

SCIENCE

A WEEKLY JOURNAL DEVOTED TO THE ADVANCEMENT OF SCIENCE, PUBLISHING THE
OFFICIAL NOTICES AND PROCEEDINGS OF THE AMERICAN ASSOCIATION
FOR THE ADVANCEMENT OF SCIENCE

FRIDAY, JUNE 5, 1908

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OPPORTUNITIES FOR YOUNG MEN IN SCIENCE¹

OPPORTUNITIES IN BOTANY

SOME of us have been assured by those who have had to do with the program that the sharers in this symposium are not to feel themselves fettered by the specific limitations of their assigned topics.

Hence my liberty in asking first why we should be concerned at all in any special effort to increase interest in science work as a profession. General interest in science is another matter. The aim of this symposium, however, appears to be to point out why a choice of their life work from the various branches of science is a desirable choice for young men to make.

It may be reasonably inferred, if only from the remarks made this morning in the discussion upon what shall be the dues of this organization (so happily placed at one dollar), that we have nothing very great in the way of financial compensation to offer. For that very reason, if we are good economists, should we not be the last to encourage more strenuous competition for the apparently limited number of real competences which exist for the sustenance of life workers in science? Yet we are most cheerfully engaged in doing that very thing. Though there may be far from enough to go around in generous portions, let us by all means have more in at the feast. There may be compensation in the extra-prandial proceedings.

An editorial in a recent science peri-

¹ From a symposium at the organization meeting of the Illinois State Academy of Science.

odical estimates that fewer than five thousand persons in the United States are professionally engaged in science investigation or in the teaching of science up to the research point. Of these it reckons that fewer than one thousand should be counted real contributors. What are one thousand among eighty million? We must accept the fact that several European nations excel us in this respect.

It comes to mind that our inferiority herein may be due as much to absence in the minds of the educated public of the aims and actual work in science progress as to anything else. Herein is, perhaps, the best reason for such a symposium and for such an organization as has just been perfected. These words of Matthew Arnold seem appropriate:

The great men of culture are those who have had a passion for diffusing, for making prevail, for carrying from one end of society to the other, the best knowledge, the best ideas of their time; who have labored to divest knowledge of all that was harsh, uncouth, difficult, abstract, professional, exclusive; to humanize it, to make it efficient outside the clique of the cultivated and learned.

The point is, then, that our real science workers are both too few and too remote from the general public. They work very largely in another world than the one of common conception. From the world of common knowledge they must, perhaps always, remain aloof. But may not the real value of their work be at least adequately conceived?

In Europe the magazines and even the shop windows furnish evidence of the popular interest in science progress. Wherever the forward movement is most active you catch a quick reflection of it in the popular press. There the public is said to be really much concerned of late with what is sometimes called the "passing of Darwinism." What does the American public know or seriously care about Darwinism being on

its "deathbed"? Here our editors shun the rather dry and obscure authorities in favor of picturesquely-worded and sensation-charged celebrities; and, reciprocally, the authorities shun the editors.

Yet are we not ready to admit that the modern aspect of "national progress" depends very largely upon the number of properly qualified persons who are engaged in science research, and, perhaps as much, upon the extent to which the general public follows their advance?

Does not the fault for this large American gap between science workers and the general public lie much with the scientists who have held aloof; who have rarely taken it as part of their task properly to popularize the problems on which they are at work; who have let misrepresentation go almost unchecked; who have done much to form a sort of aristocracy of their own kind?

But, wherever the fault lies, we must lessen the gap. The constitution we have just adopted explicitly commits us to this. Unless there develops more popular interest in the great truth search, in this and its many other aspects; unless there develops more feeling of personal responsibility in finding out for one's own self, and less of being easily satisfied with the first plausible explanation, then the national peril for lack of "clean truth" to which Dr. Chamberlin made reference this morning is surely not very difficult to perceive; a reference which, by the way, has some responsibility for this digression from my topic.

Specifically, of the opportunities in botany, we can say that the demand for trained botanists continues to exceed the supply. Such demand is, of course, especially for young men ready to begin their service at compensation less than the theoretical value of the service rendered. Fur-

ther, it is almost exclusively a demand for men to whom the service means at least as much as the compensation. But, as such, it is unquestionably a vigorous and growing demand.

The most extensive employer of young botanists in America is the United States government, and we are very reliably informed that the various bureaus of the Department of Agriculture are in positive need of more men adequately trained in plant morphology and physiology than they can find. Such training is usually sufficiently well attained in two or, at most, three years of graduate study.

It is becoming increasingly difficult to differentiate between botanists pure and simple and special students of agriculture. Yet we are loath to lose good men through a mere juggling of terms, as botanist into agronomist or something like, even though the latter cashes in better. So, among present-day opportunities in botany should not be overlooked the one of being botanist in fact only, with sedulous avoidance of a name which suggests nothing of the large cash values upon which this section of the profession, under its many aliases, may justly pride itself.

For teachers of botany the market is still brisk, though the upward tendency is not perhaps so marked as in other lines of demand. Doctors of philosophy in botany are commanding beginning salaries in teaching positions which average about fifty per cent. more than those offered eight years ago. These are in the main, of course, positions of collegiate or equivalent rank. It is for teachers of lesser training that the demand has shown a barely perceptible falling off. But this is more than offset by the increasing demand for teachers of agriculture for the rural high schools. What botany in some quarters is threatened with losing as a high school subject, agri-

culture has already more than gained. Since the question has become very largely one of teaching much the same subject in a more efficient way, we may expect that botany, in this respect, will be a graceful loser.

In the Philippines a "practical" botanist is wanted in every province, of which there are more than thirty, to take in charge the immensely important educational side of the problem, especially from the standpoint of the agricultural possibilities. No stereotyped problem here, nor meager compensation therewith!

The opportunities for amateur work in connection with the academy should, perhaps, receive a word of comment. Apart from its large educational function, I take it that the contributory work of the academy will confine itself, in the main, within state boundaries. With such limitation, and assuming the cooperation of a considerable and favorably distributed number of persons, an ecologically annotated geographic catalogue is perhaps the first task which suggests itself. Such work for such an organization has the peculiar virtue of simplicity in its individual parts, absolute necessity for extensive cooperation, and the very large value of the final symposium. The humblest sharer in the work may be thoroughly satisfied that his part is quite as important as almost any other part.

Of intensive area work in ecology, Cowles's work on the dunes and Gleason's quite recent study of sand-flat areas of the Illinois River forcefully suggest the considerable number of similar, yet untouched and equally attractive, problems within the state.

The native prairie plants, made historic by their striking floral aspects alone, remain undisturbed in but few and restricted areas. The salvation of a strip of native prairie large enough to reveal the original

ecological factors may be already impracticable, but the academy may well have in mind the establishment of a state garden of the native plants.

Fresh acres in garden and field will be given each year to the new experiments in plant breeding, and here, too, the amateur may well lend a hand, though our agronomical friends may question whether such a suggestion is pertinent among points for amateur *botanists*.

In closing, I beg to submit a definite suggestion for which I must again seek excuse in that incontestable statement of our president this morning, that in lack of clean truth there lies national peril.

Nowhere in our educational literature is the absence of clean truth more conspicuous than in the nature-study books which are in common use in the graded schools. Nowhere has the unauthorized word had wider play or more credulous following. Untrained teachers have had nature study thrust upon them and have turned with avidity toward whatever seemed to offer help. Composites of sentiment and inaccuracy have been liberally supplied as "supplementary reading."

The suggestion is that there be issued in the name and under the direct auspices of the academy a series of leaflets upon science topics suitable for use as material in nature study and geography. Such topics should be treated especially from the standpoint of the state in so far as they lend themselves suitably to such treatment. Such leaflets should be available to the public schools at low cost. An educational editor, perhaps a member of the standing committee upon publication, might have in charge the apportionment of topics to members willing to cooperate, and ample discretion in editing to suit the educational needs in view should be allowed such an editor.

In objection, the point may be raised that in its very infancy the academy would be rash to venture to finance such a scheme. It may be confidently stated, however, that funds sufficient for such purpose would be at the disposal of the academy in case such proposal meets its good will.

A similar service has been and continues to be rendered by the Cornell Nature Study and Agricultural Leaflets.

JOHN G. COULTER

OPENINGS FOR CHEMISTS

EIGHTEEN years ago, as I was sitting in a café in Munich one evening, talking to a young Englishman, he said to me "England has the present but America has the future." He meant, of course, that while England at that time stood in the forefront of progress, industrially as well as politically, the conditions were such in America, both in our command of natural resources and in the character of our people, as to make it practically certain that the lead in both respects must go to America in a not far-distant future.

In the years which have passed since that time, this prophecy has been going on toward a rapid fulfillment. As an illustration, we may take the manufacture of iron. At that time, more iron was manufactured in England than in any country in the world, but within a few years afterwards the production in America exceeded that in England, and it is now very much greater here than there.

In this increased industrial activity in America, chemists have played and are playing a very important part. In this very industry of the manufacture of iron and steel, twenty-five years ago very few chemists were employed in this country, but to-day chemists are required not only in the large establishments where steel is produced, but in foundries and factories