to suggest another one that is in use in the Division of Agronomy and Genetics at the University of Minnesota. This system originated with Professor H. K. Hayes. We found it extremely useful for our own work and for graduate students while teaching at the university during the fall quarter of 1941.

The system in use at Minnesota is very simple. Reprints are filed in reprint boxes that are large enough to take typed or mimeographed reports ($8\frac{1}{2}'' \times 11''$). Each reprint is numbered (in consecutive order) and there is an index card for the subject-matter and also one for the author. These index cards are filed, one set for authors and another for subject-matter. As new reprints are received they are numbered and cross indexed on standard 3×5 library cards. Reprints are then filed in the boxes which are arranged on the shelves in numerical order. Since each box is full there is no trouble with reprints becoming doubled up as they do in partially filled boxes. There is never any problem of where to file reprints, and it is always easy to locate any reprint by subject or author.

We found this system much more practical than the system generally used where the reprints are filed alphabetically according to authors. Where graduate students are using the reprints it is important to have them well indexed both by subject and author.

Single unbound copies of several biological journals are also filed like reprints. Although there is a greater chance of losing some number of a journal the fact that the single issues are filed makes them available to a greater number of students at any one time. Any possible loss of single numbers is more than offset by the greater good derived by more students using the journals. Both reprints and single copies of the journals are signed out by students using them.

This way of handling reprints and journals seems to us very simple and practical. The important thing is that it works, and the reprints and journals are used extensively by the graduate students in the Division of Agronomy and Genetics.

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THE STATUS OF EXPERIMENTAL PSYCHOLOGY AT THE UNIVERSITY OF MISSOURI

IN a recent report on "The Status of Experimental Psychology among the Laboratory Sciences,"[1] the University of Missouri was included in a list of institutions which require laboratory science for the A.B. degree in the college of Arts and Science, but which do not accept experimental psychology in fulfilment of this requirement. In 1937, when the data for this report were obtained, this was true. In the academic year 1939–40, however, the Department of Psychology at the University of Missouri instituted a 5-semester-hour beginning course in general experimental psychology, which is now offered in addition to the usual 3-hour course in general psychology. Students may meet the biological science requirement for the A.B. degree in the College of Arts and Science by taking general botany, general experimental psychology or general zoology.

The catalogue describes the course in general experimental psychology as dealing with "the basic facts, principles, and methods of psychological science, with special reference to the human being," and as consisting of "lectures, classroom demonstrations, and laboratory experiments." There are three lectures and two 2-hour laboratory sessions each week. The course is taught from an experimental biological point of view with emphasis on experimental procedure and scientific attitude.

The course in general psychology, on the other hand, includes no laboratory work and emphasizes to a lesser degree the biological aspects of human behavior. It meets no specific requirements for graduation, but it may be substituted for general experimental psychology as satisfying the prerequisite for more advanced courses in the department.

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A NOTE ON "STOMATES"

MUCH as I sympathize with Dr. White's[1] protest against such unnecessary words as "stomates," it is only fair to point out that the word is not, as he seems to imply, etymologically badly formed. It is not comparable to "eggses." The Greek word is στοματ (stomat); the final consonant was dropped in the nominative singular for euphony, but appears in other cases, such as the genitive singular (stomatos). The Anglicization "stomate" is correct. Nor is the word really unwieldy; "stomates" is just as easy to say as "stomas."

Many of the more ludicrous efforts of biologists to bestow names upon their mental progeny betray the results of unfamiliarity with languages. It behooves us all the more to invoke some philological accuracy in criticizing them.

H. W. RICKETT
THE NEW YORK BOTANICAL GARDEN.

CEMENT AS A FIRE EXTINGUISHER

IN the January twenty-third issue of SCIENCE there is a short article on the use of pitch as the best incendiary extinguisher, by Dr. R. Sayres, director of the U. S. Bureau of Mines.

[1] See SCIENCE, 95: 171, February 13, 1942.

[1] J. E. Winter, SCIENCE, 95: 96–97, 1942.

It would seem to the writer that a good deal of caution must be used in the application of pitch to extinguish fire, even though it originates from a magnesium incendiary bomb. It has been the experience of the writer with a great variety of small fires in oil, metals and other materials, there is nothing so satisfactory and so foolproof as Portland cement as it is placed on the market. In many cases in the writer's experience it has been highly successful in extinguishing fires where water, carbon tetrachloride, foam and similar substances have been unsuccessful. This very common material so easily available and so safe to use should be placed at points where there is danger from fires either from incendiary bombs or from normal causes.

In our own laboratory, we provide such material easily available in kegs and find it far more successful than the usual fire extinguishers. Furthermore, it gives off no injurious gases and is in itself not combustible, as in the case of pitch.

ROY CROSS

KANSAS CITY TESTING LABORATORY

SCIENTIFIC BOOKS

CELESTIAL MECHANICS

The Analytical Foundations of Celestial Mechanics. By AUREL WINTNER. xii + 448 pages. Princeton University Press. 1941.

THE author states explicitly in the preface that the title of this volume is meant to imply that the general topological methods initiated by Poincaré are not discussed. For instance, virtually nothing is said of surfaces of section. Nevertheless, the author does find occasion to state (without proof) both the recurrence theorem of Poincaré and the ergodic theorem of Birkhoff, though not the mean ergodic theorem first proved by von Neumann. Also there are some well-chosen omissions from the purely analytical aspects of the subject: for example, the proofs of Bruns and Poincaré on the non-existence of integrals of certain types in the problem of three bodies. By making omissions of this kind the author has succeeded in isolating a well-rounded portion of celestial mechanics to which he has given an exceptionally thorough and scholarly treatment.

The first chapter opens with an explanation of the matrix and vector notation, which is used to advantage in many parts of the book for the sake of brevity, but which does not, in the opinion of the reviewer, add to the clarity of the exposition save in very exceptional cases: say, in the treatment of characteristic exponents in the following chapter. The first chapter, without actually mentioning the differential equations of Lagrange or Hamilton, introduces the idea of a "Lagrangian derivative" and gives an account of various mathematical formalities connected with the underlying group of canonical transformations. Certain special transformations are also treated: namely, rotations and the conformal transformations used later in connection with systems of two degrees of freedom.

In the second chapter are introduced the (conservative holonomic) dynamical equations with their Jacobi differential equations of variation. It is incidentally proved in this chapter (from the transversality conditions of the calculus of variations) that in a family of periodic solutions, in which the period is a function of class C' of the parameters, the period must be a single valued function of the energy alone. This interesting result, though well known and discovered independently by a number of mathematicians, has not previously (to the reviewer's knowledge) been published in any general treatise on dynamics. It is also in this chapter that mention is made of the ergodic theorem and that stability and characteristic exponents are discussed.

In the third chapter use is made for the first time of the hypothesis that the Lagrangian function is a quadratic polynomial in the velocities and that the purely quadratic part is positive definite. Various results are proved on the assumption that the coefficients of this polynomial are homogeneous of various degrees in the coordinates of the configuration space. Here also is presented the principle of least action and the closely related question of iso-energetic transformation. Systems with one and two degrees of freedom and systems with radial symmetry are considered in some detail.

In the fourth chapter we have a very extensive treatment of the problem of two bodies. Just because the derivation of the equations of planetary orbits from Newton's law of gravitation is a standard topic in elementary mechanics, we sometimes forget that the derivation of the coordinates as explicit functions of the time is by no means easy and indeed has been the subject of numerous classical investigations, leading, for instance, to the discovery of Bessel functions. Here the expansions connected with Kepler's equation are given an elaborate treatment. The problem is also considered with respect to a coordinate system rotating with uniform angular velocity about the center of gravity. This is a necessary preliminary to the systematic study of the restricted problem of three bodies.

The fifth chapter is largely an exposition of Sundman's work on the problem of n bodies (with special emphasis on the case $n = 3$). There is, of course, much about the Sundman theory which is intuitively evident.