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BIOLOGY AND HUMAN LIFE[1]

THERE have been various definitions of biology ranging "from grave to gay, from lively to severe." It has been contemptuously called the study of life with the life left out; the science of dead animals and plants. A professor of Latin once said, "Biology deals with things as dead as the dead languages and not nearly as well preserved." One botanist who resented the forays of the bad zoologists into his preserve defined biology as "botany taught by a zoologist"; and a Scotchman has assured us that "biology is a by-word," thereby suggesting that it is the science of imprecations. But much more severe things are said and thought of biology by those who resent its encroachments into the realm of human life and spiritual values; to these biology is the Judas among the sciences: all the sciences may have forsaken their Lord, but biology has betrayed him.

Biology, or the science which deals with the phenomena of life in general, as contrasted with botany, zoology, physiology and other subjects which deal with various subdivisions of this topic, was brought to this country by Huxley in 1876 and since that time it has grown apace until it is represented in almost every college and university in the land. For a while it was resented by strict botanists or zoologists; still longer agricultural and medical sciences refused to come into the biological fold, but the necessity of a classification that would set off the sciences that deal with living things from those that deal with the not-living has gradually brought it to pass that biology and the biological sciences have taken in all subjects and disciplines which deal with life. And now in turn biologists find that their science is taken in root and branch by an all-consuming chemistry. But until chemistry is able to deal more effectively with such vital phenomena as reproduction and life-cycles, adaptation and evolution, sensitivity and behavior, there is no reason for the biologist to feel that his occupation is gone. Lovatt Evans, in his notable address a few weeks ago before the physiological section of the British Association for the Advancement of Science, said: "Physiology is something more than biochemistry and biophysics; it is and will always remain a biological subject." To which I may add my conviction that certainly biology is something more than

[1] An address delivered at Wesleyan University, Middletown, Conn., on the occasion of the dedication of the Shanklin Biological Laboratory, October 12, 1928.

physics or chemistry; it is and will always remain an autonomous science, of course using physics and chemistry and other sciences as tools, but dealing essentially with phenomena that are confined entirely to living things and are beyond the reach of the inorganic sciences.

Many humanists now feel that biologists are making the same mistake that we charge against over-exuberant chemists and physicists, and in certain instances I am bound to admit that this is true. There are distinctively human properties that are now and perhaps will always be beyond the reach of biology. The ultimate connections between body and mind, the eternal contrast between subject and object, the ego and the world, the whole realm of intellectual, moral and esthetic values, can not be explained, except verbally, in terms of protoplasm, differentiation and evolution. The recently proposed doctrine of "emergent evolution" or the older and more inclusive conception of "creative synthesis" recognizes and names the process by which new qualities appear through new combinations of constituents but it offers no explanation of this remarkable fact. The sound and sane biologist will not attempt to glorify his science by having it, like Pharaoh's lean kine, eat up all the others. While insisting upon the principle of the unity of life in all its myriad forms he will recognize that there are things connected with life, and especially with human life, which his science touches only remotely or not at all and he will cheerfully grant to anthropology, psychology and sociology the rights of independent sciences.

Having thus, as I hope, allayed suspicion and established a reputation for open-mindedness, let me take up in order some of the relations of biology to human life. In the older and narrower conceptions of biology it dealt only with subhuman forms of life. Many of these earlier biologists more or less recognized, though they did not fully realize, that it also took in human life. Only gradually have we come to see that it is fundamental to all phases of human life and that its laws or principles apply not only to the structure and function of the body but also to the development of mind and the organization of society. We will consider briefly the contributions of biology to the improvement of man's environment, then its conclusions as to the nature of man himself and finally its relations to society, ethics, esthetics and religion.

I. THE BIOLOGICAL ENVIRONMENT OF MAN

You will not expect me on this occasion to attempt to catalogue the contributions of biology to the improvement of human environment, but its importance in this respect may be suggested by merely naming in alphabetical order some of the applied biological sciences, such as agriculture, animal and plant breeding, bacteriology, eugenics, forestry, horticulture, hygiene, medicine, parasitology, sanitation.

(1) Practically all that we eat or wear are products of plant or animal life; innumerable things used in modern life, such as oil, coal, wood, paper, leather, rubber, many chemicals and drugs, are derived from animals and plants. A knowledge of the principles of heredity and development has led to wonderful improvements in domestic animals and cultivated plants, but we have scarcely begun to realize what may yet be done in this line. In one human generation as much may be now accomplished in the improvement of useful breeds as was accomplished in the whole period of recorded history. Also much has been done in preventing or diminishing the depredations of injurious animals and plants, but there is still enormous waste from this cause that could be prevented. It has been said that the total losses from such pests is greater than all the revenues of all the governments of the world. Biology is helping to solve this agricultural problem and its solution would probably benefit agriculture more than any political remedy.

(2) The parasitic diseases of animals and men can be controlled only through a knowledge of the life-histories of the parasites. Pasteur's discovery of the causes of fermentation and putrifaction made possible his further discoveries of the causes of pebrine, anthrax and rabies and the establishment of the germinal causes of these diseases, and this in turn has made possible all the wonderful advances in modern medicine and surgery. The director of a great institute for cancer research said recently that students of that problem had reached an *impasse* and were now waiting for the biologists to suggest a solution.

(3) Researches in biology must continue to lead the way in the further progress of medicine and sanitation, in the quicker and more complete repair of bodily injuries, in the prolongation of life and the amelioration of the struggle for existence, in the solution of the population problem, which Huxley called the real riddle of the Sphinx, to which no political Oedipus had ever found the answer, in the production of better breeds of men. Biology can furnish the only real solution of these problems upon which the continuance of civilization and even the survival of the human race may depend. There were civilizations and races in the past that went down under the onslaughts of pestilence, famine and race degeneration as well as wars, and if our civilization is to survive and progress it must rely upon biology to find methods of averting these dangers.

(4) Biological researches on the races of men is even more important than those on any other organism. No other country in the world has so great a need nor so large an opportunity for such studies as has this one. This land of liberty has been the refuge of all races and types and conditions of mankind. As a people we have proceeded upon the assumption that all these refugees could be Americanized and transformed into good citizens by favorable environment and education, that Ishmaels could be converted into Israels, and both of these into Uncle Samuels, but the facts of biology do not warrant such a belief. Environment and education are not so potent as has been supposed, and heredity is not so impotent. Proper methods of dealing with immigration and with criminals and dependent persons are in part at least biological problems.

We do not know much about the effects of hybridization on human breeds; some breeds of animals and plants are greatly injured, others are greatly improved by hybridization with other breeds; we must learn more about the biological and social effects of hybridization upon the various stocks in our population. In the future eugenics, marriage selection and birth control will be ever-present and all-important subjects. Bateson, the English naturalist, has said, "The exact determination of the laws of heredity will probably work more changes in man's outlook on the world, and in his power over nature than any other advance in natural knowledge that can be clearly foreseen."

(5) Biology is destined to play a larger part in education than it has in the past. It is a curious commentary on the conservatism of educators that the science which deals most directly with life has frequently been regarded as of less importance to human beings than physics, chemistry or astronomy. Man also is a living creature and the laws and principles of biology apply to him no less than to the humblest animal or plant.

What is education but an attempt to direct development into useful paths and away from injurious ones? Instruction, tuition, advice are only stimuli or inhibitions to the developing personality and hence are parts of the environment. Information is only an incident in the process of education, the real essence of education is habit formation. The best thing that we teachers can do for our pupils, perhaps the only thing we can do, is to help them to form good habits and to avoid bad ones. Habit formation, and development in response to stimuli, are biological topics and biology is in a position to throw a flood of light on problems of education.

It is not only in the aims and methods of education but in its subject-matter as well that biology is of peculiar value. The time has come when one can scarcely be a good citizen without some knowledge of biology. The person who does not believe in vaccination or disease germs, who fights against taxes to improve the water supply or to dispose of sewage in a sanitary way or to get rid of malarial mosquitoes, who opposes the scientific inspection of milk or other foods, or the medical examination of school children is not only ignorant but he is even a dangerous citizen. It is an amazing fact that many apparently intelligent persons know nothing about the fundamental principles and processes of life in health or disease. Thousands of persons, some of them graduates of colleges and universities, seem to think that bacteria, protoplasm, chromosomes are wholly imaginary things, like fairies or demons, and that one may believe in them or not as he chooses. When leaders of public opinion are so ignorant of elementary truths which concern them so deeply, what can we expect of those who are led? Is it any wonder that all sorts of quacks, divine healers and Indian medicine men flourish, and that people generally have no conception of the biological aspects of health and disease, of reproduction and development, of eugenics and education, of the relation between bodily disease and mental and moral disorders? Think of the unutterable stupidity of a system of education which attempts to hide from young men and women the essential facts concerning sex and reproduction, heredity and eugenics! There is need for some knowledge of biology in practically every phase of modern life—family, city, state and nation—and yet this knowledge is generally lacking.

It is a fair question whether the time has not come when some knowledge of biology should be made a prerequisite not merely to the study of medicine but also to the study of the humanities in general. One of the greatest contributions of science to intellectual emancipation is the doctrine of evolution, that great theory which has revolutionized all our thinking regarding man and nature. And evolution is the distinctive contribution of biology, for it was in the living world and especially in the human realm that the establishment of evolution came as the great emancipator from tradition and superstition. The leading theme of evolution is not the origin of species, nor even the origin of living things, but rather the oneness of all life, that through all the endless diversity of the living world there run fundamental similarity and unity. We also are living beings and in the lower organisms we see ourselves in simpler and more primitive form; we see man from the standpoint of the whole living world, as superior beings in another planet might look upon us. As a result of this intellectual revolution practically all of the sciences which deal with man have become compara-

tive sciences. We can not understand man or his institutions unless we know something about his evolutionary backgrounds. This is true not only of the purely biological sciences but also of psychology, sociology and to a less extent of history, economics and the humanities in general. The past evolution of man makes plain many present tendencies in physical, intellectual and social evolution and to a certain extent it indicates the paths of future progress. Can any student of man and his institutions afford to ignore the biological foundations of human life and evolution?

II. Biology and the Nature of Man

Biological revelations concerning the nature of man have brought about what is probably the most far-reaching intellectual revolution in the whole history of the human race. Perhaps the only other similar revolution that can be compared with it is that due to the acceptance of the Copernican theory in astronomy. As the old Ptolemaic system placed the earth at the center of the universe and made all the heavenly bodies subservient to it, so the old conception of man placed him at the center and for him all other things were created. The earth was the center of the celestial sphere; the sun, moon and stars were created to give light to man, and all living things were created to minister to his needs. But just as the old geocentric conception of the solar system was replaced by the heliocentric, so the old anthropocentric theory has been replaced by the biocentric.

This change of center has necessarily brought about a tremendous change in our point of view and in our conceptions of man himself. He was once regarded as a being wholly apart from the rest of nature; the human species is now seen to be only one out of a million or more species of animals and plants. If we place in the sharpest possible contrast the old and the new conceptions as to the nature of man, as extremists are always inclined to do, we have a sad and sorry picture. According to the old view he was made in the image of God, according to the new in the image of beasts; once he was said to be a little lower than the angels, now a little higher than the apes; once he was an absolutely free moral agent, now he is never absolutely free and is often a mere automaton. It is little wonder that the fundamentalists are up in arms against this biological fall of man which is so much greater than the biblical fall. All sciences have united to dethrone man from the central and supernatural position he was once supposed to occupy, but biology is the chief regicide.

What way of escape is there? Only one so far as I can see, namely a *via media*. Both the old and the new views contain a part of the truth, but neither is the whole truth. Man is an animal, a vertebrate, a mammal, but he is also much more than any animal. He still bears in his body the marks of his lowly origin, but in the complete development of his mental and moral qualities he is in a world apart. After all evolution does not so much degrade men as it dignifies other living things. The evolutionist no less than the creationist can say with Shakespeare: "What a piece of work is a man! how noble in reason! how infinite in faculty! in form and moving how express and admirable! in action how like an angel! in apprehension how like a god!" Or with the Psalmist he can say in both humility and exaltation: "What is man that thou art mindful of him, or the son of man that thou visitest him?—Surely thou hast made him a little lower than the angels and hast crowned him with glory and honor." Evolution does not debase man by proving his animal ancestry any more than embryology degrades him by showing that he comes from egg and embryo. "The significant fact in human history is not what man begins with—for as a developing being he must begin with the lowest—but what he ends with."

Many persons who have been compelled to grant that man's body is derived from animal ancestors, have tried to maintain that his mind is a supernatural creation. Alfred Russell Wallace was one of these, but the study of the psychic processes of higher animals shows conclusively that the same sort of relation exists between the mind of man and that of animals as between their bodies. Indeed the mind is not an entity separate and distinct from the body. For convenience and effectiveness of treatment we distinguish between structures and functions, body and mind, but the organism is one and undivided. Human life can be considered from its physical, intellectual or social aspects, and in the narrower use of the term biology is limited to the first of these, and yet the principles that apply to the physical are fundamentally the same as in the case of the intellectual and social. For example, the great principle of development from the relatively simple to the complex by increasing specialization and coordination is as true of the mental and social development as of the purely physical. Heredity and environment are the factors in the development of body, mind and morals. Adaptation, coordination, regulation are essentially similar processes in all of these. Even teleology or purpose is as plainly shown in the organs of the body as in mind or society. This threefold division of human life represents only three aspects of one thing; and as we generally think in pictures or models and represent the unseen by that which is seen, so the study of mind and morals is greatly facilitated by understanding the physiological processes of the body.

To understand properly complex phenomena they must be analyzed and studied in detail. There are three principal methods of biological analysis, namely, (1) Comparison of different organisms to note what is essential and what is accidental, (2) experiment in which one factor after another is modified or omitted, (3) development from the simple to the complex. These three methods of analysis may be applied to the structures and functions of the body or to the organization of the mind and of society. When Romanes was writing his books on "Mental Evolution in Animals and Man" Darwin wrote him, "I am delighted to hear that you mean to work the comparative psychology well—Frank says you ought to keep an idiot, a deaf-mute, a monkey and a baby in your house."[2] I once heard former President Patton of Princeton University describe with inimitable humor this new kind of psychology based upon the study of idiots, deaf-mutes, monkeys and babies, and yet this method of Darwin is the method of biological analysis by means of comparison (the monkey), nature's experiment (idiot, deaf-mute) and development (the baby), and the results of such studies have led to a new era in psychology.

As we see in lower forms of life the same principles and processes as those that occur in human life, but in simpler and more elementary form, so we can often analyze and interpret these more complex phenomena by means of the simpler ones. Thus comparative psychology has thrown a flood of light upon human psychology. And the study of animal societies, the instincts of the herd, the spirit of the hive, is helping us to understand the origin and nature of human society. Paraphrasing the well-known sentence of Terence, "Nothing that concerns man is foreign to me," the biologist may say, "Nothing that concerns life is foreign to man."

Ever since the doctrine of human evolution was fairly launched there have been scientists who have seemed to take delight in shocking more conservative persons by affirming that man is only an animal and a pretty poor specimen at that. They are ready to explain all the higher human faculties as the results of tropisms, and these as mere mechanical responses due to chemistry and physics. Life itself is said to be only a condition of activated atoms and all the thinking and feeling and doing of men is at bottom only a dance of these atoms. A distinguished physiologist once recited to me in a sort of frenzy his creed of unbelief: "There is no God, no devil, no heaven, no hell, no soul, no immortality, no freedom, no responsibility," and at another time in a more reflective mood he added the inevitable conclusion to such a creed: "The evolution of consciousness was the greatest blunder in the universe." If perforce we must reach such conclusions, we must. It has been well said that "Truth is truth even if it sears our eyeballs," but we should be sure that it is inevitable before we permit it to blind us. That such conclusions are not inevitable is shown by the number of first-class scientists who reject them. It is a curious fact that biologists are often more extreme mechanists than the physicists, whereas physicists more frequently hold that life is something more than chemistry or physics. When a science is relatively new it is, I think, invariably true that scientists underestimate the problems they attack and overestimate the importance of their work. But the more these problems are studied the more profound they are found to be. How crude do most of the older theories of biology now seem! The carbon theory of life, the phosphorus theory of mind, the artificial production of life, the tropism theory of all animal behavior! How crude are the popular ideas of the capacities of "the mechanical watchman," or the "robots"! It is refreshing, therefore, to hear the distinguished physiologist, Lovatt Evans, saying in his address at the British Association: "Science can not fathom the mystery of life." The period of frenzied physiology is giving place to a more reflective, more rational and more humble attitude. And if science is unable to fathom the mystery of life in its simplest forms, how much less is it able to explain in terms of physics and chemistry the mysteries of human life: of memory, reason, volition, of responsibility, purpose, aspiration, altruism! How little can it fathom the deeps of the nature of man!

III. Relations of Biology to Society, Ethics and Religion

(1) The old-fashioned natural history from which modern biology has descended made no such direct connection with human life as do the biological sciences to-day. At most the resemblances between man and animals were analogies rather than homologies. Perhaps the first human applications of the lessons of natural history were in the field of morals and religion. The busy ant and bee, birds that in their nests agree, dogs that delight to bark and bite, and multitudes of other more or less fabulous moral or immoral qualities of animals were examples to be followed or shunned. The study of natural history does not seem to modern biologists to afford such shining examples of moral or immoral qualities among animals as the moralists of a former period and the "nature-fakirs" of the present day assume. According to students of animal behavior, the busy ant is busy because she likes to be busy; aphids feed ants

[2] "More Letters of Charles Darwin," vol. 2, p. 49.

because they as well as the ants get pleasure from it; the mother bird or mammal feeds and cares for her young because of the pleasure it gives her. A similar view regarding human ethics is being advocated. One author says it is more blessed to give than to receive because motions of the hands away from the body are more pleasant, for some unknown reason, than those toward the body.

We need not deny that pleasure and pain enter into our conceptions of ethics, but it is often, and in the higher sense always, the pleasure or pain or welfare of others rather than that of self that is the basis of ethics. Any one who has seen a mother bird or a mother mammal defend her young even to the point of her own fright, injury or death will realize that she is not doing it for her own pleasure. Is human ethics based on any lower level than this?

(2) Somewhat akin to the moral aims in the study of natural history was that of esthetic appreciation of the beauties, the perfection, the joys and sorrows of living creatures. Some of the best work that has ever been done in this field has been by lovers of nature, of flowers and insects and birds and even of microscopic organisms. Busy men and women have made such studies their hobby and have incidentally produced work of the greatest value. Indeed it may be questioned whether such naturalists as Hooke, Leeuwenhoek, Swammerdam, Ehrenberg, Trembley, Sprengel, Gilbert White, Hudson and Gosse, Lord Avebury, Erasmus and Charles Darwin, Fabre, Gregor Mendel and a host of other amateurs (using this term in the sporting sense to indicate merely those who lived *for* but not *by* their sport) have not contributed more to our knowledge of living things than have all the professionals. All these amateurs studied biology because of their love of it, for the esthetic and intellectual pleasure which it gave rather than for any material or professional gains. Indeed they usually pursued such studies at great sacrifice of money and effort and often even of reputation, and it may be doubted whether any great work has ever been done in any other spirit. No other science makes so direct and telling appeal to esthetic appreciation and broad sympathies as biology, and it ill becomes narrow professionals of this age to despise the old naturalists and their work.

The late Professor Blackie, professor of Greek in Edinburgh University, once said that every young person ought to study natural history and music because of the pleasant occupation, interest and solace they would afford in periods of stress and sorrow. But biologists should remember that he also said in tolerable verse:

> Give me no peeping scientist if I
> Would view God's grandly ordered world aright.
> But give to plant my cosmic survey high,
> The wisest of wise Greeks, the Stagirite.

And another Greek, Euripides, said in immortal verse:

> Blessed is he who has gained knowledge of nature,
> Who seeks neither the woes of citizenship
> Nor rushes into unjust deeds,
> But who observes the ageless order of immortal nature,
> How it is constituted and when and why!
> To such the practice of base deeds never cleaves.
> (Fragmenta 910, Nauck)

(3) To many of our predecessors, natural history was the handmaid of religion, demonstrating the wonders and goodness and purpose of God in the living world. In reading the older works on natural history one is impressed by the fact that they were written by devout men, frequently by Christian ministers, for devout purposes. Among the most notable of such works are the famous "Bridgewater Treatises," whose primary aim was the demonstration of intelligent design in the living world. Again modern biologists do not find such plain demonstrations of divine beneficence and of supernatural design in the living world as former naturalists did. But the evidences of an ultimate teleology in all living things is more abundant and compelling than ever before. In biology we can not if we would get away from the idea of purpose, disguise it as we may by such words as "significance," "meaning" or "benefit." In practically every structure and function of living things we see ends to be reached and we can not avoid the conclusion that life is a process of ends as well as of means. Professor L. J. Henderson in two deeply philosophical books has extended such teleology from the organism to its environment and even to the entire order and system of nature. And Lovatt Evans, to whose recent address I have already referred, says: "Mechanistic interpretations tend in the long run to become arrogant and superficial, as vitalistic ones predispose to scientific nihilism. For while it is inconceivable that living things do not obey the laws of nature, yet it is equally unthinkable that a chance encounter of physico-chemical phenomena can be the explanation of their existence." Certainly from the standpoint of life the biologist is warranted in assuming that this is a world of teleology as well as of mechanism.

And so far as the wonders and mysteries of life are concerned they never grow less with increasing knowledge but rather more. Every mystery solved in part only leads to more profound mysteries, world without

end. When frenzied physiologists or chemists announce the solution of all mysteries of life and mind and soul in the motions of atoms or electrons I have sometimes proclaimed myself an "apostle of mystery" —not in the sense of the mystic who cherishes mystery and resists attempts at a scientific explanation of such phenomena, but rather in the spirit of one who recognizes that nature is infinite and that our science explores only the shores of the great ocean of truth.

In these days devout scientists do not generally proclaim their devoutness as they did a generation ago. Probably few if any modern laboratories exhibit the motto which Agassiz placed on the wall of his laboratory at Penikese: "The laboratory is to me a sanctuary. I would have nothing done in it unworthy of the Great Author." But in reverence for and devotion to truth, in admiration of the order and beauty and mystery of nature, modern laboratories are no less sanctuaries than those of any preceding age.

I often think of the fine faith of the founders of most of our colleges and universities—faith that the development of science and learning would serve only to confirm their religious creeds—and I wonder what they would think if they could revisit these institutions to-day. No doubt many of them would be shocked if they could know of the tremendous changes which science has wrought in those creeds. But for all those who seek truth above all things there is no cause for alarm. Truth is greater than creed or dogma, and the motto of science is the saying of Christ: "Ye shall know the truth and the truth shall make you free."

In closing I wish to congratulate the students and staff of the department of biology, and the trustees, the faculty, the alumni and friends of Wesleyan University upon the completion and endowment of the new Shanklin Biological Laboratory. May it through all the years to come be a center of teaching and research; may it contribute to the material welfare of men; most of all may it be a source of intellectual enlightenment and spiritual freedom, thus demonstrating the intimate relation between biology and human life!

EDWIN G. CONKLIN

PRINCETON UNIVERSITY

EXPEDITION OF U. S. COAST GUARD CUTTER MARION TO THE REGION OF DAVIS STRAIT IN 1928

THE Coast Guard cutter *Marion* returned to New London, Conn., September 28, 1928, after having spent ten weeks at sea investigating the physical character of the water masses between North America and Greenland, from St. Johns, Newfoundland, northward to the 70th parallel of latitude off Disko Island, Greenland.

The main object of the expedition was to learn the whole story regarding the wanderings of the icebergs from the time they break off the Greenland ice cap until they finally melt 1,800 miles southward in the warm waters of the North Atlantic. The direction and velocity of the ocean currents have been mapped by the *Marion* expedition according to the so-called Bjerknes' methods of dynamic hydrography. The fundamental values necessary for substitution in Bjerknes' formulae are those of temperature and salinity of water from frequent depths, surface to bottom, and similar data from such stations scattered net-like over the ocean area as it is desired to include. The resulting maps show the contour in dynamic meters of the chosen decibar surface relative to that of a deep decibar plane, which is the one usually employed as a bench mark. For practical purposes the contour lines connecting equal dynamic values will be stream lines of the water current in a similar fashion as the direction of the wind tends to parallel the direction of the isobars on an ordinary weather map.

Here is a case where physical oceanography is employed to solve an economic problem of practical importance. Icebergs form a distinct menace as evidenced by the *Titanic* disaster of 1912. The U. S. Coast Guard is the bureau under our government which has been charged with the responsibility of maintaining a patrol of the ice regions every spring for the protection of transatlantic shipping. Although the United States actually carries out the work, our country is, nevertheless, reimbursed by about fourteen maritime nations, thus giving this humanitarian work a true international character.

The International Ice Patrol ships (two Coast Guard cutters) have since 1921 been carrying out a systematic program of scientific investigation mostly centered on physical oceanography. The field of observation has been confined to the waters around the Grand Banks, especially where the Labrador current discharges its freight of ice into the easterly moving masses of the Gulf Stream. In the summer of 1914 the Coast Guard attempted to send a research vessel, the *Seneca,* northward of Newfoundland, but unusually bad ice conditions that year caused the cruise to be abandoned. It has remained until this summer for the Coast Guard to undertake a major exploration northward into the region between Greenland and North America—practically unknown waters. The *Marion's* survey, therefore, covering the ocean from the iceberg-producing glaciers to the Grand Banks constructs an uninterrupted story of the life history of the iceberg.