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The Plight of the Biologist: Editorial

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THE PLIGHT OF THE BIOLOGIST

EDITORIAL

This is indeed an age of science! For the past three hundred years, man has wooed the Goddess of Nature and so ardent has been his wooing, like Sampson of old, she has finally told him her secrets of power. She has given him gasoline, and by its controlled explosions he has overcome space, has lifted himself into the air to shame the birds in their native haunts, has gone beneath the sea in ships to outswim the very fishes. She has unlocked for him the age-long secrets of coal, and from it he has taken colors Solomon and Sheba never dreamed of, from it he has made explosives to rock the foundations of the solid earth; he has caught its power in dynamos and has turned the fearsome night into day. By her gifts of the lens and of radium, he has penetrated the mysteries of the infinitely great and the infinitely little; he has looked into the depths of the star and of the cell. In a thousand laboratories he has toiled to know the secret springs of life, and has driven back Death for the average man for twenty years.

With the chest of the scientist, and the physical scientist in particular, thus gleaming with the medals of achievement, is it any wonder that the layman is overawed? Is not Science to him a talisman, a thing to conjure with, a key to the very thunderbolts of heaven?

But, unfortunately, Biology has not kept pace with the physical sciences. True, it, too, has done wonders! By its researches we know the animal body as never before. We

know minutely the development of the body from egg to adult. We know the basis of hereditary characters and something of the manner of their distribution. We know something of the causes of diseases, and how to prevent them. We have entered and explored the secret recesses of the body and can remove surgically almost anything from it except a bad conscience; we have even looked into our ancestry and think we know in part from whence we came.

But in spite of his achievements, every thinking biologist knows that he has penetrated only the fringe of things; he is yet barred from the mysteries of life itself. Chemistry and physics promised him aid in the interpretation of life, but they have here fallen by the wayside. No animal is a pure machine; the glib mechanistic explanations of life of the past century are as dead as the dinosaurs! What then? The modern biologist defines life only in terms of its working. He sees an animal metabolizing, growing, reproducing, and because of these things, he says that it is alive. But this is no definition of life; it is merely telling what a living thing can do. Neither is he much better off when he comes to tell how some of the individual parts of a living creature work. Take, for example, the cerebral cortex, that thin, crumpled veil of gray stuff enveloping the human brain. Neurologists and psychologists have been examining this structure for over fifty years. They have cut it into thin sections, stained it in all manner of ways, searched it minutely with powerful lenses; and as a result of all this pother and puttering, they have learned that it is made up of millions of delicately branching interlaced cells. They cannot decide whether or not these cell processes actually touch each other or merely approximate it. They know that these cells receive impulses and are capable of retaining effects, but they do not know what an impulse is or what is retained.

Some parts of the cortex seem concerned with one function, some with another, but whole areas of it in fact seem to have no ascribable function whatever, and may actually

be removed without apparent loss to the individual. The cells of the cortex are almost countless; the possible synapses or connections between them are, according to one anatomist, greater than the number of atoms in the whole solar system. That we shall ever grasp the workings of such a maze of parts, seems improbable, but at present, at any rate, the mind, born of the brain, seems incapable of understanding the thing that produces it. Thus the plight of the biologist!

But the surprising thing about the whole matter is that in spite of the biologist's admitted shortcomings, the layman, overwhelmed, so to speak, by the omnipresent applications of physics and chemistry, has at once elevated him to coequal position with the physicist and the chemist. The biologist recognizes his own limitations but his public does not. He speaks of yeast, and straightway we have a shotgun panacea for all human ills—we become a nation of yeast-eaters over night. He discovers a virtue in orange juice, and though we may suspect the citrus fruitgrowers, we pour it down our children by the gallon, because a biologist has spoken! European opinion to the contrary, we Americans do earnestly what we do, especially in physical matters, and though we may privately dissent from the verdict of the biologist, we eat our spinach none the less fiercely. On every side of him, the biologist sees his fellows doing in the name of biological science, things which Biology has never demonstrated to be good for the race. Millions bathe with devout faith in its healthfulness, but science has never shown that a clean man is healthier than a dirty man—he is simply more tolerable aesthetically. Millions of others daub their skins with all manner of supposedly nutrient and healthful concoctions not knowing that the skin absorbs almost nothing externally. Hosts of others dose and coddle themselves throughout a hectic life, ignorant of the fact that health is largely automatic, that the only real way to insure a long and healthy life is to have chosen healthy and long-lived ancestors. And so on indefinitely. In the meantime, with a sad smile, partly at his own

ignorance and false position, partly at the credulity of his fellows, the biologist keeps on working.

THE STATE COURSE OF STUDY CHEMISTRY

The State Department of Public Instruction has recently completed a far-reaching and valuable contribution to the curriculums of our state system of schools. With the cooperation of many prominent educators of Iowa, courses of study for the grades and departmental courses for the High Schools have been carefully prepared and made available to all teachers. Among these outlines is one for chemistry teachers. According to policy, these course outlines are distributed gratis to the school and become the property of the district.

The Chemistry Course of Study does not limit the teacher to a prescribed course. Neither does it designate a definite order of topics nor method of presentation. It is applicable to any textbook and lends itself to great flexibility in pedagogic methods. To offset any personal preferences of the committee, the periodic system of elements forms the general basis for order of topics. The theory chapters are fitted in where they seem best to correlate. The arrangement of material follows the four column plan used in all of the formal syllabi.

In the first column are listed the objectives which the teacher should establish before presenting the topic. As a result of many questions directed to his classes in the Teaching of Chemistry, the writer has learned that a group of experienced and prospective teachers may differ widely in the objectives which they would assign to a given topic. Some overlook major ideas and attach undue importance to incidental points growing out of the topic; others establish such all-inclusive objectives as to offer unlimited latitude in class presentation; still others will list so large a number that it would seem they are unable to winnow the wheat from the chaff; and a fourth group can