definite in outline that their identity and number can be ascertained without question.

Jeffrey's divergent results from those of the large number of cytologists who have worked on *Drosophila melanogaster* must be ascribed to his inexperience in Drosophila technique. Judging from his figures, published in previous papers, he apparently mistakes certain cell inclusions which stain black with iron hematoxylin for chromosomes. This difficulty can be overcome when the Feulgen nuclear reaction, preceded by formol-alcohol-acetic acid fixation, is applied.

I wish to repeat that this account is not written in a controversial spirit, but is merely given as a point of information. I also fully realize that the geneticists could disprove Jeffrey's assumptions even better and more effectively than a cytologist, but I doubt whether any one of them would take the time to do so.

Since this article has been written, Guyénot and Naville have published a most thorough account of the spermatogenesis in *Drosophila melanogaster* in *La Cellule,* Vol. xxxix, No. 1, 1929. They also repeated my investigations on maturation divisions of the egg in which they agree entirely with my work. Their criticism of Jeffrey's work is almost a duplicate of mine given above.

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THE "FERTILIZATION" MEMBRANE OF ECHINID OVA

IN SCIENCE[1] for October 11, 1929, Professor A. R. Moore contributes a note on "The Function of the Fertilization Membrane in the Development of the Larva of the Sea-urchin." Against his conclusion I wish to enter a protest.

I had supposed that even beginners in marine embryology realized that the "fertilization"—vitelline—membrane of echinid ova plays no rôle in development after its complete separation from the vitellus. Every such student knows that by centrifuging, pressure, and the like, uninseminated ova of the sea-urchin are easily deformed—can, for example, be pulled out into long strands—with a return to normal form. This is due to the elasticity of the closely adherent vitelline membrane which encloses the almost watery egg contents and which plays a rôle in the metabolism of the egg. After insemination not only does the membrane stand off from the egg; it becomes stiff, brittle and easily removable; it has changed chemically, as Harvey has shown, and it plays no part in the metabolism of the egg. Removal of the membrane (except by micro-dissection?) from the uninseminated egg is practically impossible. Its removal after insemination has been frequently accomplished and this without injury to the egg or impairment of development. Finally, every student of the living sea-urchin egg has doubtless observed its "hatching," *i.e.,* the escape of the swimming form through the ruptured membrane. What justification, then, has Moore for the conclusion in his note concerning the function of the vitelline membrane in development?

Perhaps Moore did not mean the vitelline ("fertilization") membrane. In that case he should have given his note a different title. If, on the other hand, he meant the hyaline plasma layer the statement in his conclusion is superfluous; here again, every student knows that the hyaline plasma layer is part of the developing egg.

In his experiments, Moore finds that after exposure to an isosmotic solution of urea (he does not give the pH of the solution) uninseminated eggs are capable of fertilization and development without the "formation" of either the "fertilization" or hyaline membrane. Obviously, this might mean simply that the preformed cortex which during and after membrane separation builds up the hyaline plasma layer is so injured by urea that the normal cortical changes underlying the separation of the vitelline membrane are abnormal. The result would then be not the failure to "form" hyaline plasma layer but the rapid disintegration of this layer after it "forms."

If Moore's interpretation of his experiment on the effect of urea—namely, that it inhibits formation of the hyaline plasma layer—be correct, then he has been most unfortunate both in the choice of his title and in the statement of his observations.

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[1] 70: 360.

PEDOLOGY OR SOIL SCIENCE

IN reply to the comments of Dr. William A. Hamor in the January 17, 1930, issue of SCIENCE relative to the use of the term *pedology* to refer to soil science, attention should be called to the fact that pedology was first used by the Russian soil scientists in 1865, over thirty years before the child scientists adopted it. The latter, as Dr. Hamor notes, are using an incorrect spelling of the word. The term they should employ is *paedology* or *paidology.* In view of the prior use of pedology to refer to soil science and as the psychologists are using the word incorrectly and also because of the general acceptance and use of the term in Europe in place of soil science, the American Soil Survey Association at its annual meeting in Chicago in November formally adopted the term. No other terms suggested are even being considered. Those mentioned by Dr. Hamor are obviously out of the question. It is well known that the child scientists have been using the word, but if they will spell their word correctly there will be no difficulty. Of course it is not expected that any such term will immediately come into general use instead of soil science, which appeals to many of us as quite satisfactory. Perhaps it may never be generally used. But we can be sure that it will be used to some extent from now on in research work, at least.

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QUOTATIONS

MEDICAL EDUCATION IN AMERICA

THE third report of the influential American Commission on Medical Education dealt with general principles. In a supplement to the third report a critical summary is given of some of the changes in procedure which have been put to a practical test in a number of the American schools of medicine, and serve thereby to illustrate certain of the general principles of training emphasized in the earlier report. The schools are referred to by letters of the alphabet, and not by their names, and without considerable knowledge of the local conditions it is therefore very difficult to identify them. The former period of two years' pre-medical work has now been extended to three or even four years in most of the better schools of medicine, which can easily fill their classes with college graduates; and as 95 per cent. of the graduates follow their medical course of four years by a hospital internship of one to two years, it takes about ten years from the date of entering college for the student to become financially independent. The cost of medical education is naturally going up, and the fees paid by students supply, as shown by the average of the figures from sixty-three schools, little more than one third of the total, the difference being met by endowment and from other sources. In the sixty-three schools, 42 per cent. of the budget goes to provide salaries for the whole-time teachers, and 6 per cent. to part-time teachers. During the last few years the total amount of work, as shown by the number of hours required, has been somewhat reduced in the majority of schools; thus in thirteen schools which in 1925 demanded 4,000 or more hours, there has been an average reduction of over 400 hours, but there are wide variations; in twenty schools taken at random the hours required for anatomy varied from 1,267 to 480, for medicine 1,030 to 428, for surgery 660 to 332, and for gynecology and obstetrics 368 to 168. Although much consideration has been given to uniformity and standardization, there is probably far more variation in the curriculums at different schools than is generally assumed. Three types are described. The first is the orthodox standardized curriculum of recent development, intended to familiarize the students, who all take the same courses, with every phase of medical knowledge; the amount of instruction is heavy, and the staff is small. The second type is represented by a small number of schools closely allied with universities, having few students, who have much more freedom, working on graduate rather than on undergraduate lines, and specializing early; the teaching staff is large, and there are full-time clinical instructors. The third group is intermediate between the other two, and offers a comprehensive training for all and special opportunities for a limited few. Teaching in pharmacology is becoming less concerned with pharmacy and more with the physiological action of drugs, thus forming a bridge between physiology and therapeutics. Clinical-pathological conferences, in which the physician in charge of the case first gives the clinical history and diagnosis, and the pathologist then shows the post-mortem conditions, are well established at some schools, as are joint demonstrations of surgical problems by surgeons and anatomists. Efforts are made to remove the reproach that the student does not know how to deal with the sick person; thus at one school 15 per cent. of the fourth-year students follow the daily work of a general practitioner for one or even two months. The teaching of preventive medicine throughout the curriculum is gaining ground, and it is pointed out that pharmacological instruction might well deal with patent medicines and the mischief they do to patients who attempt to treat themselves at a stage when early diagnosis and proper treatment may prevent serious consequences.—*The British Medical Journal.*

SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN INNOVATION IN SCALE CONTROL

INCIDENTAL to a study of the effect of dusting citrus trees with extremely finely divided sulphurs for possible control of the citrus thrips, the discovery has been made that a very high mortality of the citricola scale (*Coccus pseudomagnoliarum* Kuw.) has accom-