remembered that in 1936 a mathematical periodical was started in Germany under the title *Deutsche Mathematik,* which has since then been widely supported by German mathematical writers even if the contents exhibit the fact that mathematics is an international subject which contains many evidences of the cooperation of writers of many lands. In recent years the German contributions have been extensive, but they were largely based on the earlier contributions of writers in other lands including the Greeks whose achievements the noted prize may help to clarify and to whom the entire mathematical world has often acknowledged itself indebted notwithstanding the growing credit to earlier civilizations.

This prize and the recently reported appointment of a professor of the history of mathematics in the University of Berlin seem to imply that this history is now receiving relatively much attention in Germany, notwithstanding the fact that the present disrupted condition in scientific work makes the unbiased study of this subject very difficult. The articles in the periodical noted in the preceding paragraph also indicate an emphasis on the history in recent German mathematical writings. In so far as these efforts are directed towards learning the actual situations they naturally receive the approval of all and should be especially appreciated in America in view of the relatively small amount of such work in our rapidly expanding mathematical activities of recent years. According to Felix Klein the thinking through of old problems by new methods is the source of pure mathematics.

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CROSS-FERTILIZATION OF ECHINODERMS

IT has long been known that the sea urchins *Strongylocentrotus purpuratus* and *S. franciscanus,* will cross-fertilize, reciprocally, but every investigator has noted that the percentage of cross-fertilizations is extremely variable. During a recent stay at the Hopkins Marine Station at Pacific Grove, Calif., it was found that the variability was largely due to the method of preparing the eggs for experimental use. The usual procedure of preparing sea urchin eggs is as follows:

The ovaries are removed from the cut animal and placed in a fairly large quantity of sea water; this is filtered through cheese-cloth to remove the débris from the exuded eggs; some investigators advocate several washings of the eggs with fresh sea-water; then a small quantity of the eggs are pipetted off into a Syracuse watch glass containing fresh sea water, and the sperm added. Using eggs prepared in this manner, it was found that when crossed with the sperm of the other species, very few eggs were fertilized, though 100 per cent. fertilizations occurred with the sperm of its own species. If, however, the eggs were taken directly from the ovary of the cut animal and left crowded together in sea water in a Syracuse watch glass and immediately fertilized with the sperm of the other species, quantities of the eggs were fertilized. In the cross, *Strongylocentrotus purpuratus* ♀ × *S. franciscanus* ♂, the percentage, in one experiment, was 1 per cent. fertilizations with eggs prepared in the usual way (well washed and separated), and 80 per cent. with eggs direct from the ovary and crowded. The same batch of eggs, and sperm from the same male, were used in the experiment, and the counts were made of the blastulae just before swimming. The experiment was repeated with many different batches of eggs with the same general result; the reciprocal cross gave similar results, but the difference was not so great. In all cases, a large quantity of sperm was used, as it has long been known that over-insemination increases cross-fertilizations.

When the eggs of the sea urchin, *Strongylocentrotus purpuratus,* were crossed with the sperm of an entirely different genus, *Dendraster excentricus,* a sand-dollar, not a single fertilization was observed when the eggs were prepared in the usual way. But when the eggs from the same female were taken directly from the ovary and left crowded together and crossed with the sperm from the same *Dendraster* male, 10 per cent. of the eggs were fertilized.

Loeb has shown that increased alkalinity of the sea water favors cross-fertilizations. In the present case, we should expect an increased acidity due to the accumulation of CO_2 around the unwashed eggs. However, bubbling CO_2 through the sea water did not increase the percentage of cross-fertilizations; possibly the optimum CO_2 tension was not attained. Keeping the eggs for several hours slightly increased the percentage of cross-fertilizations. Sea water in which unfertilized eggs had been kept for 4 to 24 hours (at about 8° C. for the longer periods) gave a slightly higher percentage of cross-fertilizations for fresh eggs than did fresh sea water. It would certainly seem that some substance diffuses from the eggs which favors cross fertilizations and that this is present in effective quantity when the eggs are unwashed and crowded.

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PHOSPHORESCENCE OF HUMAN TEETH

THE fluorescence of teeth is usually intense white with an occasional yellowish or greenish tinge. In older persons the fluorescence shifts into the longer wave-lengths, becoming reddish. Reddish fluorescence is also noted in the teeth of diseased persons.[1] A. H.

[1] J. A. Radley and J. Grant, "Fluorescence Analysis in Ultra-Violet Light." New York: D. van Nostrand Company, Inc., 1939.

van den Bergh and Hyman[2] attribute the red fluorescence of teeth to the presence of a porphyrin, and Tiede and Chromse[3] ascribe red fluorescence in teeth to the presence of proteins, since they were able to duplicate the luminescence of natural teeth by heating apatite preparations with proteins.

Radley and Grant,[1] in their discussion of the fluorescence properties of human teeth do not mention the existence of phosphorescence. To the knowledge of the writer phosphorescence in living human teeth has not been previously noted.

In an apparently healthy twenty-year-old male medium green phosphorescence of several seconds duration was excited in both upper and lower teeth by short wave-length filtered (CG 986) ultraviolet radiation from a cold mercury-quartz lamp. Ultraviolet radiation of longer wave-lengths, *e.g.*, 3600 A.U., failed to excite this phenomenon in the same teeth. Green phosphorescence was also noted in the teeth of older persons.

It would be interesting to study the phosphorescence of teeth in relation to disease, deficiency of diet, poisoning and other conditions, since the action might provide a simple diagnostic measure for certain pathological states.

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SCIENTIFIC BOOKS

RECENT PUBLICATIONS OF THE BRITISH MUSEUM (NATURAL HISTORY)

SINCE the review of British Museum publications in SCIENCE, December 6, 1940, the following have come to hand:

John Smart. Instructions for Collectors, No. 4A. Insects. 1940. 164 pp. A very useful little illustrated manual, giving an account of the various groups of insects and the methods of collecting and preserving them. It is just the sort of book which will be useful to a beginner or amateur and it must be emphasized that those who make no pretense to profound scientific knowledge may nevertheless do very important work as collectors, if they will learn how to do the work and follow advice as to what to collect. It would have been a good thing if the author, in his introductory remarks, had cited some of the results of the work of amateur collectors, as he could so easily have done from his experience at the museum. In the chapter on "Collecting Apparatus and Methods," I am surprised to find no mention of gelatin capsules, so useful when collecting small insects in the field. One's first reaction, on receiving such a book in the midst of a tragic war, is to wonder why it should be issued at this time. Aside from the feeling that normal scientific work should be continued even in wartime as far as circumstances permit, along with other activities which help to keep us sane and hopeful, there are special reasons for promoting entomology under the present circumstances. During the last war important collections and studies were made in various countries, and the work on mosquitoes and lice, in particular, proved important in relation to the health of the armies. At the present time, men are stationed at various localities in Africa and Asia, where the insects are imperfectly known. Much time is spent in guarding rather than fighting, and it is a good thing to cultivate amateur scientific interests to prevent boredom and add to the joy of life. In Britain, also, there are groups of men all over the country, whose duty it is to watch and wait, always ready to meet any emergency that may arise, but most of the time with nothing particular to do. We have been much concerned to furnish reading matter for these groups, but in addition, amateur scientific interests are very helpful, and it is easy and inexpensive to collect insects. Among the smaller insects, many discoveries or original observations may be made even in Britain. There is still another service which entomology may render. Many persons who have been injured leave the hospitals partly cured, and there is a period, sometimes a long period, before they can resume their normal occupations. For such people arrangements have been made for instruction in the manual arts, such as bookbinding, but equally valuable is the development of a scientific hobby, which may be continued through life. Having all these matters in mind, we no longer feel that Dr. Smart's guide is superfluous, even in wartime.

Ruwenzori Expedition. Vol. II, No. 4—Coenosiinae, by F. D. Van Emden; No. 5. Empididae, by C. Garrett Jones. These two papers on African flies are of interest to specialists, but they also serve to emphasize what has been said above concerning collectors. In a series of Empididae collected, it was found that the great majority (39 species) consisted of previously unknown species. Only three, in fact, had previously been described. Most of the material was collected by Dr. F. W. Edwards, the master student of Diptera, whose recent death we so greatly deplore.

Great Barrier Reef Expedition. The Biology of Reef-Building Corals. By C. M. Yonge, July, 1940.

[2] A. H. van den Bergh and Hyman, *Konigkl. Akad. Wetensch. Amsterdam wisk. natk. Afd.*, 36: 1096, 1927.
[3] E. Tiede and H. Chromse, *Ber.*, 67B: 1988, 1934.