It will be noticed by comparing these several analyses that the Pickens County meteorite is especially noted for the high percentage of titanium oxide.

I am indebted to Dr. Oliver C. Farrington, curator of geology, Field Museum of Natural History, Chicago, for the following notes on the microscopic study of a section of the meteorite:

The meteorite is not characterized by prevailing chondritic structure. Nevertheless, well-developed chondri are occasionally to be seen in the section. One of these, of circular form with a sharply defined boundary, consists of fibrous enstatite showing the usual fan-shaped arrangement, and has a diameter of 1 mm. Another chondrus of the same mineral has an irregular boundary and is somewhat smaller. The fibers of this chondrus are characterized by unusual breadth, one being .0025 of a millimeter wide. Two sets of fibers at right angles are to be seen, giving an appearance of the well-known grating structure of microcline. The fibers also contain granular inclusions arranged parallel to their long axis. Another enstatite chondrus seen is of oval form with diameters of .4 and .8 of a millimeter; another of porphyritic chrysolite is marked by an irregular contour and a diameter of .6 of a millimeter; another made up of parallel rods of chrysolite and glass is much smaller, showing a diameter of .2 of a millimeter. The preceding illustrate the principal features and sizes of most of the chondri seen. The remainder of the section is made up of an aggregate of siliceous and metallic grains irregular in size and shape. Few of these have well-defined crystal outlines. Where such outlines appear the parallel extinction and high interference colors show the mineral to be chrysolite. Irregular fragments of parallel rods of chrysolite and glass of fibrous enstatite which appear here and there suggest that they once belonged to chondri, yet it is possible that they were formed in place. Grains of nickel-iron of various sizes and shapes are very abundant and are disseminated rather uniformly over the section. One of these of reniform outline is of unusual size, being 2 mm. in length. Inclusions of troilite are to be seen at several points in the body of this nodule. A narrow, dark, opaque border of oxide separates the nodule as a whole from the adjoining silicates. Such individuals were evidently formed previous to the adjacent silicates, but most of the smaller metallic grains occupy interstices between the silicates, and hence originated subsequent to the latter. These smaller nickel-iron grains are very irregular in form. At times the nickel-iron also occurs in narrow, much elongated, irregular forms suggesting short veins. These likewise have a dark opaque border. Troilite is to be seen in but small quantity in comparison with the nickel-iron. Most of the siliceous grains show a considerable amount of fissuring, the fissures being filled with a dark red limonite. In addition, the section as a whole shows a rusty staining irregularly distributed, and there is an impregnation in places of a black, opaque, perhaps carbonaceous substance. There is apparently no crust to be seen upon this section.

S. W. McCALLIE

SOME CONDITIONS FAVORING NITRIFICATION IN SOILS

KELLERMAN and Robinson[1] have lately reported nitrifying tests of North Carolina soils on which legumes were grown, which tests lead to directly opposite conclusions from those reached by Stevens and Withers,[2] who, working with soils from the same state, found that a large percentage of the soils they tested failed to nitrify. Kellerman and Robinson are further led to believe that "nitrification, nodule formation upon certain species of legumes, and the litmus reaction are correlated."

Results obtained in this laboratory indicate that nitrification is favored by an increase in the basicity when the soil is deficient in lime. Our experiments further indicate that the growth of alfalfa on the soil favors nitrification, or, at least, increases the availability of the soil nitrogen.

Nitrification tests on samples of soil from four limed and four unlimed plats averaged twice as great an increase in nitrates on the limed soil as the result of a ten-day test, and tripled the nitrate production in a three-week test as a result of incorporating lime with the soil in the field. The lime was added four years before the tests were made.

The increased production of nitrates on alfalfa soil as compared with a perennial nonlegume was not so striking, but the favorable

[1] SCIENCE, N. S., XXX., No. 769, p. 413.

[2] SCIENCE, N. S., XXIX., No. 743, p. 506.

influence of the legume on nitrification is indicated by the following figures:

	Nitrates in Original Sample p.p.m. Dry Soil	Nitrates at End of Ten-Day Test p.p.m. Dry Soil	Nitrates at End of Three-Week Test p.p.m. Dry Soil
Soil from alfalfa plat	5.5	182	381
Soil from timothy plat	7.4	152	361
Soil from alfalfa and timothy plat	8.0	202	384
Soil from alfalfa plat	10.5	196	402

These plats had all been limed to their indicated requirements. The nitrification tests were made according to the following method: 100 grams of the moist soil were placed in a 250-c.c. bottle. To this was added 500 milligrams of ammonium sulfate and sufficient water to bring the soil to a moisture content of 25 per cent. calculated on the basis of dry soil. The bottle after insertion of a tight cotton plug in the mouth was placed in the incubator and kept at a temperature of 30° C. for the time indicated. Once each week water was added to replace that lost by evaporation. Nitrates were determined according to the method described in Bulletin 31, Bureau of Soils, U. S. Department of Agriculture.

That the availability of the soil nitrogen is increased by the growth of alfalfa is also indicated by analyses of timothy when grown alone and when growing as a mixture of timothy and alfalfa. The pure timothy, entirely isolated from other plants, contained a higher percentage of nitrogen when grown with alfalfa than when grown alone. This was true on both the limed and the unlimed soil. Alfalfa, and possibly other legumes, are thus of immediate benefit to the soil and to the crop growing with them.

The fact that Kellerman and Robinson were dealing with soils growing leguminous crops while Stevens and Withers tested soils without regard to the crop grown upon them may, in a measure, account for the more pronounced nitrification found by the former investigators. The writers must state, however, that they have not found any natural field soils in which nitrification does not take place.

Analyses of *Erigeron annuus* growing on limed and unlimed soil showed, in nine out of ten cases, a higher percentage of nitrogen in the plants growing on limed soil. The soil was deficient in lime. This is mentioned as another indication that nitrification, or at least the availability of soil nitrogen, is increased by the use of lime on soils in which they are deficient.

Our conclusion is that the presence of a certain degree of basicity in the soil, and possibly the growth of certain nodule-bearing legumes, are each favorable to nitrification in the soil. These and other conditions may account for very considerable differences in nitrification tests in different soils.

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The autumn meeting of the academy was held at Princeton on November 16, 17 and 18. The general program was as follows:

TUESDAY, NOVEMBER 16

10:00 A.M.	Meeting of Council.
11:00	Scientific Session.
12:45 P.M.	Address of Welcome by President Wilson.
1:15	Luncheon.
2:15–3:15	Scientific Session.
3:15	Lecture on the Investigations of Joseph Henry, illustrated by Professor Henry's own apparatus, by Professor W. F. Magie.
4:30	Reception of the Academy and guests by Mr. and Mrs. A. D. Russell.
8:00	Dinner to the Academy by the President and Faculty of Princeton University.

WEDNESDAY, NOVEMBER 17

10:00 A.M.	Meeting of Council.
11:00	Business Session.
1:00 P.M.	Luncheon.
2:30	Scientific Session.
3:00–5:00	Conversazione: An exhibition illustrating recent scientific investigations, open to the public, in the Museum, Guyot Hall.
8:00	Concert of the Philadelphia Orchestra.