

ondary Schools, and a Course of Study for Elementary Schools.

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#### NATURE STUDY SECTION.

The program for this section was designed to bring out the opinions of those present on the training that a teacher should have in order to teach nature study. The first session was devoted to papers and discussions on these matters, and the second session to the relating of personal experience by teachers actually engaged in carrying on nature study work successfully in their schools.

The speakers were all present and the discussions were taken up with much vigor and interest. We agreed that the basis for successfully teaching nature study lies in an interest in the subject, a belief in its educational value in the broadest sense, and in a certain amount of personal experience with nature itself. That more training is desirable, if added to the above essentials, was admitted by all.

Miss Hill, Miss Carss and Professor Bardwell showed how much could be done by trained nature students in the instructing of both children and teachers. But it was shown by Miss King, Miss Whittaker, Miss Mershon, Mr. Round and Mr. Drum that special science training is not absolutely necessary to carry out the spirit of true nature study.

Mr. Beach, in presenting his plan for teachers' classes made practical suggestions which recommended themselves to all. No doubt many such classes will be formed during the coming year in cities. Mention was made of the correspondence course for teachers, conducted by the Bureau of Nature Study at Cornell University. Teachers were urged to make use of every

available opportunity to increase their knowledge of subject matter, not in order that they may teach facts, but in order that they may teach their pupils how to learn from nature.

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#### SECTION OF BIOLOGY.

Four papers were read and discussed:

*The Preparation of Secondary Teachers in Biology:* Professor F. E. LLOYD, Teachers College, Columbia University.

The high school is the 'college of the people' in a wide sense and worthy of the best efforts of well-educated and trained teachers. Owing to the inadequate preparation of many teachers the present work in biology shows a lack of uniformity in ideals, unevenness in the quality of instruction, and a remarkably heterogeneous high school course, taking the country as a whole. Those preparing for the profession of secondary teaching in biology should hold the bachelor's degree, and should have studied physics and chemistry. In biology they should have earned at least nine points credit before graduation, one third of which should have been in botany or zoology. Following this course of study they should have a professional training, including psychology, history and principles of education, special study of the problems of the high school and a course in the theory and practice of teaching biology in secondary schools. This latter course embraces two parts: (a) Theory, consisting of lectures and reading on the history and aims of the teaching of biology, on courses of study, topics, etc.; (b) practice, consisting in observation of teaching, construction of a course of study and examination of available materials. This course culminates in a season of actual teaching under skilled criticism. During the course the

candidate should pursue advanced work in botany and zoology.

Such a course may well be made to lead up to the conferring of degrees coordinate with those of law and medical schools and equal to them in significance.

*What the Teacher of Botany in Secondary Schools should be Prepared to do:* Dr.

A. J. GROUT, Boys' High School, Brooklyn.

*Ideals in Teaching:* Professor A. D. MORRILL, Hamilton College, Clinton, N. Y.

In the modern teaching of natural history one of the first ideals to hold sway was taxonomy, then, the study of types, and, later, the investigation of physiological processes. At present no single ideal is in vogue. Along with these more or less clearly conceived general ideals there have grown up minor ideals which often are of an extra-scientific nature. Trimming the principles of biology to meet the exigencies of a set examination is a spectacle often seen in our midst.

In elementary work the pupil is of much greater importance than the subject, but many teachers think more of the symmetrical presentation of their subject than of creating in the minds of their pupils a liking for science. A similar blindness to proper methods leads other teachers to dull all the interest of discovery by giving preliminary lectures and demonstrations which make the laboratory period one of uninteresting verification.

The ideal best calculated to help the young pupil to break away from the dominating authority of books is the one that leads him into the paths of nature so that he comes upon the truths himself.

Well-directed work in biology develops individuality and independence in judgment. The example of one earnest, interested and independent student in a class is not less successful than that of the in-

structor in bringing indifferent workers into line.

*The Training of a Science Teacher for Secondary Schools:* Professor N. A. HARVEY, Chicago Normal School.

A teacher of science in a high school ought to know: (1) His subject, (2) the psychological movements involved in learning the subject, (3) the principles and the art of teaching.

Without knowledge of the subject matter, as complete as possible, no substantial progress can be made. But the teacher must not pursue one line of research to such a degree as to become one-sided, lest he attempt to drill his pupils in the methods of the trained investigator.

If the teacher would avoid the use of men's methods in trying to develop children's minds he must have more than a theoretical knowledge of the general laws of mental action. He must bring the mind of the child into the presence of truth in such a way that its activity will be aroused and growth will result.

Under the prevailing limitations, the normal schools do not properly train teachers for the high schools. Neither do colleges and universities offer an ideal preparation for the science teacher. The latter are occupied too exclusively with the idea of storing up knowledge, with little or no consideration of the psychology of the process.

There are three alternatives for securing better trained teachers: (1) Normal schools may modify their courses to meet the demands for high school teachers; (2) universities may change courses in pedagogy by introducing practice in teaching; (3) the science teacher may get the knowledge of his specialty in the university and his pedagogical training in the normal school.

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