

NEW METHOD FOR DETERMINING COMPRESSIBILITY

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New method for determining compressibility by Theodore William Richards & Wilfred Newsome Stull

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THEODORE WILLIAM RICHARDS
AND
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ANNOUNCEMENT.

This paper on a "New Method for Determining Compressibility" has been prepared by Professor Theodore W. Richards, Ph.D., Professor of Chemistry in Harvard University, and his assistant, Wilfred N. Stull, S.M. (Iowa University), Edward Austin Fellow of Harvard University. Its publication by the Carnegie Institution is recommended by these chemists: Professors Ira Remsen, of the Johns Hopkins University; F. W. Clarke, of the United States Geological Survey, and Edgar F. Smith, of the John Harrison Laboratory in the University of Pennsylvania.

This investigation was made in the Chemical Laboratory of Harvard College, Cambridge, Massachusetts, and the expense of it was defrayed, in the earlier part, by the Cyrus M. Warren fund of Harvard University, and in the latter part, by the Carnegie Institution of Washington.

DANIEL C. GILMAN,

President of the Carnegie Institution.



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NEW METHOD FOR DETERMINING COMPRESSIBILITY,
WITH APPLICATION TO BROMINE, IODINE, CHLOROFORM, BROMO-
FORM, CARBON TETRACHLORIDE, PHOSPHORUS
AND WATER.

BY THEODORE WILLIAM RICHARDS AND WILFRED NEWSOME STULL.

INTRODUCTION.

It has been suggested recently that since the volume of a solid or liquid must be determined in part by the internal pressures to which it is subjected by chemical affinity and cohesion, the compressibilities of substances are probably data of important chemical significance.¹

In attempting to interpret this significance, the enquirer at once faces the fact that few pertinent compressibilities are accurately known. Only complex organic compounds have been much studied, and their behavior under pressure is affected by too many variables to be easily interpreted. No more than four elements have been studied at all, and none except mercury and copper have been investigated by more than a single investigator.

In order to fill this important gap in physicochemical knowledge, the following investigation was undertaken. Its publication will be followed promptly by similar more extended publications, in which the compressibilities of as many elements and simple compounds as possible will be treated.

The determination of compressibility is sometimes considered as one of the most difficult of physical processes. The difficulty is due chiefly to the fact that under pressure all the parts of any apparatus change in volume, and hence the contraction under pressure of the substance under examination is partly hidden. Perhaps it is this difficulty, added to a lack of realization of the significance of the data, which has deterred investigators from undertaking the problem more systematically.

Among the various methods which have been used, those involving theoretical considerations of a mathematical nature, such as those computed from the coefficient of Poisson, are of somewhat doubtful value.

¹Richards, *Proc. Am. Acad.* 37, 1 (1901), 399 (1902); 38, 293 (1902). Also *Zeitschr. Phys. Chem.* 40: 169, 597; 42: 129 (1902).