didinia" and "the didinia were" to "ten *Didinium*" and "the *Didinium* were." Nevertheless, expressions identical in form to the last-mentioned two are to be found in current protozoological literature.

Actually, there is nothing new or radical in the use of generic names as common nouns. The practice is adequately supported by the authority that precedent invariably confers. For example, the following are some common animal names (hence common nouns) that are accepted in Webster's New International Dictionary, second edition: alligator, amoeba, arbacia, bison, hippopotamus, paramecium, rhinoceros and stentor. Yet each of these common names becomes a generic name when written with a capital initial letter and preferably italicized, though editorial practice varies with reference to italics; in other words, each is a generic name used as a common noun. In the plant world cases are even more numerous because of the wide popular interest in gardening and horticulture; *e.g.*, acacia, chrysanthemum, geranium, narcissus, rudbeckia and rhododendron. In the use of these and similar common names in scientific writings, it is merely necessary for the author to make clear what species is under consideration.

In view of the convenience which the practice embodies and the sanction which precedent has already conferred on it with reference to many of the more widely known animals and plants, there seems to be no logical reason for investigators and editors to look with disfavor on an author's judicious use of a generic name as a common noun.

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SCIENTIFIC BOOKS

APPLIED MATHEMATICS

Operational Methods in Applied Mathematics. By H. S. CARSLAW and J. C. JAEGER. Oxford: Clarendon Press. 1941.

THE title of this book might give a better indication of its contents if the words "Avoidance of" were prefixed thereto. For, the outstanding virtue of the book is that it dispels the mysticism formerly attached to the so-called operational calculus. After a brief introductory chapter tracing the historical development of the subject and giving due recognition to Heaviside, the real originator of the method, no further use of operators as such appears. Thus the book serves to put the subject on a firm basis in such a clear and simple way that even a student who is not too familiar with mathematics can learn the technique and understand the underlying theory.

The fundamental tool for the elimination of the operational method is the Laplace transform

$$x^*(p) = \int_0^\infty e^{-pt}x(t)\,dt,$$

which "carries" the function $x(t)$ into its "transform" $x^*(p)$. To solve an ordinary linear differential equation with constant coefficients in the unknown function $x(t)$ one transforms the equation by the above integral. Due to the fact that the transform of the derivative $x'(t)$ differs from $p\,x^*(p)$ by a constant (which is determined by the boundary conditions) the differential equation is transformed into an algebraic equation in $x^*(p)$. After solving this it remains only to discover the function $x(t)$ from its transform. In the first chapter this is done by use of a table of the simpler Laplace transforms. Verification of the validity of the process is left for a later chapter. Many examples and exercises are given so that the technique of the method can be thoroughly mastered.

After several applications to physical problems the authors return in Chapter IV to the theory behind the method. With a minimum of the theory of the Laplace integral and the elements of the calculus of residues they show that the method always gives a solution in the linear case described above. Partial differential equations are next treated. Here the Laplace transform serves to reduce the number of variables by one. Thus a differential equation in two independent variables becomes an ordinary equation after the transformation. For partial equations no general validity theorem is established, but each solution is verified directly. The remainder of the book consists of applications to heat conduction, hydrodynamics, various electrical, mechanical and wave problems.

The book strikes an excellent compromise between the rigor required in a mathematical text and the technical skill demanded by the engineering student. Ideals of precision are established by setting forth the foundations strictly. Then later verifications are left to the student who has caught the feeling for careful mathematical procedure. In this connection it might be in order to express regret that the difficult problem of the uniqueness of solutions is not at least mentioned. It is further to be deplored that in a book of this character there should be no mention of the Stieltjes integral. This integral is so obviously the correct tool for physical problems that it is difficult to understand why it has not found its way into physics texts. By its use the somewhat apologetic discussion of "impulsive functions" in Appendix III could be replaced by something less distasteful to the

mathematician. This is rather a comment on the existing dissemination of information about the Stieltjes integral rather than on the authors' choice of material. For there has been an evident effort in this work to meet the student of applied mathematics on his own ground.

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SOCIETIES AND MEETINGS

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS

HEREWITH is presented the eleventh annual report of the Pickering Memorial astronomer and the recorder of the American Association of Variable Star Observers. The past year, during most of which our own country has been involved in war, has, in spite of difficulties incidental to such conditions, been productive of results in the field of variable star observations and the studies of the variables themselves. With the decrease in time occupied in the routine care of the somewhat smaller number of observations which have been communicated, the recorder has been able to devote considerably more time to the long-planned statistical study of the variables—principally those of long period—which have for more than three decades been on the observing list of the association.

Not only have the reports from foreign observers been necessarily fewer and smaller, but our own observers have been fewer in number, as some of them have either joined the armed forces or have been engaged in other wartime activities.

Among those who are known to be actively participating in the armed services are Ensign C. B. Ford, formerly of Smith College; Private J. Russell Smith, formerly of Lubbock, Texas, and Captain A. T. Murphy, formerly of San Francisco, California. Foster D. Brunton, of Guam, is a prisoner of war, as is doubtless Father Depperman, in Manila.

The library continues to be used to some extent. Acquisitions during the past year numbered 168, including 43 volumes and parts of volumes, besides numerous reprints. Gifts of eleven books have been made by H. B. Webb, Anton Kovar, E. H. Jones and the recorder.

Slides: Again attention is called to the excellent collection of slides which is available for loan to members. It could be used much more extensively.

Telescopes: The three-inch telescope formerly owned by the late Sigmund K. Proctor has been donated by his mother, Mrs. Helene F. Proctor, as a memorial, and is now on loan to Mrs. Federer.

Publications: The *Bi-Monthly Bulletin* continues to serve a useful purpose. Three numbers of *Variable Comments* have been issued: one deals with the 1941 fall meeting, the report written by C. B. Ford; another contains the tenth annual report of the recorder; and the third covers the A.A.V.S.O. Get-together at New Haven in June, 1942, by Helen S. Federer.

"Variable Star Notes" appear regularly in *Popular Astronomy* and as a Harvard reprint at the end of the year. The original observations appear in the Harvard *Annals,* and Nos. 2, 3 and 4 of Volume 110 have been issued. Instead of containing the observations for each quarter separately, individual numbers now cover six months or more of observations.

Side Activities: It is to be regretted that activities other than the regular variable star observing program have not received the attention which was given them in former years. Doubtless the war can be blamed for much of the seeming neglect of these phases of our work. The Nova search has dropped considerably and the photographic research has been practically nil. The work of the occultations committee will be detailed by the chairman of that committee.

Professor Bobrovnikoff, of Perkins Observatory, Delaware, Ohio, hopes that members of the association will cooperate with him in the estimations of the brightness of comets. He has shown that some valuable cooperative work could be done by trained variable star observers. He is willing to give advice in this field of observing to all inquirers.

Research Problems: The hope expressed by the recorder in his tenth report, that he would be able to start on a real campaign of the discussion of the long-period variables, has been fully realized. During the past ten months he has discussed 250 variables. This has involved the handling of approximately 450,000 observations covering, in general, the past twenty years. The discussion has included not only new derivations of the mean light curves, but also the final determination of dates of maximum and minimum—about 12,500 dates—as well as the accumulation of an abundance of material for studying numerous correlations which pertain for the variables, especially the Me stars.

Results on a hundred of the variables have appeared in instalments of twenty-five each in *Variable Star Notes* for this year, together with diagrams of the light curves.

The SS Cygni and R Coronae Borealis stars have been well observed. SU Tauri dropped to a deep minimum, and RY Sagittarii to a shallow minimum, according to recent reports.

Annual Summary: Again, we must record a falling off in the number of observations received during the year, a total of 33,090 observations as against 37,443 for last year. Observations are meager for a few stars, especially the southern ones, but on the whole,