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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

DARWINIAN ETHICS AND ITS PRACTICAL APPLICATIONS[1]

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IT not infrequently happens that when one is called upon to deliver a presidential address he chooses a subject quite outside his own field of competence. This procedure has its dangers, of course, especially for the naive and unwary. In extenuation of my own intrepidity in venturing to discuss Darwinian ethics I may explain that in spite of the extensive literature which this subject has called forth it has rarely received adequate treatment and is not infrequently grossly misrepresented. Few people who accept the Darwinian theory of evolution realize its far-reaching import, especially in the social sciences. Sir Arthur Keith has remarked that "even our leading biologists and masters of history are evolutionists only from the lips outwards." The same statement is even more applicable to writers on ethics. Although there has been a number of relatively scholarly discussions of Darwin's views, in most books on morals the Darwinian standpoint is presented, if at all, in a few words, followed by a more elaborate criticism of the ethics of Spencer, which has commonly been treated as typifying the ethics of evolution. The subject has now lost its novelty. Ethics is still closely affiliated with metaphysics and theology, and Darwin,

[1] Presidential address before the Western Division of the American Association for the Advancement of Science, Stanford University, June 27, 1939.

having been assigned to his proper little niche, is passed by with little appreciation of the real extent of his contribution.

Darwin's views on ethics are a logical outgrowth of his theory of the causes of evolution. Although this theory has encountered no dearth of adverse criticism, I think I am justified in saying that its essential features are now more widely accepted than at any previous stage of its history. Certainly no other theory has succeeded in approaching the status of a formidable rival. If we assume that this theory is correct and carry it out consistently in all its implications, where will it lead us in the field of ethics? On this assumption we, like the lower animals, owe our native endowments of mind and body to the preservation of favorable variations in the struggle for existence. Our explanation of how we came to be constituted as we are falls into the same general formula as our explanation of the origin of a tough hide or sharp teeth. These latter characteristics are obviously very useful adjuncts to survival in this world of strife, and natural selection would seem to be peculiarly suited to afford a naturalistic explanation of their origin. But the attempts to explain man, with his superior intelligence, his high sense of duty and his capacity for esthetic appreciation and religious feeling as the outcome of the same process of selective survival naturally aroused strenuous opposition. The co-discoverer of the principle of natural selection, Alfred Russell Wallace, who was more of a natural selectionist than Darwin in relation to most evolutionary problems, stopped short of applying the theory of natural selection to explain the distinctive endowments of man. A similar position is held by many philosophers and liberal-minded theologians and by the more enlightened leaders of Catholic thought who accept the doctrine of evolution. But Darwin, who had become pretty much emancipated from all theological prepossessions when he wrote the "Descent of Man," was of a different cast of mind. In the "Origin of Species" he said almost nothing in regard to the application of evolution to the human species, beyond the remark that "light will be thrown upon the origin of man and his history." But it was this very aspect of Darwin's theory that made the strongest impression upon people in general, who were much more concerned with their own origin and what this might imply than they were with speculations on the origin of species.

The "Descent of Man" formed an original and very apposite sequel to the "Origin of Species" because it afforded the opportunity to round out the general doctrine and to show its important bearing on human psychology and the social sciences. Aside from that part of the work dealing with sexual selection, the "Descent of Man" is devoted to setting forth the evidence from morphology, embryology, etc., indicating the descent of man from animals resembling the apes, to showing that the human intelligence differs from animal intelligence only in degree instead of in kind, and that morality, and even religion do not imply the possession of unique endowments but are outgrowths of man's superior intellectual development and the social instincts and emotions which man shares to a certain extent with the higher mammals. In the "Descent of Man" Darwin ventured upon relatively unfamiliar territory when he discussed the moral sense and the standard of ethical conduct. Traditionally, the field of ethics had been appropriated almost exclusively by theologians and philosophers. Darwin, who never concerned himself with the subtleties of metaphysics, approached the subject apologetically, with the remark that the moral sense "has been discussed by many writers of consummate ability and my sole excuse for touching on it is the impossibility of here passing it over; and because, so far as I know, no one has approached it exclusively from the side of natural history." Only as a naturalist, therefore, did Darwin presume to touch upon the great problems of morals, and he did so for the simple reason that it lay across his path. If man is, as Spencer states, organically moral, Darwin's theory must be able to explain how he came to be so. A thoroughgoing Darwinian can hardly afford to admit the existence of entirely unique endowments that do not have at least their roots in more primitive forms of life.

Social life in animals is possible only on the basis of a certain degree of altruism. As Zell has shown in his work on "Morale in die Tierwelt," animals have a sort of moral life which in its fundamental features is much like our own. Man is a social animal, and because of this fact he is a moral animal.

> Any animal whatever [says Darwin] endowed with well-marked social instincts, the parental and filial affections being here included, would inevitably acquire a moral sense or conscience as soon as his intellectual powers had become as well or nearly as well developed as in man . . . the moral sense follows, firstly, from the enduring and ever-present nature of the social instincts; secondly, from man's appreciation of the approbation and disapprobation of his fellows; and thirdly, from the high activity of his mental faculties, with past impressions extremely vivid. . . . Owing to this condition of mind, man can not avoid looking both backwards and forwards, and comparing past impressions. Hence after some temporary desire or passion has mastered his social instincts, he reflects and compares the now weakened impression of such past impulses with the ever-present social instincts; and he then feels that sense of dissatisfaction which all unsatisfied instincts leave behind them, he therefore resolves to act differently for the future—and this is conscience.

This view of the origin and nature of conscience, here sketched in merest outline, was utterly at variance

with the prevailing notions of the time. Conscience has always proven to be a very troublesome faculty for the moralists anyway. The recent searching analysis by T. V. Smith in his volume "Beyond Conscience" has effectually disposed of most of the attempts to justify conscience as a dependable guide to good conduct. If we grant that conscience always means well, we must remark that it has often approved the burning of witches and heretics, and countless other foolish and wicked actions. Apparently there is no atrocity or baseness that it will not condone if it is subjected to the right sort of preliminary education. No one, except perhaps Nietzsche and his followers, would deny that conscience, despite its obvious shortcomings, is a very valuable if not indispensable aid to decent living in an organized society.

That conscience is not infallible when it might be expected to be according to many theories of its nature and origin has sorely perplexed moral philosophers for ages. But the annoying imperfections and inconsistencies of this unreasonable faculty are not at all disturbing to one who considers it purely from the standpoint of natural history. When the Darwinian looks on the organic world he expects to find adaptation, at least in a broad and general way, but not perfection. He is as much pleased with a vestigial eye or a useless ear muscle as he is with a remarkable case of protective coloration. They are all grist for his mill, provided that their origin may plausibly be interpreted according to the principle of natural selection. A conscience that is always right would fill the Darwinian with dismay.

It is evident that conscience is no single discrete faculty or organ of the mind, but a general term for a class of intellectual and emotional reactions. Its emotional components impel us to follow what we judge to be right, and our judgments on this score are usually determined by the mores of our associates. Its voice is the voice of the group or, as Clifford has called it, the tribal self. We are social animals endowed with social instincts which make us sensitive to the esteem or disregard of our fellows, and with sufficient intelligence to reflect upon our acts and to judge them in accordance with prevailing standards. Hence, according to Darwin, we are moral animals and have a conscience which is on the whole a fair though far from perfect guide to the kind of conduct which meets with moral approval.

Unquestionably, one of the greatest contributions of Darwinism to the social sciences is the light which it throws on the constitution of human nature. The traditional explanation prevailing in Darwin's time was that man is as he is because he was so created, although his original divine image was sadly marred as a result of the fall and the continued machinations of Satan and his cohorts of evil spirits. From the moral standpoint man is an exceedingly variable animal. He is at once courageous and cowardly, kindly and cruel, honorable and deceitful, proud and humble, generous and grasping, just and partial. He is capable of attaining sublime heights of moral excellence, and, on the other hand, there is no depth of infamy and degradation to which he will not descend. We need not concern ourselves with the theological interpretations of these remarkable diversities of character. Devils, evil spirits, principles of evil and doctrines of total depravity, notwithstanding the high ability and profound learning of many of their apologists, we may dismiss without further comment. The efforts of the various proponents of the experience philosophy to explain the development of mind and character have proceeded along much more scientific lines, but their failure is now commonly recognized. It is a noteworthy fact that up to the time of Darwin we had no scientific explanation of human nature that was worth a rap. The history of human thought is strewn with interpretations of human nature of the most artificial and wooden description. Man has never understood man, and the worst feature of this failure is that his misunderstandings have been fraught with incalculable evils throughout the course of human history. Flogging the insane and keeping them chained in filthy dungeons, the barbarous treatment of criminals and the petty cruelties inflicted in the discipline of children are among the many evils growing out of mistaken views of the nature of man which are gradually giving way to a more rational understanding. With a more scientific interpretation of man the cruelties of witchcraft, the horrors of religious persecution and the multitudinous barbarous practices that have been the outgrowth of superstition would not have occurred. Human history has emphasized the tremendous importance of the maxim, "Know thyself." For ages man has occupied the unfortunate position of a sort of meeting ground between the natural and the supernatural. Through sorcery and other magic powers he might influence others for good or for ill, and demoniacal possession accounted for disease. The demons are not yet all exorcized by the growing light of science, but our progress toward a rational understanding of the human animal has been among the most potent influences in humanizing man's treatment of his fellow man.

In organized society a large part of our activities consists in dealing with other people. Obviously, the better we understand our fellow creatures the better we should be able to deal with them effectively. It is only within the past two or three generations that educators have discovered that it is necessary to understand children in order to educate them in the proper way. The natural aptitudes, instincts and interests of the child were largely disregarded and he was put through a regimen which was prescribed on *a priori*

grounds, and frequent flogging was resorted to in order to supply an adequate motive for serious application. In dealing with criminals, delinquents and the insane, as well as with normal human beings, we need not merely good intentions but insight and understanding. Hence, any theory that throws a flood of light upon the nature of man and the whys and wherefores of human behavior can not fail to have a salutary influence on all our efforts at moral reform.

The Darwinian theory, I believe, does just this. One who accepts the Darwinian theory of natural selection and applies it consistently has, so to speak, his interpretation of human nature cut out for him. Man's traits, in so far as these are a part of his inheritance, owe their origin and biological meaning to their survival value. In fact, the Darwinian theory could not well account for the evolution of any other kind of creature. All the natural traits and impulses of human beings must therefore be fundamentally good if we consider the good as the biologically useful. Cruelty, selfishness, lust, cowardice and deceit are normal ingredients of human nature which have their useful role in the struggle for existence. Intrinsically they are all virtues. It is only their excess or their exercise under the wrong conditions that justly incurs our moral disapproval. For the Darwinian the categorical distinctions between good and bad take on a new meaning. His standpoint is, in Nietzschean phraseology, "beyond good and evil." The old distinctions between sins, venial or otherwise, and ordinary wrong acts melt away. Immutable principles of good and evil go by the board. They are the inventions of philosophers and have no place in reality. What we call bad conduct is usually the result of maladjusted egoistic impulses that are not properly subordinated to the needs of social life. Our good conduct, on the other hand, commonly springs from social impulses which the Darwinian would explain as the result of group selection. As expressed by a thoroughgoing Darwinian, Professor Karl Pearson:

> The struggle among primitive men of tribe against tribe evolved the social instinct. The tribe with the greater social feeling survived; we have to thank the struggle for existence for first making man gregarious and then intensifying, stage by stage, the social feeling. Such is the scientific account of the origin of our social instincts; and if you come to analyze it, such is the origin of what we term morality; morality is only the developed form of the tribal habit, the custom of acting in a certain way toward our fellow beings, upon which the very safety of the tribe originally depended.

If this gives us a true natural history of our moral sense, we should not be perplexed by the great diversity of character exhibited by different men. Man, as we should expect in the light of his origin, is no angel; neither can he be accused of total depravity in the absence of divine grace. He is loyal and sympathetic toward his own, hostile to the stranger, amenable to leadership and subordination and willing on occasion to sacrifice his own welfare in the interest of his group. At times he is cruel, revengeful, cowardly or otherwise a pliant creature of his purely self-regarding impulses. In the eternal conflict between egoism and altruism he obeys now the one and now the other kind of urge. Human nature bears the imprint of having been molded in the stern school of strife. On the whole it is just about what we would expect it to be in the light of its method of evolution.

If we wish to gain a proper insight into the native and uncamouflaged impulses of human beings there is perhaps no more instructive procedure than to study the group behavior of chimpanzees. There you will find the mutual sympathy, the group pugnacity, the egoism and the altruism which are so curiously blended in man. They are more crudely exhibited, to be sure, but they have a more adequate adjustment to the needs of the group.

"Nature," says William James, "implants contrary impulses to act in many classes of things and leaves it to slight alterations of the conditions of the individual case to decide which impulses shall carry the day." It is this endowment of varied and seemingly contradictory traits that accounts largely for the remarkable diversity of human character to which I have alluded. Basically, most of us have the same natural impulses. Our differences of character, like our differences of bodily structure, are mainly matters of emphasis. If the purely egoistic impulses are grossly hypertrophied we may become highly undesirable members of society. On the other hand, normally virtuous tendencies may become vices if carried to excess. After all, there is much wisdom in Aristotle's doctrine of the Golden Mean.

We sublimated simians have no reason to be ashamed of our origin. We owe to our more primitively moral ancestors our good as well as our bad traits. Our nature is much less closely adapted to the environment in which we live, for reasons very easy to understand. We owe much more than any lower animal to the influences of our environment. This environment has changed greatly in the last few thousand years. Human nature seems to have been developed for life in small, quarrelsome clans which afford ample opportunity for the exercise of the complementary traits of mutual aid and group pugnacity. The complex civilization which has appeared in recent times has developed so rapidly that the innate endowments of man have not kept pace with environmental changes. We shall probably be more and more concerned with problems arising out of the maladaptiveness of human nature to its conditions of life. For the proper solution of these problems, therefore, a really scientific under-

standing of human nature will become more and more imperative.

The influence of Darwin upon ethics consisted not only in giving us a new standpoint in relation to human nature, including man's moral sense, but in affording a standard of right and wrong which, if not necessarily associated with the doctrine of natural selection, is a perfectly logical and consistent conclusion from Darwinian principles. The proper standard of conduct is a subject upon which moralists have furnished us with a most varied assortment of theories. Throughout the recorded history of mankind most peoples have lived under moral codes which were assumed to owe their origin and binding force to supernatural authority. A perfectly typical example of such a system is furnished by the ancient Hebrews, who were instructed concerning right and wrong by special revelations from Jehovah, who not only furnished them with the Ten Commandments, but, through the inspired authors of Leviticus and Deuteronomy, with meticulous instructions as to what they should and should not eat and the fine points of conducting sacrifices. For the Hebrew being good consisted in acting according to the revealed code, and sin was disobedience. When our original parents ate the forbidden fruit, when all the inhabitants of the earth, with the exception of Noah and his immediate family, departed from ways of righteousness, when the inhabitants of Sodom and Gomorrah were given over to their scandalous ways and when the unfortunate Onan ventured on the first recorded experiment in contraception, an outraged Jehovah visited upon them the full measure of his wrath. It behooved the faithful Hebrew to walk in the ways of the Lord. That was morality.

The ethical teachings of Jesus, though greatly refined and humanized as compared with those of the Jews in their semi-barbaric period, were still authoritarian in character. Amid the various modifications of ethical doctrine that had grown up during the history of Christianity, the authoritarian basis of morals, in one form or another, has remained one of its most stable features. In the Roman Catholic church this doctrine has come to be more deeply intrenched, inasmuch as this body has definitely claimed to be the final court of appeal on all questions of morals as well as religion. Here we have perhaps the sharpest and most vital issue that remains between science and theology. Catholicism purports to speak on matters of morals with a voice from which there is no appeal. Questions of astronomy have long since been passed over to the astronomers. The healing art, once held to be the peculiar province of the priest, is now generally, but by no means exclusively, conceded to be the legitimate occupation of the physician. But in the opinion of a large part of even the educated public the field of morals belongs not to the scientist but to the man of God. Supernaturalism in morals is still very much alive. Not only does it continue to enjoin many observances of no intrinsic moral significance, but it is very influential in determining attitudes on many questions of real importance. There is, of course, a broad basis of agreement in practically all moral codes. Murder, lying, stealing and adultery are all condemned in almost every list of forbidden acts, but of course no code can cover all the varied situations in which questions of right and wrong may arise. There are many problems of morals upon which people differ sharply. Among these we may mention the justification of divorce, birth control and euthanasia. When we look into the alignment of opinion on these controverted questions we find that it is determined largely by whether or not the individual forms his moral judgments on the basis of authority or upon considerations of human welfare. There is no gainsaying the fact that whether our moral judgments are determined by authority, the greatest happiness principle, the categorical imperative, some form of self-realization or the Darwinian criterion of rightness may determine our attitude on many important moral problems.

Where differences of opinion as to the morality of an act arise from differences in criteria by which the act is judged, discussion comes to an *impasse*. If agreement is reached it is only when both parties come to view the act from a common standpoint, such as the promotion of human welfare, which they both adopt in principle, whether consciously or not. In our present age notions about the basis of morals vary greatly. The rank and file of people still base their conduct on some form of authoritarian ethics, and the authority is coming to have less and less hold upon them. Many drift along with no clearly defined moral standpoint, being guided by their natural impulses under the restraining influence of law and custom. For the most part they get along fairly well. After all, social instinct and social traditions are much more effective than moral philosophy in keeping people in the straight and narrow path.

The common criticism directed against standards of conduct is that their practical application would lead to very undesirable consequences. Evolutionary ethics, especially Darwinian ethics, has been denounced as subversive of everything that humanity has considered most worthy. Darwinism consistently applied would measure goodness in terms of survival value. Darwin never developed this phase of his doctrine fully, but his view is indicated by the following remark made in discussing general happiness as a standard of conduct: "The term general good may be defined as the rearing of the greatest number of individuals in full vigor and health, with all their faculties perfect, under the con-

ditions to which they are subjected. As the social instincts, both of man and the lower animals, have no doubt been developed by nearly the same steps, it would be advisable, if found practicable, to use the same definition in both cases, and to take as the standard the general good or welfare of the community rather than the general happiness." According to this viewpoint, the end of the moral life, speaking teleologically, is the same as the biological life of the organism. Morality becomes just one phase of the adjustment of the organism to its conditions of existence. As a good body is one which runs smoothly and efficiently in the maintenance of its vital functions, so a good man is one whose conduct not only maintains his own life on an efficient plane, but conduces to the enhancement of the life of his social group. In making the preservation and perpetuation of life the true function of morals, as it is a function of life itself, Darwinism affiliates ethics more closely with the biological sciences. Moral life is the expression in human conduct of true and effective living. Through being moral we have life, and have it more abundantly.

Of course, human beings are free to choose any criterion of conduct they please and to order their lives accordingly. There may be a number of perfectly justifiable ends of moral endeavor. The Darwinian, however, would maintain that, wittingly or not, people have been led to approve of conduct that makes for survival and to condemn conduct that is socially destructive. As Walter Bagehot remarks in his "Physics and Politics," "the moral groups cohere and therefore prevail." Tribes having the most effective codes have continually been selected in the competition of opposing groups. Peoples may believe that their moral customs derive from a supernatural source, but one potent reason for their adoption is their conduciveness to survival. The Darwinian standard may be said, therefore, to be in a sense nature's own. If peoples depart too widely from the kind of conduct it prescribes, they are courting the fate of all ill-adjusted variations in the struggle for life.

The Darwinian would maintain that his standard makes explicit what is implicit in all codes in so far as their prescriptions are morally valid. Although peoples may ascribe the origin of their codes to the commands of their gods, or whatever else, the true cause for their development is their survival value. Whether or not we agree with Ritchie that "natural selection . . . is a perfectly adequate cause to account for the rise of morality," we must concede that it affords a plausible interpretation of the differences in the moral codes of peoples living under different conditions. Although there is a good deal of maladjustment in the moral customs of peoples, as there is elsewhere in organic nature, differences in moralities, as Westermarck has shown in his "History of Moral Ideas," are to a large extent explicable as an outgrowth of the varied environments to which a people must adjust itself.

In speaking of applying the concept of natural selection in the field of ethics I must here guard against a possible misinterpretation. The application of the principle of selection to interpret the adaptive modifications of moral codes does not compel one to assume that moral sentiments and, still less, the particular acts which are approved or condemned, are matters of biological inheritance. In social evolution tradition plays a role very similar to that of heredity. Complex sentiments as such are not transmitted through the germplasm, although they may rest upon a basis of instinctive components. Tribes with the best codes will tend to prevail, whatever be the method by which the more useful moral customs are handed on. Natural selection has made man a social animal as a result of his heredity. Selection, experience and social tradition have led him to adopt moral practices which favor survival.

There are many people who are very suspicious of Darwinian ethics and are disturbed over what might happen if we proceeded to order our conduct in accordance with its dictates. I think that we can assure ourselves that nothing very dire would happen, because to a large extent people order their lives according to its dictates now. They really approve honesty, courage, loyalty and benevolence because these qualities have led to greater fulness of life. Fundamentally, therefore, our ethics is Darwinian, whether we like it or not. It is only imperfectly so, however, and I venture to suggest that current moral practice might be considerably improved if it became more consciously and definitely regulated in terms of the Darwinian standard.

There are several ways in which the practical application of Darwinian principles would affect our conduct and our ideals. One can not imagine a Darwinian finding anything particularly heinous about eating meat on Friday or playing cards on Sunday. Neither, if smitten, would he be likely to turn the other cheek. On occasion he would feel quite justified in going to war. He would doubtless contend that conflict has played an important role in shaping the evolution of man, although if he followed Darwin and many of his adherents, he would point to the highly dysgenic effects of modern warfare. He would emphasize the importance of eugenics, both positive and negative, and all measures that make for healthful and wholesome life and the improvement of its adjustment to its environing conditions, material and social. For every ethics that seeks its sanctions in the welfare of mankind every moral problem is a scientific problem to be solved like other problems by the employment of scientific

methods. For such a view-point ethics is not a field that can be sharply demarcated from other disciplines and made the province of priestly authority. As John Dewey remarks, "ethics is ineradicably empirical, not theological, nor metaphysical, nor mathematical. Since it directly concerns human nature everything that can be known of the human mind and body in physiology, medicine, anthropology, and psychology is pertinent to moral inquiry."

A scientific ethics would insist, as the Greeks did, upon the moral obligation of wisdom. One unfortunate influence of Christian ethics has been its tendency to divorce wisdom from morality. The good will alone is a very inadequate guide to good conduct. It is impossible to be really effectively good without being wise. There are circumstances under which practically all rules must be broken in order to lead the good life. Where different codes are followed in a community there is bound to be more or less conflict of moral aims. The people of Christian nations profess allegiance to a code which the exigencies of their life compel them to continually violate. The result is confusion and conflict and a constant incentive to hypocrisy.

In many ways the attempt to follow authoritarian ethics leads to conduct at variance with that which is dictated by considerations of human welfare. One of the most serious obstacles to several moral reforms is the blind adherence to moral codes that command unquestioning obedience. Were all questions of morality frankly recognized as scientific problems, much of the conflict I have mentioned would disappear. Many unsettled problems would of course remain, but by the applications of scientific methods they might finally be settled. It is only through becoming a true science that ethics can perform its greatest service. In this respect ethics is on precisely the same footing as medicine and other fields of applied science. Darwin, the great naturalist, in approaching ethics purely from the standpoint of natural history in the two famous chapters in his "Descent of Man," has contributed greatly toward making ethics scientific, and hence of greater value to mankind.

THE STANFORD UNIVERSITY MEETING OF THE PACIFIC DIVISION

Edited by Professor J. MURRAY LUCK
SECRETARY

THE twenty-third annual meeting of the Pacific Division, American Association for the Advancement of Science, and of seventeen associated societies was held at Stanford University, California, during the week of June 26, 1939.

The meetings may be considered noteworthy in several respects. They were characterized by a number of symposia of outstanding quality and were followed by a five-day symposium of fascinating interest on "The Cell and Protoplasm." Following upon this, in turn, was the sixteenth National Colloid Symposium, which brought to the university a third contingent of distinguished visitors. The results of such meetings can never be properly evaluated. The stimulus to scientific research is admittedly great, and the interest awakened within the layman in the contributions of science to the social order is, we suspect, more than transitory. The only index available for measuring the "success" of the meeting is to be found in the registration figures—a total of 882 for the divisional meetings alone. This is much greater than that of any previous meeting and may be compared with the registration total of 377 at the last Stanford University meeting (1924).

All the general sessions were held in the Memorial Theater and in Cubberley Hall—two new buildings provided with excellent auditoria and other facilities necessary for large meetings of this character. Guests were housed in Lagunita Court—a splendidly equipped dormitory which was placed in commission by the university only a few years ago. In every respect the material facilities were all that could be desired.

Local arrangements for the meeting were in the care of a committee consisting of S. B. Morris (*chairman*), Ernest R. Hilgard (*secretary*), Norris E. Bradbury, Eliot Blackwelder, Paul H. Kirkpatrick, Eliot Mears, George S. Parks, Templeton Peck, Gilbert M. Smith, Victor C. Twitty.

The first general session, which was held on the morning of June 27th, took the form of a symposium on "Radiation and Life." Four invited speakers participated. Since it is manifestly impossible to describe in detail the papers presented, it may be sufficient to list the titles and speakers: "Radiation," W. V. Houston, California Institute of Technology; "Radioactive Elements as Tracers in Metabolic Studies," John H. Lawrence, University of California; "Radiation and the Hereditary Mechanism," M. Delbruck, California Institute of Technology; "Medical Applications," Robert R. Newell, Stanford University Hospitals.

The afternoon of the same day was devoted to surveys of current research—a program which has been repeated annually by the division for many years. J. W. McBain, of Stanford University, reviewed a