is that of the great Stegomyia of tropical America, which bears a parasite which is the cause of yellow fever. The germ is transferred from man to man by means of the ~~great~~ infected gnat and from gnat to gnat by biting the same infected man, in a manner similar to the spread of malaria by the gnat Anopheles. A parasite which causes the death of both hosts is the liver fluke (Fasciola hepatica); the larva finds its way into a small water snail, the liver of which is also destroyed, and becoming encysted

on wet grass is swallowed by ~~sheep rabbit grazing~~ some grazing sheep, in which the species recommences the cycle of its existence. At every stage of such a cycle the enormous proportion of failures ensures that the survivors are well adapted, in their structure as well as in their inherent tendencies, to perform the series of actions required of them. As an example of a parasite which is ~~which is~~ of service to its host the experience of ostrich farmers in Cape Colony may be mentioned; the young birds hatched in incubators were found to die, until it was observed that in the natural state the chicks would pick up some of the droppings of the parent birds, and so establish in themselves a colony of bacteria essential to digestion; the chicks are now provided with a certain amount of refuse among which they can pick up a supply of the beneficent bacteria.

A somewhat similar case of cooperative symbiosis may be cited in the yellow cells of the radiolarians; these are really algae which profit by their position by receiving carbon dioxide and other waste products of the animal, and in return supply carbohydrates to their partner. The principle is that of specialisation, and division of labour between the animal and the plant concerned. Owing to the very great difference between the constitutions of the partners, the waste products of the one being the food of the other, ~~a great advantage~~ a very complete cooperation is here possible, without any great ~~special~~ modification of the participants, for their special ~~form~~ way of life; the fact that one is an animal and the other a plant is in itself sufficient specialisation. Cooperation between animals of the same species is rendered difficult and incomplete by the similarity of the contracting parties; but as if to make up for this difficulty it is often of advantage to the species to establish relations whereby only one party benefits, as is the case of females suckling their young, an altruistic situation which could never come into existence between different species; again when the benefit conferred is mutual the gain to the species is double as great as it would have been to each of two cooperating species.

The assistance afforded, among birds and mammals, of parents to their young while they are still helpless, and the cooperation of the two sexes to fulfill their duty, provide further examples of the manner in which ~~the~~ natural specialisation, in this case of age and sex, is utilised to establish forms of cooperation. Among animals of the same type ~~such~~ cooperation is usually of a much more simple kind. A pack of wolves are banded together by a common interest during the chase, but after a kill they return to an unfettered individualism;

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the larger ruminants herd together for defensive purposes, the herd being more easily warned of danger, and more formidable to approach than the individual. Galton has described how the circumstances in which they are placed are sufficient to account for the "stupid" herding instinct of S. African cattle. Cattle with too much initiative wander too far from the herd and perish; a herd of such animals would break up and be exterminated. On the other hand a certain number of leaders are required, the proportion depending on the most suitable size for a herd. Too large a herd could not obtain sustenance within the ordinary day's march, and a smaller herd would suffer a larger proportion of losses from beasts of prey.

The above example of the cattle illustrates in a very simple form two notable phenomena which will continue to occupy our attention. First we may notice that the incidence of selection is not determined only by the qualities of the individual but by those of the herd, the individual only contributing to this latter factor in so far as they are fit to be members of that kind of herd which is best suited to its environment. Secondly, we have an example of two animals specialising in two different occupations, one type being equipped with the instincts of a leader, the other being terrified by isolation and only comfortable among their companions. These qualities are no doubt inherited so that we may regard the two types as two incipient varieties, which however freely interbreed, and would neither of them be able to maintain a separate existance.

The same phenomena have become more highly developed among the social insects. In a bee-hive it is the survival of the queen and her offspring only which is essential, and the qualities of the hive, and of the individuals only as members of the hive, which is the object of selection. The two types of females, workers and queens are strongly differentiated, and specialised for many different functions; they however cannot be regarded as different varieties, since the workers are sterile and are produced only from eggs laid by the queens. Some species of ants produce many different grades of sterile workers and show in a higher degree specialisation for particular functions

In the previous chapter we have seen how, in the animal and vegetable kingdoms, the principle of cooperation is of sufficient value in the struggle for existence to give rise to a process of selection, by which instinctive habits, and other adaptations have been produced fitting the animal or plant for ~~a cooperative existence~~ cooperation, not only with other species, but even with members of its ~~own~~ own species, sex and age; that this cooperation for social life involves the specialisation of different types for different purposes, the specialised types at the same time suffering a degradation of some of ~~its~~ their functions and faculties in return for greater efficiency in ~~its~~ their particular vocations; further that this specialisation may go so far as to leave the vital functions of reproduction to one type only, the reproductive instincts and faculties of other types suffering degradation in order to allow for an increase in their efficiency for other purposes; while in other cases all types are capable of reproduction, and we are apparently concerned with an intimate case of symbiosis between nearly related incipient varieties of the same species.

The latter case finds its most complicated and elaborate expression in the manifold occupations and aptitudes of ~~the~~ human society; in the words of Mr W. Bateson:– "How hard it is to realise the polymorphism of man. Think of the varieties which the word denotes, merely in its application to one small society such as ours, and of the natural, genetic distinctions which differentiate us into types and strains – acrobats, actors, artists, clergy, farmers, labourers, lawyers, mechanics, musicians, poets, sailors, men of science, servants, soldiers and tradesmen. Think of the diversity of their experience of life. How few of these could have changed posts with each other. Many of these types are, even in present conditions, almost differentiated into distinct strains. In no wild species, not even among the ants, so often quoted, do we find any polymorphism approaching to this. I never cease to marvel that the more divergent castes ~~of~~ civilized humanity are capable of interbreeding and of producing fertile offspring from their crosses. Nothing but this paradoxical fact prevents us from regarding many classes even of Englishmen as distinct species in the full

sense of the term." In this diversity let us distinguish two different factors; firstly it is due to the different capabilities, aptitudes and instincts with which men are endowed; and which render some types of men fit to occupy positions, and to render services to the social organism, for which others would be utterly incompetent. The other is the natural versatility of men of great mental endowments, a true polymorphism of their type, which enables such men to fit themselves, according to accident, training or caprice to any of a large number of occupations. The first ~~type~~ cause of diversity justifies us in considering the various human types as incipient varieties, since it depends on innate qualities which are inherited. The composition of society as regards these types, will change according to the relative rate of reproduction, like the S. African cattle to which we have alluded. On the other hand, able men of a versatile stock who occupy different positions and professions in the social economy, belong to the same incipient variety, which may be reproduced indifferently from any of the classes which this stock chooses to occupy. If it were expedient they might all be reproduced by individuals set apart for the purpose, which their colleagues, freed from sexual cares, might become as sterile as is the case in bee communities.

It must be remembered that the different trades and occupations which men ply come into existence by the economic ~~forces~~ pressure of supply and demand. Those types which were incompetent to occupy positions for which there was a demand suffered, while those competent to fill many useful posts throve and ~~prospered~~ multiplied. The innate instincts of the genetic types composing the population acting and reacting with the traditions and established institutions of their civilization determine the ~~types of men~~ different occupations in which men may profitably engage, and the genetic types which will decrease, or ~~multiply~~ increase in number. This complex reaction between the individual and his human environment must have arisen gradually in the development of human societies; even now the process is responsible for grave waste and much misery, and without the long selection of ~~those~~ races most suitable for social life, would lead to unalterable chaos. In this way a process of tribal or national selection

Biological Fact and the Structure of Society, Herbert Spencer lecture, 1912

has led to the spread of races, whose instincts lead them directly or indirectly to make themselves of service to their state, who are willing to some extent to cooperate in trade and to abide by just laws, to cooperate in war and to obey their ~~rightful~~ appointed leaders, who rejoice instinctively in the possession of friends, and commend the virtues of justice and kindliness, even when they do not consciously observe, without consciously observing the advantage which such qualities bestow on the classes and races which possess them.

We find, then, men labouring together in cities, one taking on the work of another, supplying each other with what they need, so long as they perform some useful task, as if they were consciously serving some common purpose. The question arises; How far can this process of civilization go? How far will it go?

When we consider the body of an animal or man as a colony of cells, each having a separate individuality, each responding to its environment as a separate life-unit, we begin to see how ~~far the~~ far cooperation can go. Each cell has a definite task to perform, a definite profession is open to it, perhaps to build connective tissue, perhaps as a nerve cell, perhaps it will become a leucocyte; whatever the particular work is, there is some service which is expected of it, which it has a natural tendency to perform, and in performing which it is supplied with such nutriment or material as is required. There exists the most perfect cell socialism; the conscious government of the body concerns itself entirely with the external conditions in which it has to survive; if the internal cells are not fit to perform their duties, the animal suffers from some defect, in health or function, and is handicapped in its struggle for life. The ~~redundant~~ abundant health and surplus energy displayed by wild animals, indicates how perfectly the animal organism is adapted, in all its infinite detail, to secure that most wonderful ability to respond to ~~its~~ their environment which animals possess. The spectacle of a dog ~~having~~ pursuing a rabbit is ~~wonderful~~ remarkable enough when we consider the mechanism involved; but it becomes even more wonderful when we regard it as an example of social discipline, the ultimate perfection of cellular cooperation.

The comparison which we have made between nations of men, and bodies of cells is no mere analogy, but a true homology based on the intimate kinship

of the courses acting in each case. The organised bodies of animals and plants have come into existence by variation and selection, ~~in~~ exactly the same mechanism as has developed the social activities of man, and is developing them still further. In "The Grammar of Science" Professor Karl Pearson sums up the situation with admirable lucidity. "The struggle for existence involves not only the struggle of individual man against individual man, but also the struggle of individual society against individual society, as well as the struggle of the totality of humanity against its organic and inorganic environment. To include these omitted factors might at first sight appear only to enlarge the battlefield, to extend the chaos of ~~conflicting~~ opposing interests. But in reality it alters the whole aspect of life. The interest the individual has in developing to the utmost his own powers is a very important factor of change — let us call it individualism. But the interest individual societies have in developing their resources, in organising themselves owing to the intense struggle which is ever waging between society and society, this is an equally important factor, and one too often forgotten when the doctrines of Darwin are applied to human history. Individual societies have the strongest interest in educating, training and organising the powers of all their individual members, for these are the sole conditions under which a society can survive in the battle for life. This tendency for social organisation, always prominent in progressive communities, may be termed, in the best and widest sense of the word, Socialism. The Socialistic as well as the Individualistic tendency is a direct outcome of the fundamental principle of Evolution."

We are not ~~then~~ concerned with ~~whether~~ the question whether or not the above definition of Individualism and Socialism conforms to the doctrines put forward by those who call themselves Individualists or Socialists; the terms are sufficiently well defined by Professor Pearson ~~above~~, and we may use them in this sense so long as we clear our minds completely from any connotation which is not in accordance with the above definition.

The more closely we examine the homology presented in the last chapter, the more clear it becomes that ~~the~~ many of the problems which confront modern societies, have been met before in the animal kingdom, and that Nature has solved them in Her tentative, provisional manner by the pragmatic method of trial and error. It becomes clear too that we shall not properly understand human institutions, or human psychology, ~~until~~ until we can grasp their biological significance as factors in the evolution of society.

Let us obtain a clear idea of what instinct means to the Evolutionist. ~~The function of senso~~ Among simple nervous systems we are familiar with the phenomenon of reflex action, the response invariably made by an organism to certain stimuli; an instinct, from the external point of view, is a tendency to perform some definite series of actions under the stimulus of a suitable train of circumstances. As the standard of survival rises it becomes necessary to make an appropriate response to more and more external conditions; the organism has to be prepared for more and more diverse changes and chances in its mortal life; the instinctive responses necessary for its survival become ~~more and more~~ increasingly complex. Moreover, since it is manifestly impossible to fit a creature with reflexes suitable for all ~~circumstances~~ imaginable circumstances, it becomes necessary to develope a mnemic faculty, whereby past experiences may be utilized by the aid of vague generalised instincts such as the universal tendency to repeat successful experiments, and even more to eschew disastrous ones. We have here the biological significance of memory, with its necessary concomitants, imagination and consciousness, as the means of simplifying an overburdening complexity of instincts, a means whereby the individual is enabled to remember, to predict, to reason and finally to understand his environment.

The origin of reason, as ~~stated~~ sketched above, does not at all imply the disappearance of instincts as a whole, as the governing principles of human action. In the conscious mind an instinct is a motive or desire depending on the idea that the state of the individual will be more pleasant, more desirable, more happy if the instinct is obeyed than if it is not. Reason itself supplies no motive, its function is to replace a series of reflexes by a persistent pursuit of a desired end. Pleasure is Nature's bribe to persuade a conscious mind to obey its instincts. The terms "pleasure", "happiness" and "contentment" refer to states which differ in their duration, and differ in their intensity, but

it may be as well to emphasise their common origin in the need of persuading a free will (real or apparent) to conform to the course which selection has shown to be best.

As the use of reason becomes more and more universal we see that the very method of its application involves a serious problem; by reason we are continually overruling some tendencies for the benefit of others, and it seems not unnatural to suppose that a continuation of the process will lead to one ruling principle of human life. The universal instincts to seek for food, shelter and bodily comforts have almost been raised to this proud position. In his work entitled Social Evolution, admirable in so many respects, Mr Benjamin Kidd invariably uses the word "rational" as appropriate only to the "selfish" instincts; and indeed there is a very widespread prejudice in favour of considering such phenomena as sexual love, or religious awe as unreasonable. For a truer notion of what is reasonable we must look to survival value, the popular prejudice on the subject merely shows that at ordinary moments, those in which current opinions are coined, the comfort seeking instincts is paramount, and instincts are called unreasonable, merely because their predominance is occasional. It may be indeed that the altruistic or social instincts are actually less well developed than their survival value to Society would justify, the balance being made up by the action of the religious motives which we are about to consider.

Originally, there can be no question, the chance which a man or woman enjoyed of obtaining or retaining the necessities of survival, food, shelter and a mate, depended, among the factors which we are considering, wholly upon his or her personal abilities and proclivities. The motives which lead the individual to further his own survival must have been of violent urgency; greed, fear and sex passion must have in times have held overpowering sway, mastering the whole brain and senses with a completeness, which for us, modified as our passions always are by social instincts, and equally by intellectual criticism, is impossible of vivid realisation. How to make these unharnessed passions, how to break them in to subserve social interests, is the first problem which social selection has to solve.

Two ideas, or more strictly moods, must early have manifested themselves. Compassion, and Obedience, deep rooted in the early necessities of family life,

were destined to become the chief agencies of social unity, the ~~bases~~ bastions altars of Religions and States, the rails along which alone our social machines can advance.

It ~~was~~ is with the gradual growth of these two moods, and possibly of others, since our psychological analysis makes no pretence to finality, that the drama of Social Evolution opens. Obedience to the head of a family or clan, is from the first associated with rewards and penalties, good and ill fortune come to be connected with the beneficence or displeasure of things other than men, as the spirit of a departed chief, or of a thunder cloud; in fact ~~without~~ without involving ourselves in conjectural details, the steps are numerous and easy by which primitive religions might have been built up; it does not concern us which particular line of thought was historically the most efficacious. What we are concerned with is that these and kindred moods, are of positive survival value in restraining the violence of the pristine instincts, and especially that definitely religious conceptions, such as God, the Giver and the Avenger, have the same effect in a somewhat more subtle manner, by diverting the Individualistic instincts themselves from their original purpose, and transforming them into motives of kindness and obedience. Hence, we see, it is natural that races who have long enjoyed an advanced social code, should find in the cruder forms of their religion, ~~motives which~~ appeals to motives which are repulsive to the higher social instincts which have since become more generally developed.

The essential function of religion, as well as of the social instincts is to restrain the individual from advancing his own interests at the expense of those of the society to which he belongs. We are not, it would seem, directly concerned with the conceptions and doctrines by means of which religions accomplish this end, but merely with the precepts of a faith and the practice to which these give rise. When we come however to examine the precepts of those religions, and religious conceptions which have most widely influenced the human race, we see that they are closely associated with generalised religious conceptions, and that these latter, as the more general and fundamental, throw more light upon our investigation than the laws and

ordinances of religious bodies, and even those texts and quotations familiar to the people.

Primarily, then, we find that the will of the individual is to be overruled absolutely by ordinances representing the Will of God, and it is this conception of God which is all important in the development of religions. God has a purpose in the world, which purpose every man must serve on pain of dire penalties. God loves the faithful and obedient as His own children, and will bring them to great felicity. The wicked who know not God, who hate or oppress the faithful, shall be consumed and all their works shall perish; they are the enemies of God and He shall overthrow them. The righteous are content and praise God for His blessings, owning a perpetual debt to God, which however is forgiven them so long as they serve Him faithfully. The wicked are arrogant and willful, and shrink not by His commandments, but follow after their own hearts desire. These examples are, of course, conceptions common to Jewish, Christian and Mahommedan writings, where they find their most complete expression, but the notion of an absolute and personal debt or duty to a superior power is evident in the prevalence of sacrifice in less spiritualised religions. Throughout European history the influence of Christianity is evident in making men humble, content, industrious and therefore useful members of their states; in modifying men's tastes in conformity with those which can be gratified under civilised conditions; in developing those faculties, as in literature and craftsmanship which are conformable to quiet and orderly life lives; in repressing the instincts of independence, pride, pugnacity, acquisitiveness, and rendering each dependent for his mental comfort as well as for his material well being on the good opinion of his neighbours; not only in teaching the duty of forbearance, kindness, beneficence, but in emphasising the pleasures attained through these as the only earthly pleasures worth attaining, the only true pleasures attainable. And when sentiment in this last direction has developed far enough we must remember that true happiness is to be found, not in any earthly pleasure of those around us, but in seeing laying the foundations of immortal bliss, approaching daily nearer to God, growing more and more into the likeness of the Perfect Man; and that we must truly fulfill our functions in life as true members (or organs) of the Corporate Church.

The nature of the influence of ~~religion~~ the social instincts, aided by religious conceptions, on the development of human societies may now be clearly realised. It is a persistent and continual tendency to oversule the interests of the individual (these interests being invariably estimated in relation to the innate tendencies of the individuals of any particular epoch), and to exalt the interests of society. To lower the individual standard of living, or, more accurately, of dissipation, by ordering him to renounce his dissipative activities. To render the path of complete social service more and more conformable to his aptitudes and desires, in fact more easy and more pleasant. To make human instincts coincide exactly to the economic interests of the race. To procure as a complete a cooperation between human ~~units~~ units, as exists between the cells of the human body; so that, as in the healthy body, every ~~cells~~ cell is well nourished, and well protected; each possesses those innate tendencies, and the right environment to foster those tendencies, which most contribute to the welfare of the whole; so that every individual is naturally specialised for a particular vocation, with complete atrophy and degradation of unnecessary faculties, so that there is at no point of its career any possibility of hesitation, but that it is guided inevitably, following its instincts as well as its influences, in the predestined path.

If, however, we follow a predominant line of modern thought in considering the increase of human happiness as the end of social endeavour, we are led face to face with a serious paradox. It is true that the Utopia sketched above bears a considerable resemblance, in its essential features to the Heaven of joy and service ~~imagined~~ as conceived by many Christian thinkers. A social life in which there is no evil or sorrow, in which all are helpful and strong to help, where all, in amity, many serve the Will of a Higher Being, certainly realises a great height of spiritual aspiration; it is only when we turn to the consideration of the nature of happiness, outlined earlier in this chapter, that doubts begin to arise.

~~We cannot help observing~~ ~~Although~~ Happiness, we have seen, is Nature's reward for obeying ~~this~~ an instinct, and in spite of this undeniable fact, nay, because of it, we cannot help observing that the more complex ~~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 or a man's interest should be centred on those objects, necessary to survival, which are hardest to obtain; the greater effort

requires the greater reward. A dog which is well fed, and indifferent to its master will not readily learn to do tricks; which others, for caresses or food, and often for the very admiration and applause which its performance provokes, will display most remarkable intelligence and dexterity. Among simple people men will endure long toil and severe hardships in order to obtain for themselves land and substance; even more remarkable dangers and difficulties have to be encountered in order to secure some particular woman for a mate; in cases such as these we cannot doubt that the pleasures of success afford ample compensation for the pains endured. This consideration by itself suggests that our pleasures will be of a typical nature, if ever our instincts become easy to obey. For the individual indeed this is only partially true; the satisfaction of instinctive desires, even when actually attended by no difficulty may give rise to considerable satisfaction; but it is evident that the desires themselves would never have become so strong, nor the pleasures afforded so vivid, if the achievement had not been in the past one of great difficulty. Long ages of rivalry between males, accentuated in human times by female infanticide and polygamy, have resulted in the sexual instinct being that most favoured by poets.

We have however another side-light on the problem, which lends support to the above considerations; the very existence, real or apparent, of Free Will implies a multiplicity of possible courses, a conflict of instincts. If ever the instincts were to become so perfectly adapted to economic needs that the wisest course was invariably followed, we should have no power of choice, no need for motives, for rewards and penalties, no use for reason, deliberation, consciousness; nothing but an automatic reflex action.

The state of society as modified by the perfection of the social virtues, which we have now considered, will strike the majority with a sense of profound disappointment; and this is natural, since it is evident that our ideals and ambitions have not yet been wholly ~~sent~~ transformed to minister to social well-being. Nevertheless, it is in this sense of dissatisfaction that we come face to face with a problem of profound and overwhelming importance, the factors of which overshadow every feature of interest in human life. The virile qualities which we most admire, the characteristics of those whom we recognise as the greatest among us, are to be steadily sapped by the subservient position of the individual, and finally lost by atrophy. There will be no place for the ~~[illegible]~~ courage ~~which~~ to face personal destruction, or moral obloquy; for the passion of the poet; for the devotion of the idealist; for the insight of the critic, or for the powerful self control of deep wills. Seeing how unique the possession of human consciousness may be, for how long the earth was tenanted ~~only~~ by life no more conscious than the lower animals, it is not unnatural that we should anticipate with regret the loss of what may well be the most precious product of the visible universe. Nevertheless we must constantly bear in mind that the solution which commends itself to Nature, and which is of interest to ourselves as the future state of our race, is ~~not~~ characterised not by any conception of human happiness, or by the most magnificent realisation of human ideals, of this age or of any other, or by any such considerations, but solely by its stability and power of survival.

We may well imagine a debating society of amoebae, at a time when the movement towards cooperative cell groups was but dimly manifesting itself, discussing how undesirable it would be if free swimming protozoa with all their faculties intact, contractile, irritable, aggressive, capable of absorbing varied food, and of unlimited reproduction, should ever band themselves together to form a many celled animal, should degrade and lose one or more of the faculties in which they felt it right to glory, in specialisation for some ~~sing~~ single function; should lose, perhaps, their free motion, and lead out a sessile life imprisoned in a wall of cells as inert as themselves. They might despise ~~the~~ an offer of blissful freedom from cares and animosities, the abundance of food, the equable temperature, and yet overlook the essential 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 were barely recognisable. And further that associated with these cells, who had sacrificed their personal ~~interests~~ inclinations

to serve a purpose altogether transcending their own interests, there would arise a mind and a will, not associated with one cell or another, but with the whole aggregate of the nervous system, beside which the mind of an amœba would be, as it is, utterly indiscernable.

With these considerations in our minds we are in a position to appreciate two very significant features in the modern political history of Europe. The tendency for national divisions to fall along ethnic lines, and the tendency to bring the individual into closer personal relations with the central authority of the state. The first is exemplified by the rise of the German Empire and of ~~modern~~ Italy, and, it would appear, is the governing factor in the destiny of the Austrian Empire and the Balkans. It is the expression of a deep-seated desire ~~among~~ people of all races to share ~~their~~ their destiny, success or failure, wealth or poverty, with those of their own race; and, what is more important, it represents the consciousness of the individual that his personal welfare, not only the satisfaction of his ~~ideals~~ desires, but the fruition of his ideals, is bound up in the progress or decay in the State of which he is a part. The second tendency ~~also~~ illustrates the lines along which this ~~tendency~~ some sentiment tends to develope, in a state which is free from severe social cleavages. The State progressively issues and assumes more and more duties towards the individual, the ~~individual~~ becomes more and more dependant, for his comfort in mind and body, on the faithful service which he pays to the State. The State not only protects the individual from violence, and many forms of fraud, but provides him with the ~~rudiments~~ of military and industrial training; it assumes further a responsibility for his health, ~~gives him~~ and even for his employment; it stories for the commercial and industrial success of its own citizens, and fosters those industries, such as agriculture which it deems of intrinsic national value; it sets up enquiries where knowledge is lacking, and supplies information wherever it is thought possible to further national prosperity by this means. In every walk of life men find themselves brought more and more closely into contact with the ~~vast~~ organisation ~~with~~ of their nation; energetic state officials occupy the places of his schoolmaster, his banker, his employer, his creditor, his ~~partner~~ and his ~~passenger~~ storekeeper; his opinions are supplied by a government press, and his early ideals by the state schools.

These ~~intimate and~~ increasingly intimate relations between the state and the individual could not have progressed far without bringing into prominence ~~the social organisers~~ ~~being~~ ~~faced by~~ a series of intricate problems connected with the biological structure of society. Several classes are soon detected as being actually harmful to the community, and it becomes in addition evident that the civic worth

of different strains differs to an extent which is scarcely credible. The main ~~difficulty of~~ obstacle to national organisation lies in the difficulty of obtaining a sufficient supply of officials of unquestionable probity, combined with fair ability and an eager attention to duty. In the same way the success of every institution depends entirely upon the human element; according to the proportion of different strains, a nation may find it easy to foster commerce, but impossible to suppress corruption,

The solution of the problem of specialisation within the society by means of adaptability of ~~a single~~ individual types, whether that adaptability is due to educability during youth or to versatility in adult life, as opposed to an actual diversity of different types within the social organism, is as we have seen successfully adopted by insect communities; it may now be noted that the same method is not inapplicable to the problem of specialisation in human societies. All the occupations in a human society may be supplied with the human type appropriate to them, if those engaged in such occupations maintain a birth rate not inferior to that of the general population, but it is not difficult to find professions, popular among the highest intellectual and social types, ~~in which either the economic reward is insufficient~~ those engaged in which are on the whole unwilling to undertake the responsibility of marriage, or at all events of a ~~self~~ family sufficiently large for eugenic purposes. The reasons for this may be divided into two classes, on the one hand we have love of ease and of a bachelor life, and the economic pressure exerted by those in maintaining an artificially high standard of living, on the other hand there are cases in which the economic reward is actually insufficient, or in which the conditions of service in an unhealthy climate, or in other immediate danger to life or efficiency place difficulties in the way of marriage, or as is sometimes alleged of an academic life complete devotion to duty ~~can~~ is only consistent with freedom from family cares. With the first class of objections we are not here concerned, the second class whenever they are judged to be valid deserves some close and careful consideration. If only in view of the immense value such persons may be to the survival of their nation, or to the civilization of humanity. A solution lies ready in the adaptability of certain types; as is well known the landowning families during, for instance, the eighteenth century provided younger sons

In the same way, wealth being now predominately possessed by ~~industrial~~ commercial and financial houses

In order to ensure that no degeneracy takes place, either in the qualities required for the actual profitable family occupation, or for those of the comparatively shorter social services of the cadets, it is necessary that no selection should take place in choosing which son is best adapted for occupying the position of head of the family, as opposed to the position ~~of~~ commonly held by the younger sons. If any selection is to take place, the qualities ~~suitable~~ suitable for a cadet must count as heavily to the credit side of the chosen head of the family, as do those qualities suitable for the actual occupation of the central position. Such a selection would be difficult to make, since it is ~~rare~~ rare for a man to attain distinction in more than one profession; but in primogeniture we have an admirable method of preventing the soldierly, adventurous, heterozygotic qualities from being squandered by the permanent landowning families. That there is any ~~degeneracy~~ necessary degeneracy in the direct line of eldest sons may be disputed; regression may be expected towards the mean, not of the whole population, but of the ~~landowning~~ class from which the eldest sons choose their ~~wives~~ wives. And a slow continuous economic process is undeniably eliminating those landowners who are unfit to own land, and replacing them by a class ~~who~~ who have attained, on the whole, distinction in administrative ability.

From the selection standpoint there remains a solution which does not involve adaptability; the direct central line may be heterozygous in one, two, three or more ~~fatal~~ characters; then $\frac{1}{2}$, $\frac{1}{4}$ or $\frac{1}{8}$ of the children will be like their parents, and fit for the central position or for passage with the direct line, the others will in general be different in type and may lead erratic lives in ~~st~~ some public work, without endangering the prevalence of their ~~personal~~ gifts, provided they are represented by nephews and nieces in the direct line; in this case primogeniture would be inescapable and it would be necessary to determine, both with regard to the heir and his wife, whether they were actually heterozygous in the required characters.