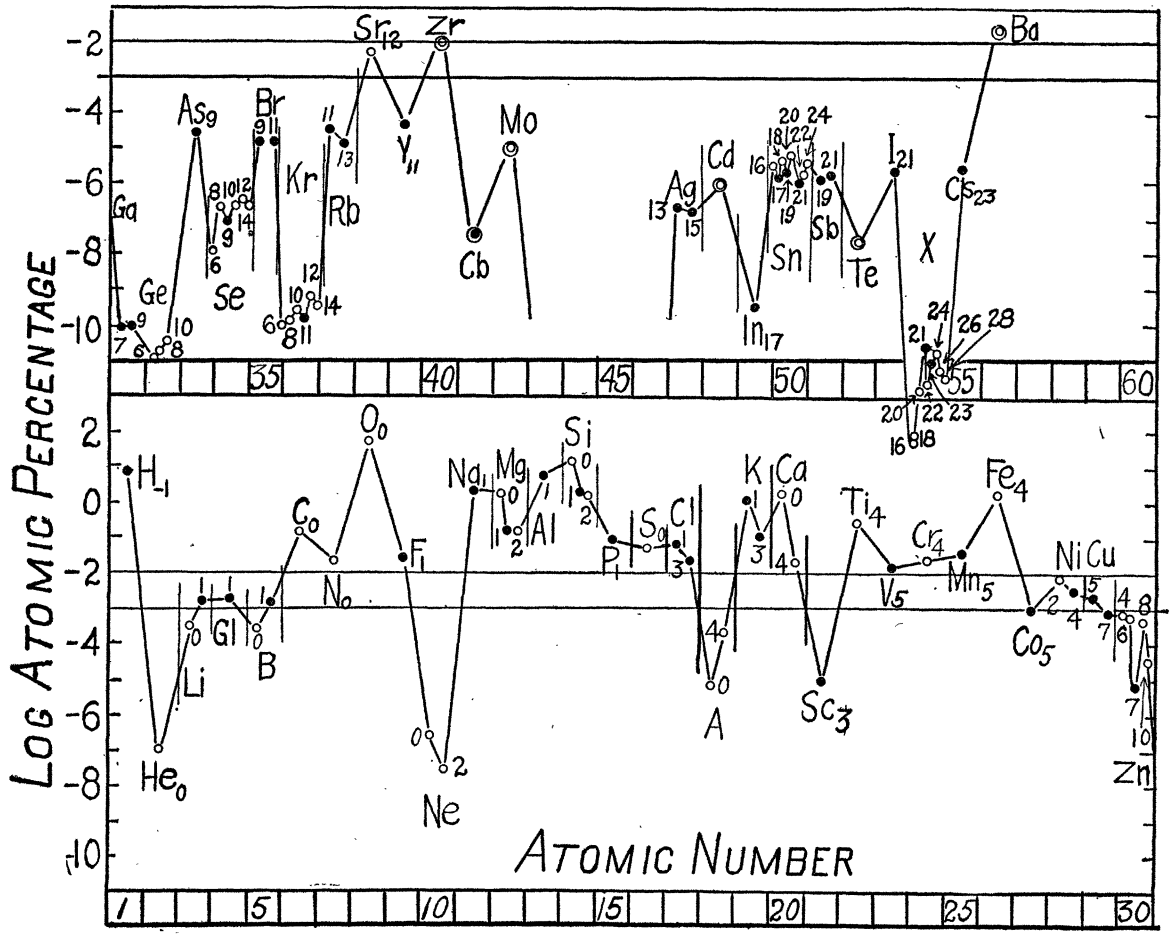

FIG. 16

by their relative stability and method of formation with reference to their source.

In addition this work seems to show that the natural processes which occur on earth and in the meteorites have not sufficed for their separation. This is not on the whole surprising, since the work of this laboratory indicates that the experimental separation of the isotopes of chlorine is a moderately slow process under favorable conditions, and thus far nickel has not been separated at all. Nevertheless, if the earth's surface is as old as it is commonly supposed to be, the above facts are somewhat remarkable. They agree with the idea obtained from other sources, that isotopes can not be separated by chemical means, and they indicate that conditions on earth and in the meteorites are not favorable for their separation by diffusion.

While these relations do not lead to any definite theory of the origin of the earth, they are entirely in accord with the planetesimal theory, which supposes that the earth at one time had a much smaller mass than at present, and that it has grown to its present size by the addition of small bodies such as meteorites or planetesimals. Whether or not they are in agreement with other theories depends upon the specifications of each of the theories. On the whole, it seems difficult to reconcile these facts with the theory that the earth has been formed by the condensation of a gaseous system of about the same mass as the earth of the present period.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE PRESENT ENROLMENT

THIS is the time of year when a report on the number of members enrolled in the American Association is most significant, for the association year closes on September 30, for which date the official count of members is made for the year. The following notes on the enrolment of September 30, 1929, will surely be of considerable interest to all readers of SCIENCE.

On any date the roll of the association consists of four categories: (*a*) endowment members (including sustaining members and life members), (*b*) paid-up annual members, (*c*) annual members in arrears for one year or less and (*d*) annual members in arrears for from one to two years. Names of annual members are retained on the roll till arrearage amounts to two years, but the journal subscription that goes with membership is not available. Annual dues are due October 1 and on that date all those enrolled whose arrearage amounts to two years are considered as having automatically resigned. There is therefore a difference between total paid-up membership and total enrolment. On September 30, 1929, enrolment in each of the four categories was as follows:

Endowment members	458
Paid-up annual members	17,062
Total paid-up membership	17,520
In arrears for one year	615
In arrears for two years	327
Total enrolment	18,462

Only 327 automatic resignations had to be recorded on October 1, 1929. In the year closing September 30 there had been 322 actual resignations and 187 deaths. On September 30 the total paid-up membership was 94.9 per cent. of the total enrolment. The number of new members and reinstatements for the year 1928–29 is 2,992, which is 16.2 per cent. of the total enrolment at the end of the year. For the same period the total loss in membership (including deaths, actual resignations and automatic resignations, the latter recorded October 1, 1928) is 858, which is only 4.6 per cent. of the total enrolment at the end of the year. The net gain in total enrolment for the year from September 30, 1928, to September 30, 1929, is 2,134.

Records of this sort have been kept since 1920, and it is interesting to compare the percentages given above with the corresponding values for preceding years. The value 94.9 is the highest yet recorded in its series, the next lower one being 94.5 per cent. for the year 1927–28. The same is true of the value 16.2, the next lower percentage in that series being 14.5, for 1923–24. The total loss in membership was 4.6 per cent. of the total enrolment at the end of the year for 1925–26 as well as for the year here considered, this value being the lowest in its series; the next higher value in that series is 4.9 per cent., for 1924–25. Data for paid-up membership and total enrolment for September 30 of each year from 1920 to 1928, inclusive, are shown and graphed in the new volume of Summarized Proceedings of the American Association, which was published October 15, 1929, and the same graphs are shown in the booklet on "The Organization and Work of the American Association." Copies of the booklet may be secured from the permanent secretary's office on request and the new volume of proceedings may be purchased from that office.

The recent rapid increase in the membership of the association reflects the correspondingly rapid growth of public interest in the advancement of science in America. There seems to be no reason to doubt that the association will continue to grow in a similar manner.

BURTON E. LIVINGSTON,
Permanent Secretary

OBITUARY

HORACE BUSHNELL PATTON

HORACE BUSHNELL PATTON, PH.D., professor emeritus of the Colorado School of Mines, died at Atascadero on July 15, 1929, after an illness resulting from an operation for appendicitis. He was born in 1857, graduated from Amherst in 1881 and after a couple of years at Howard University, of which his father, Rev. W. W. Patton, was for many years president, he went to Europe. He studied geology (and especially petrography) first at Leipzig under Zirkel, then at Heidelberg in Rosenbusch's laboratory, where I first met him and had the pleasure of field excursions with him, not always geological, I remember. He took his degree *summa cum laude* in 1887 and remained as Rosenbusch's assistant for a short time. A short paper[1] in German on the minerals of a diorite crystallizing out into a miarolitic cavity which might well be called to the attention of certain recent writers and his thesis[2] on the origin of the Marienbad serpentine from a peridotite, not then a hackneyed subject, were the fruit of his German stay. Returning to America in 1888, after brief teaching appointments at Howard University and Rutgers, 1889, he was again associated with Dr. L. L. Hubbard and myself in more congenial work, combining research and teaching for the Michigan Geological Survey and Mining School at Houghton. His research here was largely petrographic and was to have been correlated with work by Dr. Wadsworth, which the latter's resignation as state geologist upset. However, there are a few pages signed by him in Wadsworth's 1892–93 report. Dr. Patton then accepted a call to the Colorado

[1] "Hornblende, Oligoklas und Titanit aus Drusenraumen im Schriesheimer Diorit" (Separat-Abdruck aus dem Neuen Jahrbuch fur Mineralogie, etc. 1887. Bd. 1)

[2] "Die Serpentin- und Amphibolgesteine nordlich von Marienbad in Bohmen." Wien 1887. Alfred Holder, K. K. Hof- und Universitäts-Buchhandler.