tion on a single evaporation, but for technical purposes it is a negligible proportion of that contained in 5 grams.

The filtrate from the silica is made up to a liter and two portions, of 100 cc. each, are measured into two Becher glasses. The average technical analyst has no time to redistil ammonium hydroxide. It is much more economical of time to assume a contamination with ammonium carbonate and reprecipitate. This is not a long operation, especially with a filter pump, and is *always* safe. For technical purposes the lime and magnesia are easily determined with one precipitation each, although each may be contaminated with a trace of the other.

It is rare that for technical purposes a determination of carbon dioxide or alkalies is necessary.

While thanking Dr. Hillebrand and Mr. Blount for all the good things they have said and done, I am confident that the scheme above set forth will be found to furnish all the information necessary for the solution of a great number of technical problems, for which the elaborate niceties of Dr. Hillebrand's scheme were never intended, and for which they should never be recommended.

LABORATORY OF THE COMMISSIONERS OF ACCOUNTS,
NEW YORK, September 30, 1904.

[CONTRIBUTION FROM THE UNIVERSITY OF ILLINOIS AGRICULTURAL EXPERIMENT STATION NO. 12.]

THE DETERMINATION OF ORGANIC CARBON IN SOILS.

BY J. H. PETTIT AND I. O. SCHAUB.

Received September 16, 1904.

IN CONNECTION with the chemical side of the soil investigations now being carried on at this Station, it was desirable to know the organic carbon content of a large number of soils. The copper oxide combustion method was too long and tedious, and the wet combustion method, using potassium dichromate and concentrated sulphuric acid, did not give complete combustion on chemically pure organic compounds like sugar. Accordingly, Parr's[1] method for carbon in coal was tried for soils. After some modifications this method gave results which compare very favorably with the copper oxide combustion method, and it has the advantage of being much more rapid than other methods used.

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[1] This Journal, **26**, 294.

Four determinations on chemically pure sugar gave the following results by this method:

Weight taken. mg.	Weight carbon. Calculated. mg.	Weight carbon. Found.[1] mg.	Carbon recovered. Per cent.
150	63.15	62.81	99.46
150	63.15	62.85	99.52
150	63.15	63.08	99.89
150	63.15	62.84	99.51

The percentage of organic carbon in most soils is low, and it is usually necessary to add some easily combustible material to the charge in order to start the combustion.

Sulphur used for this purpose, as suggested by Professor Parr, gave sulphur dioxide in the gas resulting from the treatment of the charge with acid after the combustion in the bomb, and this was not prevented by the use of potassium nitrate in the charge. Powdered magnesium was then tried in place of the sulphur. One gram of finely ground magnesium powder, thoroughly mixed with a charge of 2 grams of soil and 10 grams of sodium peroxide, gave a complete and satisfactory combustion with all soils ranging from 0.1 per cent. to 3.5 per cent. organic carbon.

The magnesium is not always completely oxidized, however, and that which remains as metallic magnesium will, of course, liberate hydrogen when the charge is treated with acid to set free the carbon dioxide. To avoid error in this way the gas, after measuring, is forced into a Hempel pipette filled with potassium hydroxide (2: 1) and the carbon dioxide absorbed, the residue being drawn back into the burette and a second reading taken. The time taken for this absorption and extra reading is compensated by time saved in the previous manipulation by not having to measure out exactly 100 cc. of air. A determination of the inorganic carbon is made in the same apparatus by treating a sample of the original soil with acid and measuring the liberated carbon dioxide. The total carbon found by the combustion less the inorganic carbon gives the organic carbon.

The soils used represent types ranging from a poor silt, low in organic matter, to a drained swamp soil, high in organic matter. The first sample in each set of three is the plowed soil taken to a depth of seven inches. The second sample is the soil between the

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[1] Computed from volume of carbon dioxide measured at known temperature and pressure.

plow line (seven inches) and the subsoil line (usually about eighteen inches); and the third is a sample of the subsoil to a total depth of forty inches.

The method was checked up with the copper oxide combustion method and the following table gives some comparative results:

PER CENT. ORGANIC CARBON IN SOILS.

Soil No.	Soil stratum.	Copper oxide method.	Parr's method modified.	Difference.
59	Surface	3.39	3.40	0.01
60	Subsurface	2.08	2.11	0.03
61	Subsoil	0.45	0.54	0.09
89	Surface	3.32	3.35	0.03
90	Subsurface	1.92	1.98	0.06
91	Subsoil	0.54	0.67	0.13
119	Surface	3.15	3.15	0.00
120	Subsurface	2.36	2.42	0.06
121	Subsoil	0.65	0.74	0.09
473	Surface	0.87	0.94	0.07
474	Subsurface	0.36	0.39	0.03
475	Subsoil	0.12	0.13	0.01
556	Surface	8.37	8.38	0.01
557	Subsurface	1.48	1.64	0.16
558	Subsoil	0.22	0.24	0.02
661	Surface	3.93	3.96	0.03
662	Subsurface	2.45	2.48	0.03
663	Subsoil	0.48	0.43	— 0.05
690	Surface	1.29	1.39	0.10
691	Subsurface	0.61	0.59	— 0.02
692	Subsoil	0.44	0.36	— 0.08

With this method, using Parr's apparatus, one man can easily make duplicate determinations on eight soils in a day of eight hours. One man has made nineteen separate determinations in one day in this laboratory.

INACTIVE THORIUM.[1]

BY CHAS. BASKERVILLE AND FRITZ ZERBAN.

Received October 19, 1904.

Synopsis.—A new source of Inactive Thorium has been found in a rock from South America.

Most of the investigators working on radio-activity are of the opinion that thorium is a primarily active body, under all condi-

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[1] Read before the New York Section of the American Chemical Society and published by permission of the Carnegie Institution.