formed no solid solution or addition compound with the major constituents. Eventually it turned out that potassium chloride was suitable for that purpose, but in the meantime it occurred to us that the above difficulties could be removed or greatly minimized by using a radioactive tracer.

To this end radioactive phosphorus, P^{32}, in the form of potassium dihydrogen phosphate was chosen, as its type of activity was suited to the problem at hand. The peroxide solutions containing 0.025 mg tracer/l were partly frozen, and the bulk of the liquid was separated from the crystals by means of a filter stick. After warming to room temperature the activity of each phase was measured with a thin glass counter immersed in the liquid; the hydrogen peroxide content was determined from refractive index. The results obtained with a dilute (10%) and a concentrated (90%) solution indicated that the solid phase was pure ice and pure hydrogen peroxide, respectively. Further details on the experimental procedure and results will be published elsewhere (*3*).

Summing up, the use of a radioactive tracer offers the following advantages: minimum complications resulting from addition of a third component to the original system; no interference of the tracer with chemical analyses or measurements of some physical property of the solutions such as density, refractive index, etc.; only one component need be determined instead of two. This technique is equally applicable to the "synthetic" method of Bancroft (*4*) which requires no separation of phases. The results may be analyzed algebraically or graphically by plotting on rectangular coordinates activity against concentration of the component in greater proportion.

A number of years ago Terrey and Jolly (*5*) used natural radioelements to study the degree of hydration of certain salts. We feel that the availability of powerful artificial isotopes and the development of modern counting techniques add greatly to the interest and possibilities of this method.

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Comments and Communications

Touché!

In SCIENCE for May 11, 1951 (p. 543), in the article, "The Origins of American Scientists," by Robert H. Knapp and Hubert B. Goodrich, they list "the first fifty institutions with 30 or more annual graduates, ranked in order of their production index." The authors commented that "No Southern institutions appear here." Johns Hopkins University, Maryland, is nineteenth, and Charleston, South Carolina, twenty-ninth. I realize that Maryland, although below the Mason-Dixon Line, is sometimes felt to be a border state; but this is the first time that I had known that South Carolina was not considered a Southern state.

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Condensation Globules at Meteor Crater

THE American Meteorite Museum, located on U. S. 66, 5 miles from Arizona's meteorite crater, has been making extensive and intensive studies of the adjacent soil. These studies have brought to light minute metallic globules that are believed to have been formed as condensation products from metallic vapors generated by the explosion of the colliding meteorite or meteorites.

Chemical analysis of these particles by F. G. Hawley[1] shows them to be about 17% nickel, and metallographic studies by A. W. Herbenar[1] prove the presence of cohenite, steadite, and schreibersite, as well as troilite. The percentage of nickel is about double that of the meteorite fragments found in the same area.

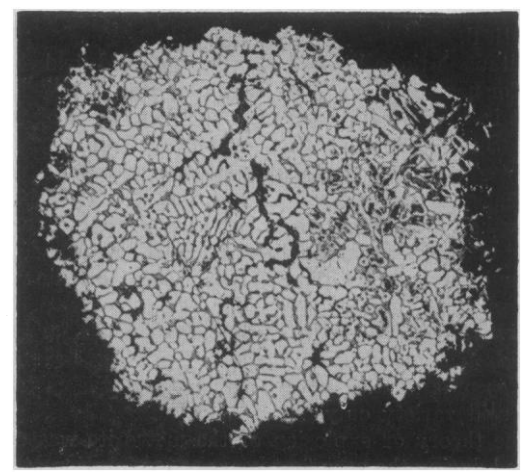

FIG. 1. Dendritic structure indicative of rapid cooling from liquid state. Black veinlike areas are oxide. The white dendrites are nickel-iron, and the gray filling between the lobes of the dendrites is sulfide, carbide, and phosphide more or less mixed. (× 100.)

[1] We wish to express our thanks to F. G. Hawley for the chemical analysis, to A. W. Herbenar for his metallographic report, and to both Mr. Herbenar and Glenn E. Mills for photographs.

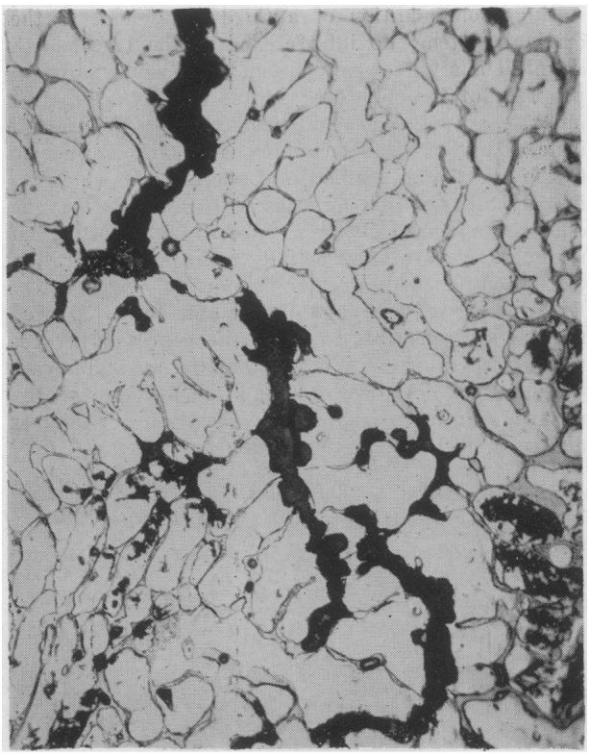

FIG. 2. Same as Fig. 1 but enlarged to 425 diameters. (Photos by A. W. Herbenar.)

The reason for this nickel-enrichment is still problematical.

Although these little objects have eluded fieldworkers for nearly 60 years, we have now proved that they exist in concentrations as high as 100 g/cu ft of topsoil. Such a concentration would amount to 3,000 tons/sq mi. Over how large an area this high concentration extends is not known, but it is thought to be rather limited. However, at least a sparse sprinkling of the material has been detected over 100 sq mi around the crater. Quantitative studies are now in progress.

Five different varieties of particles have so far been found, two of which are shown in Figs. 1 and 2. Microscopic studies have been made of the metallic spheroid variety only.

The theory of explosion of the meteorite was suggested during the very first years of exploration at the crater. But D. M. Barringer in 1909 thought he had amassed abundant evidence that such had not been its fate. He wrote:

> The evidence also is all against its having gone into a state of vapour at the moment of impact. In this connection it is only necessary to again point out that the absence of staining on a grand scale, in the depths of the crater and outside, is practically conclusive proof that the projectile did not either go into the form of vapour or of metallic mist upon impact, for a small amount of such metallic vapour or mist, so to speak, would have caused an immense amount of staining of the rock fragments and silica (paper read before Natl. Acad. Sci. U.S., Princeton Univ. [Nov. 16, 1909]).

The writer would like to point out that in no place, even where the particles are most abundant, is there any evidence of staining. The soil and ash from which we separate them is plain gray, and the silica almost white. Only where they lie on the reddish brown Moencopi formation is there any evidence of rust coloration, and here it is the natural color of the formation.

Absence of staining appears to be the result of an oxide coating formed on the little globules while they were still liquid, as the cloud came into contact with oxygen in the atmosphere. This coating was so impervious that, subsequent to its formation, the particles have evidenced little or no scaling. In this respect their present surfaces differ strikingly from the silvery metallic fragments of comparable size that are sometimes found with them.

A detailed study of these particles is now in progress.

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Erratum

WE FIND a correction is necessary in the last sentence on page 625 of our article entitled "An Analog of Vitamin B_{12}" (*Science*, **113**, 625 [1951]).

In our original this sentence reads:

> The thiocyanate analog and vitamin B_{12a} when tested by the *L. lactic* (A) and the *L. leichmannii* "unprotected" (B) titrimetric assay methods (*6*) also respond in a like manner, distinct from vitamin B_{12}.

Please publish the following correction:

> The thiocyanate analog and vitamin B_{12a} when tested by the *L. lactis* (B) and the *L. leichmannii* "unprotected" (A) titrimetric assay methods (*6*) also respond in a like manner, distinct from vitamin B_{12}.

This will also necessitate the transposition of the headings "A" and "B" in Table 1 on page 626.

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