

St. Nicholas magazine, which is so popular with young people and has on the whole exercised such an excellent influence, will with the new year add a department of natural history, under the editorship of Mr. Edward F. Bigelow, editor of *Popular Science*. Six pages, monthly, will be devoted to this new department. Two of these will be given up to the out-door world; two more to indoor study and research, both in nature and science; one to correspondence from the children; and one to a department of 'Questions and Answers.'

SOCIETIES AND ACADEMIES.

PHILOSOPHICAL SOCIETY OF WASHINGTON.

THE annual meeting of the Society was held at the Cosmos Club on December 23, 1899. The usual reports of the Secretaries and Treasurer were read and an Amendment to the Constitution proposed at the last annual meeting was adopted. By this action membership in the General Committee is subject to new conditions as far as the ex-Presidents of the Society are concerned.

The election of officers for the coming year resulted as follows:

President: G. M. Sternberg, Surgeon General U. S. A.; *Vice-Presidents*: H. S. Pritchett, Superintendent Coast and Geodetic Survey; C. D. Walcott, Director Geological Survey; L. F. Ward, Geological Survey; Richard Rathbun, Smithsonian Institution; *Secretaries*: J. E. Watkins, National Museum; E. D. Preston, Coast and Geodetic Survey; *General Committee*: Cyrus Adler, Library of Congress; W. A. DeCaindry, War Department; J. H. Gore, Columbia University; G. W. Littlehales, Navy Department; H. M. Paul, Naval Observatory; F. W. True, National Museum; C. K. Wead, Patent Office; I. Winston, Coast and Geodetic Survey; C. F. Marvin, Weather Bureau.

E. D. PRESTON,
Secretary.

SCIENCE CLUB OF THE UNIVERSITY OF WISCONSIN.

THE December meeting of the Science Club of the University of Wisconsin was held on the evening of December 18th, the program of the evening being a paper by Mr. S. M. Babcock, dealing with the fat globules of milk.

Mr. Babcock stated that, although the fat globules of milk were discovered about two hundred years ago, no accurate knowledge of their structure, number or size was gained until quite recently. Two hypotheses have been advanced regarding their structure. One is that they are surrounded by a thin membrane of albuminous matter which prevents their uniting when they come into contact and protects them from the solvent action of ether when this is shaken with milk, unless a little acid or alkali is first added to dissolve the membrane. The other hypothesis holds that the globules are free particles of fat emulsified with the serum. It was shown that all phenomena which have been considered to favor a membrane are such as occur also in artificial emulsions, where no true membrane can exist if the fat globules are as small as those of milk, and it was, therefore, concluded that milk is an emulsion. The method of counting fat globules by means of capillary tubes was described and the circumstances which affect their number and size were discussed with the aid of lantern slides.

WM. H. HOBBS.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

AT the meeting of the Academy of Science of St. Louis of December 18, 1899, Dr. Amand Ravold addressed the Academy on the necessity and means of filtering and otherwise purifying water, especially with reference to freeing it from bacteria, for municipal purposes. The speaker explained the sand-bed filter system as used in Germany and England, and the American mechanical system, represented by two commercial devices. The Wormser filter plate was also described and its characteristics were considered.

WILLIAM TRELEASE,
Recording Secretary.

DISCUSSION AND CORRESPONDENCE.

OBSERVATIONS WITH THE MERIDIAN CIRCLE.

TO THE EDITOR OF SCIENCE: In reading Professor Keeler's most interesting report upon the results of the Lick Observatory, as printed in SCIENCE for November 10, 1899, I find a statement on page 669 which, if not a misprint, eclipses all work of a similar character.

In connection with that portion touching upon the Meridian Circle, Professor Keeler states that during the year ending last September, and upon 106 nights, 6000 observations were made with the Meridian Circle.

Now the question I would submit, and upon which I would request information, does Professor Keeler wish it understood that 6000 star places were observed in that time, or are these numbers of observations made up of the determination of the right ascension, declination, nadir point, collimation, level and azimuth, each individual determination of these quantities to be counted as one observation?

The above figures give as a nightly average 57 observations, and from my experience four or five observations per hour—I mean a complete determination in both right ascension and declination, when one is not working with an assistant and not in zone work—is about the limit.

When it is taken into consideration that one observer sets his circle, reads four microscopes, observes nine or eleven transits, makes two or more bisections in zenith distance, and records all these, reads his level at least once every hour, observes his collimation twice in an evening's work, an average of 57 observations per night is almost, if not quite, unrivaled.

But, as I said before, perhaps what Professor Keeler wished to convey by the word 'observations' is not what I have construed it, a complete determination of the two coördinates of the star place, but may contain two, three or four quantities, which he calls observations.

GEO. A. HILL.

NAVAL OBSERVATORY, WASHINGTON, D. C.

NOTE ON THE FOREGOING LETTER BY PROFESSOR HILL.

IN the part of my report to which Professor Hill refers in his letter, one observation means one complete determination of both coördinates of a star. A complete observation of the nadir (zenith) point and level is also, in accordance with the usual custom, counted as one observation. Collimation and flexure determinations and *mire* readings have not been included.

A reference to our records for the year covered by my report shows that the average number of stars, completely observed in both coörd-

inates during this period by Professor Tucker, was fifty per night. With an assistant reading the microscopes the average number was sixty-two per night of from four to five working hours. The observations, as shown by their probable errors on complete reduction, are of the highest order of precision.

Doubtless this is quick work, but I believe that it is by no means of unprecedented rapidity. It is moreover obvious that a comparison of the work of different instruments, on the basis of such figures as those given by Professor Hill, may be quite misleading, since the rapidity with which observations can be made depends largely on the character of the work which is being done. With a full list like that of Mr. Tucker's during the past year, the stars culminate more rapidly than they can be observed, so that the list has to be gone over several times. The rate of observation then depends upon the observer's quickness and skill. With a list which contains many gaps, stars have to be waited for, and the rate depends upon the list alone.

JAMES E. KEELER.

DARK LIGHTNING.

TO THE EDITOR OF SCIENCE: My attention was drawn to Mr. Clayden's work by an article in *Nature* in which reference was made to a communication in one of the photographic journals. The note in the *Philosophical Magazine* I had somehow overlooked.

Mr. Clayden in his letter states that he was unable to obtain any results with the calcium light or with sunlight, and suggests that there may exist some difference between light from such a source and a source whose excitement is electrical, and that it is not safe to assume that the time factor is the only one, until the image of some non-electrical source has been reversed. I cannot see much difference between the calcium light and the arc, for in both we are dealing with an incandescent solid. To settle the matter definitely I have repeated the experiment with the revolving disc, using a calcium light, and obtained perfect reversed images of the slit on the first trial. Mr. Clayden's failure to get reversal with sources other than the spark was due, I imagine, to a too long exposure. The duration must be something less than $1/15000$