and in Robertson's "Principles of Biochemistry" (2nd ed., p. 390). Reference to the original analyses[1] makes it clear that the above value has an extra zero inserted after the decimal point and that the correct value is about 0.34. The decimal point is correctly placed in the values given in Harrow and Sherwin's "Textbook of Biochemistry" (p. 492), Mathews' "Principles of Biochemistry" (p. 351), Mattice's "Chemical Procedures for Clinical Laboratories" (p. 138), Macleod's "Physiology in Modern Medicine" (7th ed., p. 86), and McClendon and Pettibone's "Physiological Chemistry" (6th ed., p. 143).

BURNHAM S. WALKER
WILLIAM C. BOYD

BOSTON UNIVERSITY
SCHOOL OF MEDICINE

REPORTS

RESEARCH IN THE FIELDS OF GEOLOGY, CHEMISTRY AND PHYSICS

IN the spring of 1936 two steps were taken by the National Research Council to ascertain what researches were regarded as especially important and timely in the fields of geology and geography and in the borderlands between geology and chemistry and physics. The first step was to send a letter of inquiry from Dr. E. S. Bastin, chairman of the Division of Geology and Geography, to about 300 prominent geologists and geographers. Those replies that related largely to the recognized confines of geology and geography have been edited and issued in mimeographed form by the National Research Council.

The second step consisted in the establishment of an interdivisional committee, comprising geologists, physicists and chemists, to consider the borderland problems between these sciences. This committee was under the chairmanship of Dr. Thomas S. Lovering. Its purpose was not only to review and appraise the borderland problems but also to suggest modes of attack and the possibility of applying special techniques familiar to physicists or chemists that might prove useful in the solution of certain geologic problems. Much of the work of this committee has been accomplished, and the list of the research problems that it has considered will be published at an early date.

It seems highly desirable when problems requiring a new and difficult technique are started for the investigator to have available information as to where the work in which he is interested can best be carried on and where he may consult with men who have had experience with some of his special problems. It thus seems desirable that the final report include the names of those organizations that have special facilities for or experience with certain types of research problems whose solution requires equipment not commonly available. The committee realizes that it is unable to prepare an adequate list without the full cooperation of the many scientists working in the borderland fields. It is our earnest desire that all individuals, especially chairmen of departments of geology and mineralogy, who know of such special facilities for research of the type listed below, will make them known to some member of the Committee on Borderland Fields of Research before May 15. In the final report, which will be issued as a bulletin of the National Research Council, this committee will publish a list of the problems that have come to its attention and briefly consider the special types of techniques or equipment that can be applied to them, together with a list of those organizations having special facilities or experience with the individual problems.

The committee will confine its activity to the preparation of this report and does not contemplate participation in plans for financing any of the researches suggested. It is hoped that the final report will stimulate research in the borderland fields by some chemists and physicists as well as by geologists. It must be realized by geologists, however, that the brunt of the work has to be borne by them and that the chief contribution which they should expect from physics and chemistry is one of methods or techniques.

The types of research in borderland fields of physics, chemistry and geology, requiring special facilities are listed below:

(1) *Phase equilibria study:*

Equilibria in anhydrous melts at high temperatures.

Equilibria in systems containing volatiles at moderately high temperatures and pressures.

Equilibria in saline solutions at room temperatures.

Equilibria of sulfides in contact with volatiles such as water and chlorine over a range of temperatures and pressures.

The alteration of rocks and minerals by hydrothermal solutions over a range of temperatures and pressures.

(2) *Analyses:*

A control laboratory for the identification and analysis of minerals by x-ray and spectroscopic methods is greatly needed. The services of the laboratory should be available to all and at a minimum cost.

[1] O. Zinoffsky, *Zeitschr. f. physiol. Chem.*, 10: 16, 1886; A. Jaquet, *ibid.*, 14: 289, 1890; G. Hüfner, *Arch. f. Physiol.*, 130, 1894.

(3) *Colloids:*

The deposition of minerals as colloids and their subsequent crystallization, special attention being given to the sulfides. The studies should be carried on over a range of temperatures and pressures.

The effect of coagulation on size distribution of clay particles.

(4) *The physical chemistry of replacement at moderately high temperatures and pressures:*

Replacement in the geologic sense means the dissolving of one mineral or a group of minerals and the immediate deposition of another mineral or group in the place thus vacated, with no intervening formation of open spaces. An explanation of the physical chemistry of the large-scale replacement of essentially solid rock makes experimental work in the artificial production of replacements under closely controlled conditions of temperature and pressure highly desirable.

(5) *Radioactivity:*

The determination of the radioactive content of rock masses.

The determination of the helium content of rocks.

(6) *Differential pressures:*

The study of the physical and chemical conditions of formation of the "stress minerals," their stability fields and their orientation during crystallization. This research will involve investigation at temperatures ranging up to four hundred degrees Centigrade under differential pressures of many hundreds of atmospheres.

(7) *Determination of physical constants of geologic material:*

Determination of density, viscosity, porosity and the thermal and elastic constants of rocks and minerals in the laboratory.

The determination of as many physical properties as possible of rocks *in situ*, to be correlated with the constants determined by laboratory work on material typical of that studied in the field.

The change in physical constants with changes in temperature and pressure.

(8) *Rock deformation:*

Experimentation with scaled models that are dimensionally correct and the application of photoelastic techniques to the study of changes induced by stress.

(9) *Hydrodynamics:*

The principles of stream and wind action as ascertained by means of hydraulic laboratories and wind tunnels.

Investigation of the terminal settling velocities of masses ranging from small to large size.

The laws governing the orientation of unequidimensional particles under conditions of viscous, turbulent and plastic flow.

Rock permeability under special conditions, such as incomplete saturation, high pressure and high temperature.

(10) *Geophysics:*

Gravity instruments to determine gravity or gradient of gravity on land or on sea.

Seismic equipment for the investigation of general geologic problems, such as the extent of thrust faults and their change of attitude with depth, and the position and configuration of the floors of batholiths, and the structure of the continental shelfs and ocean bottom.

Tiltmeters to determine the body tides of the earth.

Magnetic equipment for investigation of geologic field problems or for investigation of magnetic properties of rocks and minerals.

Committee on Borderland Problems of Geology, Chemistry and Physics.

CHEMISTRY

G. E. F. LUNDELL
H. R. MOODY, *ex-officio* (*chairman*, division of chemistry and chemical technology)
GEORGE W. MOREY
HOBART H. WILLARD

GEOLOGY

E. S. BASTIN, *ex-officio* (*chairman*, division of geology and geography)
W. H. BUCHER
R. A. DALY
C. N. FENNER
BENO GUTENBERG
M. KING HUBBERT
T. S. LOVERING, *chairman*
W. W. RUBEY

PHYSICISTS

HENRY A. BARTON, *ex-officio* (vice-chairman, division of physical sciences)
FRANCIS BIRCH
I. S. BOWEN
C. C. MURDOCK

SPECIAL ARTICLES

MAGNETIC ANOMALIES NEAR WILMINGTON, N. C.

A RECENT paper by one of us presented the results of a reconnaissance survey of the magnetic anomalies of a portion of the North and South Carolina Coastal Plain.[1] Since the publication of this paper the survey

[1] Gerald R. MacCarthy, *Jour. of Geol.*, 44: pp. 396–406, 1936.