book, but to use them the key to the abbreviations must be consulted, since the names of scientific journals are so much abbreviated that it is impossible to guess even the names of the best known among them.

So far, what has been said applies both to the original German and to the English translation. In the latter the language of the original preface and introduction has been condensed somewhat, but elsewhere the chief changes in substance seem to be additions, mostly a line or two here and there of additional statement, with perhaps additional bibliographical references. In some instances, however, whole paragraphs or pages have been added in order more fully to develop the subject or to bring it down to date. Dr. Cobb has used the translator's privilege to break up many of the long periodic sentences so characteristic of German style into shorter ones more agreeable to English-speaking readers, but the translation still reads like a translation. In many passages the language is not smooth and in some the author's thought is incorrectly rendered. However, for English-speaking readers the translation will be easier to follow than the original and, of course, more nearly abreast of recent developments. It may occasionally be convenient, however, to have the original at hand to refer to.

WALTER D. LAMBERT
U. S. COAST AND GEODETIC SURVEY

SCIENTIFIC APPARATUS AND LABORATORY METHODS

CORRUGATED RUBBER TAMBOUR DIAPHRAGMS

SINCE its invention and description by Marey the tambour has consistently held its place as one of the most widely used and one of the most serviceable devices for exploring behavior. Since the careful analysis of Frank its limitations are well understood. Certain errors due to transmission by an elastic medium are inherent in the system. Errors due to the mass and unfavorable leverage of the recording arm can be reduced in many instances to a negligible minimum but not without some sacrifice of sensitivity. Of the several suggestions for obviating the errors dependent on rubber diaphragms no one has proved satisfactory enough for wide acceptance. For experimental purposes we needed a diaphragm of greater permanence, increased sensitivity and closer proportionality between excursion and air pressure throughout the range of deformation. After trying several materials, including corrugated collodion and cellophane, we have to report a reasonably satisfactory corrugated rubber membrane. As finally made by Mr. Newton this compares favorably with the flat rubber diaphragms with respect to all three desiderata. Their durability is still under test, but the latex preparation that we use is reported by the makers to be very durable. The corrugated membrane tested over four and a half times as sensitive to air pressure as a fresh Harvard Apparatus Company diaphragm under usual tension. A pressure of 5 mm of Hg at a recording leverage of 4:1 gave average excursion amplitudes of 59.9 mm and 12.8 mm, respectively, for the corrugated and flat membranes. A cumulative step-wise series of air displacements of approximately .25 cc each gave the following amplitude steps:

Corrugated	Flat
2.52	2.10
2.49	2.03
2.38	2.02
2.50	1.95
2.59	1.89
2.90	1.85
2.62	1.75
2.83	1.65
2.72	1.68
2.90	1.57
Total ..... 26.45 mm	18.49 mm

Under both tests the corrugated membrane is the more sensitive. In the air displacement test both show changes in amplitude with increasing deformation of the membrane: the flat membrane becoming less sensitive, the corrugated becoming more sensitive, but changing less proportionately than the flat.

Obviously, the corrugated membrane is still in a state of development and must be carefully made to be satisfactory. A few membranes can, however, be supplied at low cost for experimental work. If Harvard tambours are sent to Mr. Newton available membrances will be mounted.

They can be furnished in three grades; average sensitivity, approximately like that on which the tests were made, extremely sensitive, and robust with more rapid recovery. A photographic record of the constants of each membrane in response to a pressure of 5 mm Hg can be furnished on request at cost of time and materials.

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A METHOD FOR THE DETERMINATION OF THE VELOCITY OF SOUND IN SOLIDS

RECENT developments in vacuum tube oscillators have made the velocity of sound in liquids far more accessible without adding materially to its significance