

sciousness of the material available. This plan would result in greater use being made of these aids, and, if the bibliographies are more complete, the libraries would doubtless be moved to make their list of references even more extensive.

(4) We would urge still another method of bringing state bureaus into a more useful relationship to the public schools, a method that has long been practiced in New York state where the department of public instruction has instituted a system by which lantern slides are loaned to schools. It is within the province of state geological surveys to be of great service to the school system in providing photographs and slides of physiographic and geologic phenomena<sup>4</sup>. The survey in the prosecution of its work assembles photographs, but their usefulness is usually limited to the readers of the reports. It is evident that this method would insure a service which at present the state surveys do not render. No official bureau is apt to become less efficient in making itself more useful. A service rendered to the public schools is the speediest method of doing the most good to the greatest number. It may be urged that the state geological surveys are not instituted for doing work of a character that most states have legally relegated to another bureau. This suggestion has no weight until the state departments of public instruction have expressed an unwillingness to receive from our geological surveys the coöperation mentioned.

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### A SATURDAY COURSE IN PHYSICAL CHEMISTRY FOR TEACHERS.

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During the winter of 1907-08, a Saturday course in physical chemistry for teachers has been given at the Massachusetts Institute of Technology, Boston, in the Teachers' School of Science. This course was established and given, free of charge, by Mr. A. Lawrence Lowell, of Boston, who has charge of the funds of the Lowell Institute. The course, which was planned especially for

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<sup>4</sup>The efficiency of "loan collections" in a city has been explained in a recent paper by Jane Perry Cook; *v. School Science and Mathematics*, Vol. VII (1907), pp. 451-456.

teachers of elementary chemistry, was conducted by Professor Gilbert Newton Lewis of the Research Laboratory of Physical Chemistry, Massachusetts Institute of Technology.

Fifteen lectures on the fundamental principles of physical chemistry made up the course, each lecture lasting an hour and a quarter, and followed by an informal discussion of the topic of the day. Throughout the course, Professor Lewis gave especial attention to those principles that are immediately applicable in elementary science; and he illustrated his lectures by experiments, many of which are adapted for use in elementary chemistry courses.

Among the topics discussed were the following:

Fundamental laws of matter and energy, the perfect gas, the transition from gas to liquid, liquids and solids, solutions, chemical equilibrium, thermochemistry, electrochemistry, and photochemistry.

Physical chemistry, the subject treated in this series of lectures, was selected by a postal card vote of the members of the New England Association of Chemistry Teachers as a result of a canvass made by the secretary in the spring of 1907. That the selection was a wise one is evidenced by the fact that the course maintained until the end a membership of about sixty teachers of chemistry.

It was recognized by teachers in general that physical chemistry is, at the present time, in a period of great activity, bringing out at frequent intervals new explanations for phenomena that form the essential part of elementary chemistry; and while many of the older teachers had never had the opportunity to take this subject while they were in college because the newer theories of physical chemistry were not then taught in college, many of the younger teachers who had taken such courses in college found this course an excellent opportunity to review the subject and receive a more up-to-date presentation of it.

To illustrate the general character of the course Professor Lewis has written out in full one lecture, which appears in another part of this issue of *SCHOOL SCIENCE AND MATHEMATICS*. Professor Lewis has, moreover, promised to publish the lectures in book form soon.

The giving of this course under the auspices of the New England Association of Chemistry Teachers has proved so successful that this Association has already under way a movement to secure a course in industrial chemistry for the coming winter.