on interpolation enhances the value of the book considerably, especially for the student who wishes to compute. The mathematical foundations of the Laplace, Gauss and Olber methods are clearly presented, especially in the case of the last. The historical sketches, though brief, add greatly to the interest and value of the book. These, coupled with the rather complete bibliography, make the book of considerable value for reference purposes.

The chief criticisms apply to the treatment of practical details necessary for the student who wishes really to learn to compute orbits. The formulas for computation are in some portions very detailed and in others somewhat sketchy. They are, however, designed for machine computation, which is a definite advance. The omission of plus signs in the numerical examples is in bad form for the student learning machine computation, but, of course, the instructor should watch over such details.

One would rather expect Moulton's "Celestial Mechanics" to be used as a standard of notation in an English text, but one finds ξ, η and ζ representing the direction cosines when usually they represent geocentric coordinates in orbit theory. Other changes in notation may cause confusion. The failure to identify explicitly the well-known f and g series in the modified Laplacian method may possibly save computation time, but the treatment almost completely masks these most important series. Their omission as definite entities prevents the student from appreciating the tremendous flexibility of the modified Laplacian methods, such as Leuschner's, when applied to the many problems that the orbit computer will meet.

I can find no mention of Bengt Strömgren's modification of Olber's method, though his nomograms for the solution of the geocentric distance are of great value in computation, both by Olber's and Leuschner's methods.

One may say of the book generally that, in spite of certain deficiencies in the practical treatment of orbit computation, it affords the most complete text on the subject available in the English language. This book should stimulate activity in a part of astronomy somewhat neglected at the present time.

FRED L. WHIPPLE

HARVARD OBSERVATORY

QUOTATIONS

A MESSAGE FROM THE PRESIDENT OF THE AMERICAN CHEMICAL SOCIETY

WITH the American Chemical Society entering a new year, the fifth of the depression, a circumspection of its affairs may well be made. The society is in a strong position. On account of the interest and efficiency of its permanent officers, the editors of the journals and their staffs, the American Chemical Society is in the front as one of the outstanding scientific organizations of the world. With the cooperation of the members it will always remain so. The society has weathered the last five years without serious impairment of its functions, and there is every indication that the next years will present easier sailing.

The high standard of excellence of the society's journals is accepted by all. The national conventions and intersectional meetings of the society are a tremendous stimulation and inspiration to the members, and at the same time attract public attention. It is difficult to suggest basic improvements in these two interests of the society. There is still a third function of the organization, the improvement of the professional standing of the chemist, which may very briefly be discussed. That the chemist should be pictured in the minds of the public in the same category as the physician, engineer or lawyer, is the desire of all who understand chemistry. There are at least two viewpoints as to how this may be best accomplished, and only time will crystallize the policy which the society as a whole should support. Without mentioning all of the various factors which have aided the professional standing of the physician and of the engineer, only the one which is perhaps the most influential need be cited —the necessity of state examinations and registration. Is the chemist, in order to attain a greater professional standing, willing to accept state examinations and registration before he can practice or become a properly qualified chemist in the eyes of many business executives? Although such a plan will effectively assist the chemist in gaining public recognition, nevertheless years would pass before a system satisfactory to the chemist and to the states could be evolved and before this plan might accomplish its purpose.

The alternative is to educate the public gradually in the manner that has been taking place during the past ten or fifteen years. The industries have manufactured more and more products which touch directly the layman and which are advertised to him as the result of chemical investigations. With such products steadily increasing in number and with the numerous interesting press reports of discoveries involving intricate pure and applied chemistry, the professional standing of the chemist with the laity is bound to improve.

The trained chemist is truly in a favored position to-day. The past decade has seen his services first greatly in demand, and has then seen them diminish, until three years ago a current topic of conversation

among university professors was the problem of employment for the newly trained chemists. The picture has changed once again in the last two years. Unemployment has diminished rapidly until the number who are not placed, and whose training qualifies them for a research position, is relatively small. In fact, it does not now appear to be presumptuous to predict the possibility of a shortage of research chemists within a few years. This situation has been created through the recognition by the executives of an ever increasing number of our industrial organizations of the value and necessity of research. More and more chemists are being diverted to executive positions, to sales or legal departments in various organizations. The desirability of a technical training in these fields is not yet fully recognized.

Compare the chemical profession with any other. Is not the outlook for the chemist very encouraging?

—*Roger Adams*

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SECOND EXPERIMENTAL METHOD FOR INCREASING AUDITORY ACUITY[1]

IN previous publications[2,3] fixation of the round window membrane with a pledget of cotton or with a living tissue graft was shown to increase the intensity of tones transmitted through the cat's ear from 10 to 30 decibels. In all these experiments the Wever and Bray phenomenon was used to measure the strength of action currents set up in the animal's auditory nerve as a result of the specific sound stimulus applied to the ear. It was shown later[4] that measured increases in intralabyrinthine pressure tended to improve the intensity of tones transmitted, though only to a slight degree; the higher frequencies were affected more than the low. Decreased intralabyrinthine pressure resulted in a marked lowering of the intensity of all tones transmitted.

In the present series of experiments an attempt was made to block the cochlear aqueduct. This was done by drilling a hole with a small dental burr over the position of the aqueduct well away from the cochlea itself. The base of this hole was then scorched with a high frequency cautery, hoping thus to occlude the aqueduct. In two experiments the burr actually perforated the wall of the bulla, and, following recovery from anesthesia, these two animals exhibited what was apparently a cerebellar ataxia. In neither case was nystagmus present. Fourteen such operations were performed under strict aseptic technique. Five animals have been tested subsequently at intervals of from two to three weeks following the original operation. In every instance the intensity of spoken voice was greatly increased on the operated side, using the normal ear as control. In addition pure tones of the octaves from 1,000 d.v. to 8,000 d.v. were increased from 10 to 25 decibels over the normal ear.

To demonstrate occlusion of the aqueduct 10 cc of a 30 per cent. NaCl solution was given intravenously. While the usual rapid falling off of intensity was noted on the normal side, much less effect could be observed on the experimental side. Certainly no greater lowering of pressure took place than might be accounted for by absorption of fluid through the capillary beds of the inner ear itself. Without waiting for the histologic evidence of serial sections it seems safe to assume that the aqueduct had been occluded successfully. The intensity measurements of such an experiment follow:

Frequency	180	250	500	1,000	2,000	4,000	8,000
Right ear (Operated)							
Control, before injection NaCl	27	29	19	29	19	24	70
Immediately after injection	33	24	23	40	26	30	66
½ hour after injection	30	25	26	42	30	35	.....
Left ear (Normal)							
Control, before injection NaCl	21	23	33	40	40	50	.....
Immediately after injection	19	22	34	37	55	58	.....
½ hour after injection	20	25	44	.....	.....	.....	.....

The figures beneath the different frequencies represent decibels of attenuation necessary to balance the comparison intensity with the intensity of tone transmitted through the cat's ear.

Two possible explanations of the results observed present themselves. In the first place occlusion of the duct may result in a gradual increase of intralabyrinthine pressure with the resultant improvement in the transmission of the higher frequencies. In the second place the cochlear aqueduct may serve in a minor capacity as an additional safety valve for the cochlea. This function of the round window membrane was originally put forward by Hughson and

[1] From the Otological Research Laboratory and the Surgical Hunterian Laboratory, the Johns Hopkins University School of Medicine. Aided by a grant from the Ella Sachs Plotz Foundation for the Advancement of Scientific Investigation.

[2] Walter Hughson and S. J. Crowe, *Jour. Amer. Med. Asso.*, 96: 2027–2028, June, 1931.

[3] Walter Hughson and S. J. Crowe, *Ann. Otol., Rhinol. and Laryngol.*, 41: 332, June, 1932.

[4] Walter Hughson, *Am. Jour. Physiol.*, 101: 396–407, July, 1932.