The meeting closed with some remarks by Mr. W. Lindgren, U. S. Geological Survey, on the Boise Folio (No. 45, of the Geol. Surv.), recently published.

WM. F. MORSELL.

DISCUSSION AND CORRESPONDENCE.

ON THE MAKING OF SOLUTIONS.

TO THE EDITOR OF SCIENCE: A remark in a recent paper by Professor Macloskie calls my attention afresh to a curious error which, so far as I know, is universally current in our zoological laboratories. Professor Macloskie remarks (SCIENCE, Vol. IX., p. 206) "a 1% solution of cane sugar in water, * * * that is 342 grams, * * * dissolved in 34,200 grams of water." In other words, a 1% solution is made by mixing 1 part of the substance to be dissolved with 100 parts of the solvent. In this conception the zoologists appear to be at one. It is sufficient to refer to any of the well-known text-books: Marshall and Hurst, 'Practical Zoology,' 4th ed., p. 464; Gage, 'The Microscope,' 6th ed., p. 179; Dodge, 'Elementary Practical Biology,' p. 391. Like many other text-books, Huxley and Martin's 'Practical Biology' (revised ed., p. 496), does not directly commit itself to the error, but gives directions to make the 'normal saline solution' by mixing 7.5 grams of salt with a liter of water. That the normal saline solution is a ¾% solution is directly stated by Whitman ('Methods of Research,' etc., edition of 1885, p. 207), and Lee (The Microtomist's Vade-mecum, 4th ed., p. 263.),

These citations abundantly prove that Professor Macloskie's conception of a 1% solution corresponds with that of other zoologists. If, however, we ask a chemist how such a solution is made, the reply will be: "Dissolve one part of salt, sugar, or whatever the substance may be, in *ninety-nine* parts of the solvent." And that this is logically correct becomes self-evident upon a moment's thought. A 1% solution of HCl, as all will agree, consists of one part of the acid to ninety-nine parts of water. Why should the fact that in one case we deal with a solid, in the other with a liquid, alter the case?

It would seem that unless, or until the zoologists come into agreement with the chemists, every investigator in publishing his researches should make a point of preventing ambiguity by stating whether his 1%, 5%, 20% solutions of solids are compounded on the logical or the zoological plan.

M. A. WILLCOX.

WELLESLEY COLLEGE, March 6, 1899.

THE ORIGIN OF NIGHTMARE.

OVER and over again when a child I was for years the victim at night of a certain form of mild nightmare, so that it came to be to my fearful imagination no insignificant part of my unpleasant experiences. This nightmare always took the form of a great wave of something gradually rolling towards me and finally engulfing and oppressing me to a painful extent. It would roll up a huge shapeless mass of no particular material, but always irresistibly towards me helpless and overwhelmed. Most often it finally appeared to be a huge soft pillow or even formless feather bed, but without color or other qualities save that of engulfing and terrifying. At its worst on various occasions this mass as it rolled up became a huge fat boar, defined as such, however, only subconsciously, but always dreadful in its power to overwhelm me. All this was years ago.

One night recently, as I was falling asleep in bed in a lighted room, I became gradually aware of that sensation which compression of a nerve produces, a vague and quite indefinite sense of discomfort localized only in the region about my head and arms, but in my state of somnolence only a growing sensation of discomfort pressing on my consciousness. Increasing steadily, it finally began to awaken me, and I then became distinctly conscious of the well-remembered nightmare of my childhood beginning to approach. With the noise in the room I was now sufficiently awake to be interested in this familiar visitor, and I lay still deliberately. Gradually the mass rolled up towards me exactly as of yore, with no terror in its coming now, until finally it was upon me and all about me oppressively. I very slightly moved my arm (upon which my head was lying), and the nightmare was for the moment lost sight of in the sensations now localized there. I opened my eyes and instantly the whole experience vanished, closed them and it instantly returned in all its force and peculiarities. Over and over again this little experiment was performed without variation in its results, until, finally, satisfied, I moved my head off my arm and stretched my arm out of its cramped position, and felt no more this *bête noir* of earlier days, now again returned, bringing with it emphatic and unmistakable explanation of its cause.

G. V. D.

ASTRONOMICAL NOTES.

A NEW SATELLITE OF SATURN.

A new satellite of the planet Saturn has been discovered by Professor William H. Pickering at the Harvard College Observatory. This satellite is three and a half times as distant from Saturn as Iapetus, the outermost satellite hitherto known. The period is about seventeen months, and the magnitude fifteen and a half. The satellite appears upon four plates taken at the Arequipa Station with the Bruce Photographic Telescope. The last discovery among the satellites of Saturn was made half a century ago, in September, 1848, by Professor George P. Bond, at that time Director of the Harvard College Observatory.

Edward C. Pickering.
Harvard College Observatory,
Cambridge, Mass., March 17, 1899.

NOTES ON PHYSICS.

THE NERNST LAMP.

The electric lamp recently invented by Nernst, as has been stated in this Journal, consists of a small rod of magnesia which is heated to brilliant incandescence by an electric current which is pushed through it by an electromotive force of several hundreds of volts. The rod must be heated nearly to a red heat by a blowpipe or other independent means before it passes sufficient current to operate.

A number of these lamps have been made in the Physical Laboratory at Bethlehem, Pa. It has been found that a rod of pure magnesia can scarcely be started even with 1,000 volts and a good blow pipe. The surrounding air becomes electrically too weak to withstand the high electromotive force at a temperature lower than that required to make the rod a sufficiently good conductor. This is true even when the rod has been heated to softness beforehand in a temporary mounting.

The conductivity of the rod may be completely controlled by mixing with the magnesia varying amounts of silica and of fusible silicates. A satisfactory lamp is made as follows: Pure calcined magnesia (heavy) is thoroughly mixed with two or three per cent. of powdered silica, one or two per cent. of magnesium sulphate, and one per cent. or less of sodium or potassium silicate (water glass). The mixture is dried until it is just moist enough to pack under pressure. A small piece of brass tubing is lined with a roll of several thicknesses of stiff writing paper, and the mixture is tamped into this tube. The tube is then baked until the paper is burned, when the rod of magnesia may be removed. This rod is then laid upon a bed of magnesia (powdered lime would, perhaps, answer) and by means of carbon terminals an alternating current is passed through the rod, heating it first to redness by a blow pipe. With some care a very hard and compact rod of magnesia is thus formed which is then ground to a thin rod with large grooved ends. Platinum wire is wound on these grooved ends and, if desired, cement made of water glass and powdered magnesia may be used to cover the platinum. The two platinum wire terminals may then be bound to the sides of a small glass tube as a support. A lamp made in this way may be started easily, although its resistance rises slowly with continued use, owing, perhaps, to the volatilization of the potassium or sodium silicate. Calcium silicate would, perhaps, be more satisfactory in this respect.

A very striking experiment may be performed with a piece of glass tubing several inches long wound with copper terminals at its ends. The tube begins to pass considerable current at a low red heat, with a few hundreds of volts, and is quickly melted by the current. A thin-walled tube half an inch or more in diameter is best, and it should be heated along one side only so that the cool portion of the tube may for a short time serve as a support for the hot conductive portion.

W. S. F.