4. The question still remains whether soda or ammonia solution, and in what strength, satisfy best the requirements of a solvent for humus substance, regarded as the sum of organic substances, decomposed or not, that are immediately available for the plants.

After concluding this investigation, we received a publication of A. L. Emery entitled "Soil Humus: Some Sources of Error in Analytical Methods."[1] As to the absorption of ammonia by the humus solution, there mentioned, it is, as we have explained, at least partially a simple process of combination of the humus acids (liberated by hydrochloric acid from earth bases) with the ammonia; the quantity of the latter has been regularly determined by Prof. Hilgard for some time past, by distillation with magnesia (not lime, which decomposes organic nitrogen compounds). A question, however, still to be decided is whether the ammonia used forms amido-compounds with the humus substances during the digestion or evaporation.

NOTES.

The Brown-Taylor-Richards Method for the Microscopical Identification of Butter.—In the June number of the Journal appears an article by John A. Hummel on "Brown and Taylor's Official" method of identifying butter, with plates showing the appearance of butter, oleomargarine, and renovated butter, when viewed by polarized light. This is the first time the method used by the Bureau of Internal Revenue for identifying oleomargarine has been formally christened, and I would suggest, if the designation is to stand in chemical literature, the addition of the name of Mr. Richards, formerly microscopist of this office, to whom is due the credit for its adoption and successful employment as a field test for the past twelve years. His report on this subject will be found on page CLXII of the Annual Report of the Commissioner of Interval Revenue for the fiscal year ended June 30, 1888. Directions for the use of the form of (unmounted) microscope officially adopted and its polarizing attachments are given in Series 7, No. 9, revised, of the Regulations of the Internal Revenue Office, everything being simplified as much as possible, so that the test can be performed by

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[1] This Journal, 22, 285 (1900).

persons not specially skilled in microscopical manipulation. These regulations, which are in the hands of all internal revenue officers, contain plates prepared by Richards showing the appearance of oleomargarine when viewed by polarized light, presenting the same characteristics as are given by the plates in Hummel's article, except that no reproduction is made of the appearance of butter, since this is, practically, a blank field.

In regard to the use of this test to distinguish between fresh and renovated butter, the experience of this office would tend to substantiate strongly the claims for its value put forth by Hummel. The regulations above referred to recognize the fact that it is really a test for the presence of melted fat, and prescribe that all samples giving a doubtful appearance in the microscope shall be sent in to Washington for a chemical examination. Of those which proved to be butter when thus examined, about nine-tenths are renovated butter, showing a field more or less mottled when examined with crossed nicols. In fact the value of the method as a sorting test to discriminate between butter and oleomargarine has been seriously impaired of late years by reason of the large quantity of renovated butter which has found its way into the markets. This is mainly due, however, to the lack of skill on the part of revenue officers, few of whom have occasion to make frequent use of the instrument. To a person skilled in the use of the polarizing microscope, it is not difficult to distinguish between oleomargarine and melted butter, for it is seldom a sample of the latter is met with which gives the sharply defined, crystalline appearance of the field typical of most oleomargarine. In applying the method to the identification of renovated butter much care should be exercised, for, in my experience, most butters will show *some* variation in the field, due probably to a slight crystallization at some period in their production, and it is rare indeed to find a sample giving the uniformly blank field implied by Hummel's plate of "normal butter."

The method certainly deserves mention along with the tests given by Hess and Doolittle,[1] the best of which is the "spoon test" (the absence of froth in oleomargarine or renovated

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[1] This Journal, **22**, 150.

butter when heated in an open receptable) which has been in use for the detection of oleomargarine for many years, and which is preferred by some revenue officers to the microscope test.

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The Analysis of Arsenical Insecticides.—Since sending my article[1] on "The Adulteration and Analysis of the Arsenical Insecticides" to press I have done still further work on the soluble arsenious oxide in Paris green, and find that although an extraction of 1 gram of Paris green with 500 cc. of water finally gives practically constant results, still a small amount of cupric oxide goes into solution at the same time, thus indicating that either the Paris green itself is soluble in cold water or breaks up slightly on treatment with this medium. I am inclined to think that this last assumption is the more likely, since the amount of copper oxide going into solution in the 500 cc. of water is not constant.

If we assume then that the Paris green breaks up, and that for a certain amount of copper oxide a corresponding amount of arsenious oxide goes into solution, the figure obtained for soluble arsenious oxide (without taking into consideration the breaking up of the Paris green itself) which we will call the *apparent* per cent. of arsenious oxide, will not represent the *actual* per cent. of arsenious oxide, but a determination of the copper oxide dissolved in the water will have to be made, and after calculating how much arsenious oxide this corresponds to, the resulting figure will be subtracted from the *apparent* per cent. of arsenious oxide, thus leaving the *actual* per cent. of free arsenious oxide in the green.

It is of course possible, even probable, that the arsenious and copper oxides of Paris green do not go into solution in water in the same proportion that they are present in the original compound, but in the present state of our knowledge it seems to be the most plausible assumption that they do.

The determination of copper oxide is made by precipitating an aliquot portion of the 500 cc. of cold water extract with hydrogen sulphide, filtering, washing and drying the combined sul-

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[1] This Journal, 22, 568.