greenish yellow color of the conjunctiva, mucous membranes and skin appeared much later than in the control animal. Both results might be due to delayed absorption or delayed transudation, or to both. In further studies with subcutaneous injections of fluorescein it was found that the color entered the blood later, and in diminished quantity, in the adrenalin animal than in the control. Among other observations, it was noted that the kidneys of the control animal were more intensely colored than those of the adrenalin animal. The same difference was found when equal quantities of the stain were injected directly into the blood stream. The lesser coloration of the kidney is therefore due to the diminished elimination by the kidneys in the adrenalin-animal. Other related problems are still under consideration. But the reported series of experiments already justify the conclusions that suprarenal extract delays absorption as well as elimination.

The starting point for the investigation was the hypothesis, stated by Dr. Meltzer in another publication, that since capillary endothelia possess irritability and contractility, their pores are surrounded by rings of contractile protoplasm which act like sphincters upon them, thus increasing and decreasing the permeability of the endothelia. The explanation for the observed facts is now offered that suprarenal extract, which causes contraction of the smooth muscle fibers of the arterioles, causes, also, an increase of the contractility of the endothelia, diminishing thereby their permeability and thus reducing their powers of absorption and elimination.

Mendel's Law. E. B. Wilson.

A review of the more important facts in Mendel's observations, together with a statement of some of the deductions to be drawn from them.

William J. Gies,
Secretary.

SCIENCE CLUB, UNIVERSITY OF WISCONSIN.

The seventh meeting of the club for the year 1903–04 was held in the physical lecture room of Science Hall, April 26.

The first paper, by N. M. Fenneman, on 'The Arapahoe Glacier in Colorado' was a description of some recent explorations by the author and investigation of the character of the Arapahoe Glacier. This glacier lies about twenty miles west of Boulder, Colorado, and is about a half mile long and about a half mile wide. It has been only recently that the glacier has been studied scientifically. The glacier follows the type of the North American glaciers.

The second paper, by W. D. Frost, on 'The Antagonism of Certain Saprophytic Bacteria against the Typhoid Bacillus' developed the facts that four very common bacteria produce substances that kill the typhoid germ; that these substances are heat stable but that their efficiency varies directly as the temperature; and that they are alkaline and are neutralized by acids. Mr. Frost's experiments have shown that at the temperature of the ice-chest these substances do not kill the typhoid germs and hence is explained the prevalence of the most severe epidemics of typhoid in winter.

After the foregoing papers were read and discussed the club proceeded to elect the following officers for 1904–5:

President—H. L. Russell.
Vice-President—A. Trowbridge.
Secretary-Treasurer—F. W. Woll.

Victor Lenher,
Secretary.

DISCUSSION AND CORRESPONDENCE.

SHALL WE HAVE TWO GRADES OF COLLEGE PHYSICS?

The writer has examined about twenty catalogues of institutions where technical courses in engineering exist side by side with courses which may be termed general or cultural. Of these only five made any distinction in the manner in which the subject of physics was presented to students in their various departments. Doubtless a more extended investigation of the subject would reveal others, but it is probable that the ratio would not be greatly changed.

I wish in this note to raise the question whether it is not wise to give two courses in general physics in such institutions as have been referred to, the one being adapted to en-

gineering students, and the other to classical, chemical and literary students. Personally I believe it is highly desirable to make this distinction.

The problem of the inequality of student interest and capacity is one that confronts college teachers of physics in an unusual degree. It does not always (and, perhaps, not usually) follow that the poorest students in physics are the poorest in other subjects; it is simply that the charms of physics reveal themselves only to those who are willing to work hard and long over its perplexities. A course in history or civics may appeal to a student who expects to go into business when he leaves college, but optical interference and magnetic hysteresis are likely to appeal only to the specialist.

As a rule these two classes are clearly defined. Students who are expecting to use physics as a foundation for technical branches will master its difficulties as a matter of course; while the other class think themselves aggrieved that they should be burdened with mathematical theories and problems.

There results a very unfortunate state of affairs when these classes of students are reciting in the same division. The question, therefore, arises, Is there not some remedy for the difficulty? And the only possible solution becomes an easy solution if we are ready to answer affirmatively the question propounded in the heading of this article.

Leaving out of consideration the question of ease or difficulty in teaching, does it not seem fitting that physics should be presented to a student who is looking towards civil or electrical engineering, somewhat differently than to one who is preparing for law, theology or business? To be more specific, it seems to the writer that the mathematical treatment of physical subjects is undesirable in cases where the student is not looking forward to further work along this line. It is unfortunate that a subject so delightful under certain conditions should be made the bugbear of the course by insistence upon rigid mathematical applications. For example, Hastings and Beach's textbook, to which I can not pay a higher compliment than to say that I use it each year with about eighty engineering students, is, in my opinion, absolutely unadapted to students in classical, literary or chemical courses.

What is the purpose of the training in physics which these latter students receive? In the first place it develops their reasoning faculties in a very high degree; secondly, it makes (or ought to make) them familiar with the historical development of the various physical theories which are commonly accepted at the present time; thirdly, it gives them an insight into the laws and processes of nature. If these points are well taken, it may be admitted that for the development of logical methods and processes nothing can surpass the applications of mathematics to physics; but such a large amount of similar training must of necessity come from the various mathematical courses usually pursued that the first need not be insisted upon. It is rather the second and third statements of the advantages of physics for general students that appeal to us. And these are very distinct from the purposes of a course for technical students. It would without doubt be a poor technical course which entirely neglected the historical development or other general features of the subject, but, on the whole, the purposes of general and technical courses are diverse. One who is looking forward to the law as a profession ought to know the conditions under which the law of gravitation was discovered, and something of the development of the doctrine of the conservation of energy. But there is no occasion for his mastering, or better, life is too short for him to stop to master, the mathematical development of simple harmonic motion or the kinetic theory of gases.

The fact that so many institutions prescribe the same courses in physics for students in all departments would indicate that there must be good reasons for so doing. This note is written by one who pursues the opposite policy with the hope that some of these reasons may be published in a future number of SCIENCE.

JAMES S. STEVENS.
UNIVERSITY OF MAINE.

COMET *a* 1904.

THIS comet, discovered by Professor W. R. Brooks on the night of April 16, has an orbit