

POPULAR LECTURE: THE BIOLOGY OF HUMAN NATURE

The Popular Lecture of the Centenary Meeting was delivered by Professor JULIAN HUXLEY in the Great Hall of University College on the evening of July 29th. Dr. E. KAYE LE FLEMING presided over a crowded hall.

Professor Huxley began by pointing out that man was in many respects a unique organism. He was an animal, but with properties so different from those of other animals as to place him in another kingdom. Certain properties which he had in common with other organisms—glands, chromosomes, and the general machinery of anatomy and physiology, immunity reactions, and biochemistry, and the process of ancestral evolution—must be taken for granted, but he was biologically unique in regard to the variation which he displayed within the single species and in the qualities of his mind. The latter was the more important, because it was really the cause of the former. In man mind had evolved to greater fluidity than in any other creature. In lower organisms there were rigid instincts which automatically brought about a certain kind of urge, followed by a certain kind of action. In the higher types there was a certain margin of plasticity of behaviour, but in man such plasticity passed a critical point and became the dominant feature, to which the rigid instincts were subordinate. Where instinct was dominant, the instinct, the urge, and the response made but a single channel; in man the process was rather that of a series of reservoirs, separated or connected by elaborate dams or sluices. Thus in one individual knowledge might be pursued for its own sake, giving the scholar and the scientist; in another the reservoir might be at the motor end, yielding satisfaction in pure skill, as in mechanics or dancing; or again it might be in the emotions, resulting in the lover or the mystic. In man, too, the different channels ceased to be isolated, and several or all of them might unite to give complex emotions, resulting in new urges and new behaviour. In love, for example, every possible emotion could be linked up to reinforce or counteract the primary sex instinct, giving a complex emotional stimulus which had no parallel in animals.

DEVELOPMENT OF ABSTRACT IDEAS

Man had also been able to reach the plane of conceptual thought, which had made possible the evolution of language and the development of abstract ideas. Language had led to the development of tradition, biologically a unique thing, constituting a social form of heredity operating side by side with the true or biological form, and making it possible for things to happen much more quickly in human affairs than in those of any other species. The fact of abstraction had been less thoroughly established, but was none the less important. Once it could be said that a thing was good or true, some standard was presupposed which was crystallized in abstract words, such as "goodness" or "truth," and because there was a word "truth" it was almost automatically believed that truth existed as an entity, and that there must be some absolute truth to be discovered.

Professor Huxley then passed to consider the large part which incertitude played in the life of man—intellectual indecision, emotional conflicts, suspended judgement, and all inner states which did not permit of useful action as an outlet. A great part of human development consisted in the resolution of conflicts and the establishment of sufficient certitude for action. Very lowly animals could react in only a few ways and respond only to limited situations. All the situations to which the jellyfish could respond were the food situation, the situation of well-being, and one or two situations of discomfort. In more complex organisms inhibition secured certitude of action at various levels of behaviour. He illustrated this from

the mechanism of opposing muscles and of reflex centres. In animals with clear-cut instincts it was extremely rare to find two instincts interfering with one another in behaviour. When the situation was such as to arouse two competing instincts, they came into action alternately. In most animals the competition between instincts was also reduced by the fact that the breeding season was limited to a short period of the year. By artificial means, as Pavlov had demonstrated with dogs, situations might be imposed upon animals which were incapable of being resolved, but in the ordinary way the temporary indecision which a situation might demand was of brief duration, one or other of the primary instincts gaining control.

MAN'S VARIABILITY AS A SPECIES

In man these states were of much longer duration. The method of reducing incertitude and conflict always involved the same principle of inhibition of one set of impulses and reinforcement of another, but neuroses and certain types of insanity were the result of very faulty methods of applying inhibition. Man also was the one organism who was never complete in the sense that animals might be complete; he was continuously discovering new desires and satisfactions, and he was the first organism to substitute conscious reason and purpose for habit and instinct as a means of securing action. The real biological problem confronting man was to prevent himself from taking short cuts for the resolution of his inevitable conflicts and the securing of his necessary adjustments.

Another important factor was man's variability as a species. Nature tended to an enormous multiplication of species with very little variation within each, but in human evolution two factors had operated to produce a result quite different from elsewhere—namely, mass migration, which kept on bringing the variants into contact, and also the fact that it was tradition more than structure or instinct which regulated human behaviour. As a result of constant migration and generalized instinct, the divergent groups of men had never succeeded in becoming isolated physiologically. By virtue of interbreeding between migrant members, single groups came to throw up a much greater range of types, owing to Mendel's law, than would a wild species, and this produced further curious consequences. It meant that there must always remain a residuum of incomprehensibility between different members of society. The tough-minded could never really understand the tender-minded; the moron could never appreciate the philosopher, or vice versa. It was true that conflict would exist were all human beings alike, but their diversity of type increased the range of conflict.

The realization of this special characteristic of diversity also emphasized the need for the individual treatment of human problems. "We shall never succeed," Professor Huxley said, "unless in every problem involving human material we pay as much attention to individual differences as to common resemblances." Man, an organism of unlimited desires, must lead a limited life; capable of abstract thought, he must live in a concrete environment; with a mind impelling him towards unity, political and social, he could not help generating diversity, and having been born helpless, and required to adjust himself to a social environment, he must know frustration as well as achievement.

DEVELOPMENT TOWARDS RATIONAL ACTION

The lecturer distinguished three stages in what he called the "soul's progress"—namely, the pre-rational, the rationalizing, and the rational. In the first stage the human being had neither the experience nor the capacity to deal rationally with the situation. Adjustment during this stage was by simple habit formation, but where conflict persisted it might be necessary to use one part of the mind against another, one set of impulses to suppress another, and thus establish a sort of hierarchy in the

emotional system. But the structure of the personality that developed in this period was by no means suited to more mature situations. As the process was primarily unconscious the basic structure thus laid down was relatively inflexible, and if it should prove unsuitable to the later development it was called upon to undergo there would be trouble. Appeasement of a sense of guilt by mere penance or punishment, or the striking of moral bargains, was a sign of the resolution of conflict on the pre-rational plane.

The rationalizing stage was one in which the rational faculty was growing up and demanding exercise. Justification was now sought in the way of reasons for actions and feelings; the reason was enlisted to aid in the resolution of emotional conflict. In the third stage, which was the rational one, there was a deliberate facing of limitations and the working out of a rational technique of living. In the final outcome the rational mind rejected all absolute solutions and remained obstinately relativist. Modern science laid no claim to the possession of absolute truth; it allowed more and more that all the truth it discovered was not absolute but relative. But science was a method—it appeared to be the only method—of discovering constantly more truth, and it became so by declining more and more to employ abstract principles. Science no longer even pretended to deal with ultimates; its most elaborate systems were mere conveniences. Yet, in spite of this, science had proved to be the best method of achieving practical certitude in the fields to which it had been applied.

All this might seem very commonplace, but pursued to its logical conclusion it became important, for it presented a new unifying concept by which the individual could combine stoic resignation with hopeful enthusiasm, could combine the negative and positive in rational union—namely, the concept of development. To talk in terms of ultimates and absolutes was a sign of immaturity;

development must be achieved by thinking in terms of processes and relations. Professor Huxley thought it safe to say that the next fifty years would see an enormous advance in the technique of the development of rational personality. The urgent need was that the eugenic idea should permeate the common consciousness, and the close connexion between social organization and racial change should be vividly realized, also the spread of the conviction that the most nearly ultimate thing was neither salvation in the next world nor wealth in this, but the pilgrimage of the individual to his own maturity.

In these developments, Professor Huxley concluded, the medical profession was called upon to play a notable part. Medicine could not help but make contact with every branch of activity. He supposed that historically the medical man must begin as a "medicine man," a man whose function was to cure a particular complaint in individual patients. In the last century a second main advance had appeared, that of public health and preventive medicine; educational and industrial medicine had also arisen. To-day two new fields were calling for fuller invasion by medicine: one was psychology, especially normal psychology—the idea of psychological public health must arise; the other was racial medicine. Both the quantity and the quality of the population were very important factors in the general well-being of the community. The individual medical man should be prepared to advise on conception control and hereditary prognosis. Moreover, the economics of the profession needed eventually to be reorganized so as to make the prevention of disease more "paying" than its cure.

A vote of thanks to Professor Huxley was accorded on the proposition of the chairman, Dr. LE FLEMING, seconded by Dr. A. J. ORENSTEIN, who remarked that one of the rarest things to be encountered was fearless and original thinking, of which the audience had had an illustration that evening.

VETERINARY CONGRESS

The annual congress of the National Veterinary Medical Association of Great Britain was held at Folkestone from August 8th to 13th, when a number of papers of medical interest were presented. At the annual business meeting the name of the association was changed to "The British Veterinary Medical Association."

On August 9th Mr. R. LOVELL of the London School of Hygiene and Tropical Medicine read a paper entitled "Relation of meat and meat products to bacterial food poisoning in man." He pointed out that such poisoning might be due to *Salmonella* bacteria, to the pre-formed toxins of *Cl. botulinum*, to staphylococci, and, if present in large numbers, occasionally to comparatively harmless bacteria. In Britain, the usual cause was the *Salmonella* organisms. He believed that a large number of cases were due to food which was originally sound but subsequently became contaminated during preparation; in these cases, rodents and dogs were possible sources of infection, rodents which were being destroyed by viruses being particularly dangerous. In a number of cases, however, infection had been traced to the food-animal itself, and emergency slaughter was the prime danger in these cases. Eggs, particularly duck's eggs, might on occasion be not without danger to man.

On August 10th Lieut.-Col. T. DUNLOP YOUNG discussed meat inspection in Britain and abroad. He emphasized the lack of any organized system in this country and the laxity of the veterinary profession in securing the right due to the members with their special training to be recognized as experts in meat inspection, as in other countries. The present law, he declared, was in need of amendment, and the English law was much behind that in force in Scotland and other countries. At the same meeting Major D. S. RABAGLIATI discussed milk inspection in a similar manner, comparing the administrative methods and milk regulations, the part played by the

veterinary profession, especially in regard to the inspection of milch cows, the methods of dealing with bovine tuberculosis, and the powers available by which milk from diseased cows could be prohibited from use, in the various countries.

On August 12th Captain R. SIMPSON discussed the clinical examination of the cow's udder, emphasizing its importance on account of the veterinary surgeon's increased responsibilities at the present time in connexion with the milk supply. He believed that most of the pathological conditions could be diagnosed clinically, combined with accurate microscopy. He discussed fully the clinical features of tubercle infection of the udder, paying particular attention to the pre-clinical stage when bacilli are being eliminated in the milk. At the same session Dr. W. HORNER ANDREWS considered vaccination against bovine contagious abortion and the relation of the disease to human undulant fever. He pointed out that while it was now certain that *B. abortus* might infect man and cause undulant fever, and while many cases were probably undetected, the total number must be comparatively small. The organism had only a low virulence for human beings, but some individuals appeared to be more susceptible. Some strains also were more pathogenic, particularly porcine strains. Milk accounted for less than half of the human cases. Abortion could be ideally eradicated by isolation methods, but these were often impossible. Sanitary methods, while valuable, were insufficient, while dead vaccines gave only a weak protection. Live vaccines, however, seemed generally to prevent abortions or reduce their numbers considerably. They did cause a proportion of udder cases, but fewer than the natural disease. So long as the live vaccine was used for infected herds only, their use was beneficial and unobjectionable; they must never be given to pregnant animals.

Among the other subjects discussed were recent advances in veterinary therapeutics, anaerobic infections of sheep, and gastric and intestinal diseases in dogs and cats.