features of the French system is that of devoting certain places to one stage of the work, and other places to other stages. From Arcachon, for example, after being cultivated up to the age of about two years, the oysters are brought up for further advancement elsewhere and for fattening for the market. Prof. Herdman gave a warning in regard to the fat green oysters, the green in some cases being simply a disease, in which the true blue had got mixed up with the yellow. He remarked that the oyster cultivators, in drawing off the water periodically, trained the oyster to keep its mouth shut when out of the water, which is a point of some importance when it comes to be laid out in the market. The Italian method of culture differed from the French, inasmuch as the former is conducted on the vertical principles, by suspension of the oyster with ropes or twigs in deeper water, whilst the French method is the horizontal, in shallow beds from a few inches to a couple of feet deep. The oyster is said to live as long as twenty years, and those fittest for the market are of the age of about five years. Prof. Herdman stated that the American oyster is more prolific than the English oyster, producing as many as 60,000,000 ova at a time. The typhoid germ does not flourish in sea water at an ordinary temperature, but the question of typhoid fever, as propagated by oysters, is under Government investigation and is not yet settled.

UNIVERSITY AND EDUCATIONAL NEWS.

IT is reported that $300,000 of the $1,000,000 given by Miss Culver, to the University of Chicago, will be used for the erection of a laboratory of biology on the grounds of the University. An Inland biological station will probably be erected near the Yerkes Observatory on Lake Geneva, and the Marine Biological Laboratory at Woods Holl will be strengthened. About one-half of the entire sum is to be reserved for endowment. The buildings and endowments are, whenever it is suitable, to be named after Mr. Hull, from whom Miss Culver inherited the money.

MRS. MARTHA W. BROWN, of Manchester, N. Y., bequeaths to Dartmouth College a sum of money to be left to accumulate until it reaches $40,000, when it is to be used to endow the chair of Physiology to be called 'The William Brown Professorship of Human Physiology.'

DR. CHARLES PALACHE has been appointed assistant in mineralogy at Harvard University. Dr. Palache received the degree of B.S. from the University of California in 1891, was fellow in mineralogy there in 1892–93 and honorary fellow in 1893–94, received the degree of Ph. D. in 1894, and has spent the last year in advanced work at Göttingen.

WE have received from the Missouri Botanical Garden an announcement concerning garden pupils and garden scholarships. Three scholarships will be awarded by the director prior to the first of April next, and applications should be made not later than March 1st. The value of the scholarships is for the first year $200, for the second $250, and for the third and fourth years $300, together with free lodgings.

THERE are said to be 2,610 medical students attending the several schools at Philadelphia; of these 900 are at the University of Pennsylvania and 725 at the Jefferson Medical College.

THE Herbarium of the University of Wisconsin is making special efforts to collect all plants that grow in the State. Mr. L. S. Cheney has been for several years in charge of the field of and herbarium work of the Botanical Survey of Wisconsin, and has already examined the plants of the Wisconsin River Valley from the headwaters to the Dells. Prof. Barnes believes that the function of State collections should be to represent the local fauna and flora, leaving the accumulation and maintenance of great collections to institutions which are established or endowed for this purpose, where proper provision can be made for their use.

LADY HERSCHEL has placed copies of observations made at the Cape of Good Hope by the late Sir J. F. W. Herschel, Bart., at the disposal of the trustees of the Mathematical Scholarships of the University of Oxford, with a request that one copy should be given annually to that candidate for the Senior Scholarship who distinguishes himself most in the part of the examination which relates to astronomy.

AT a meeting of the electors to the Waynflete professorship of mineralogy, held at Magdalen College on December 13th, Mr. Henry A. Miers, M.A., Trinity College, was elected professor in the place of Prof. Story-Maskelyne, resigned. The emoluments of the professorship are £500 per annum, of which £400 is from Magdalen College and £100 from the University chest.

DISCUSSION AND CORRESPONDENCE.

AN EASY METHOD OF MAKING LINE DRAWINGS.

IT is often difficult to get satisfactory cuts of apparatus or of natural objects to illustrate scientific articles. A half-tone, although the easiest to get, is somewhat expensive and liable to be poorly printed, and, on account of its vagueness of outline, is in many cases not as good for scientific purposes as a half diagrammatic line drawing. To get a cheap cut that can be printed on a newspaper press the original photograph must be redrawn in lines and dots. But not everyone has the time and skill to make an accurate line drawing, while if the photograph is sent off to a professional draftsman the expense is about the same as for a half-tone, and the drawing frequently fails to bring out the very point to be illustrated.

A line drawing with the accuracy of a photograph can, however, be easily made in this way: photograph the object, take from the negative a pale blueprint, on the blueprint trace the outlines with as much detail as desired using a crowquill pen and waterproof ink, put the print in water containing a few drops of ammonia, when the blueprint will fade away leaving the black lines on white ground, wash and dry, make such alternation or additions as are required, and the drawing is ready for reproduction by the zinc etching or other process. Of course if the photograph is several times larger than the cut is to be, the reproduction will be neater.

E. E. SLOSSON.

UNIVERSITY OF WYOMING.

[We are glad to give space to the above, although the method has already been recommended. For an apparently new and in many cases better method cf. Prof. Hallock's note on page 761 of the present volume of SCIENCE. J. McK. C.]

THE MEASUREMENT OF COLORS.

EDITOR OF SCIENCE—*Sir:* Mr. J. W. Lovibond, of Salisbury, mentions in *Nature* that his system of Tintometer glasses is in constant use in many laboratories and manufactories for enabling one to record and to reproduce exactly at a future time any given color; and that the method is so simple that it can be carried out by any intelligent workman. Does anyone know whether these glasses are in use in this country, or whether they can be obtained here?

C. L. F.

SCIENTIFIC LITERATURE.

ON THE STRUCTURE OF PROTOPLASM.*

WHAT is the structure of the most marvelous known substance, protoplasm, 'the physical basis of life,' is a question that has long waited its final answer. Probably the best solution thus far given is that found by Prof. Bütschli in the work imperfectly represented in what follows:

That the watery, jelly-like material we find in the most actively living parts of all plants and animals has any discoverable structure is by no means self-evident, and it is only by slow, uncertain steps that the conception of a visible physical structure in this soft living matter has become generally accepted.

The idea that protoplasm is a structureless, homogeneous fluid early met opposition from many who observed here and there facts that pointed to the existence of apparently solid portions in the protoplasm of various cells.

Remak in 1837 found the axis cylinder of vertebrate nerve fibers made up of very minute fibrils. Frommann in 1867 supposed a fibrillar structure was common to all protoplasm. Striated structures were seen in ciliated cells and in gland cells, while Pflüger in 1869 found fibrillations in liver cells.

The fibrils were then seen to be connected in the form of a reticulum. Thus Küpffer in 1870 describes the living protoplasm of the follicle

*Untersuchungen über mikroskopische Schaüme und das Protoplasm. Von O. Bütschli. Leipzig. 1892. 229 pp., 6 pl.

Investigations on Microscopic Foams and on Protoplasm. O. Bütschli. London. Adam and Charles Black. 1894.