accuracy, rapidity, ease of manipulation and general applicability should render it more satisfactory than any of the previously known volumetric methods for the estimation of sulphuric acid.

The method may also be used for the estimation of lead in soluble compounds of lead by reversing the operation.

A PRELIMINARY NOTE ON THE OIL OF MILFOIL.

BY A. B. AUBERT.

Received April 30, 1902.

THE specimen examined was distilled by Metzner and Otto, of Leipzig. It is of a dark bluish green color and has a mild and pleasant odor. Specific gravity at 22° equals 0.9217. Refractive index, 1.506 at 20°. It is soluble in absolute alcohol, ether, xylene and chloroform; also in about 6.5 volumes of 95 per cent. alcohol with a slight residue of brownish colored oil.

It was distilled under reduced pressure with the following results:

One hundred volumes of the oil yielded:

7 parts by volume between 170°-190°.
17 parts by volume between 190°-210° (sp. gr. 0.900).
50 parts by volume between 210°-220° (sp. gr. 0.907).
9 parts by volume between 220°-235° (sp. gr. 0.936).
3 parts by volume above 235°.

The residue, constituting 14 parts, remaining in the flask was a semi-solid, dark olive-brown, waxy substance, hardly soluble in cold alcohol, partly soluble in boiling alcohol, yielding a dark yellow-brown solution. The insoluble residue was of a greenish brown color, somewhat resembling paraffin in consistency. By evaporation of the alcoholic solution a dark yellow-brown pitch was obtained.

The oil has a slightly acid reaction.

The products of distillation gave the following reactions:

170°-190°, slightly acid.
190°-210°, nearly neutral.
210°-220°, nearly neutral.
220°-235°, slightly acid.

(This distillate contained products of decomposition.)

That portion distilling between 170°-190° was tested for cineol,

with no very satisfactory results, the conclusion being that but a small amount of cineol is present.

The oil was examined for aldehydic constituents with sodium bisulphite. A slight precipitate formed which, upon decomposition with caustic potash, yielded traces of a substance having a faint odor somewhat similar to that of cedar wood.

A test was made for acids, but the quantity present was too small to give any definite results.

No sulphur compounds were detected. All the distillates exhibited traces of blue color. That portion distilling between 210° and 220° had a color very similar to that of a solution of copper sulphate, while that coming over at 220°-235° was much deeper in color but of a greenish blue shade.

The blue distillate (210°-220°) was redistilled, the greater part passing over at 214°. This was put away in a tightly corked bottle and after about a year and a half was examined. During that time its color had become quite light and changed to a yellowish green, though it had been carefully kept in darkness.

The ultimate analysis gave the following results:

	Oil. Gram.	C. Gram.	H. Gram.
No. I.....	0.3691	0.288	0.0400
No. II.....	0.3302	0.2886	0.0406

The molecular weight determination by the boiling-point method gave as results 164.5 and 165, which would correspond to the formula $C_{12}H_{20}$. The above determinations were performed by Mr. C. D. Holley, M.S., one of my former students.

The rotary power is —14.2° for 100 mm. tube. Refractive index, 1.492. It boils at about 254° (uncorr.) at 754.8 mm. pressure, undergoing slight decomposition. This substance exhibits most of the reaction of the terpenes.

A small quantity (5 cc.) was diluted with alcohol and ether (20 cc. each), kept cool, and bromine slowly added. The action was quite energetic, the light yellowish green solution soon changing to very dark green.

The alcohol and ether were driven off in a warm closet, leaving a greenish black pitchy residue which continued to emit hydrobromic acid for a long time. Ten cc. were diluted with 30 cc. of benzene, kept cool, and a steady current of dry hydrochloric acid gas passed through for an hour and a half. It was, at

first, quite rapidly absorbed, the liquid becoming red-purple and finally purplish brown. Upon evaporation of the benzene a dark brown, viscid liquid remained. A few drops were placed upon a watch-glass and several scales of iodine added For a moment no action was noticed. Very soon however a violent reaction set in, considerable of the iodine being vaporized thereby. The result of the reaction was a dark, sticky, resinous mass.

The remaining quantity of the distillate was so small that further tests had to be suspended. But from the examination made it would seem that the blue distillate obtained from this specimen of the oil of milfoil is not identical with that from the oil of chamonile. It is evidently closely related to the terpenes.

The quantities of the other distillates were too small for extended examination.

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NEW BOOKS.

THERMODYNAMIQUE ET CHEMIE. By P. DUHEM. 16 x 25 cm. pp. ix + 496. Paris: A. Hermann. 1902.

This is primarily a book on the phase rule, written for the chemist and not for the mathematical physicist. The first chapter deals with work and kinetic energy, the second with heat and internal energy. These two chapters are really introductory thermodynamics. We next have a chapter on heat effects and then one on chemical equilibrium. In the sixth chapter there is a discussion of the theorem of Carnot-Clausius, and of the thermodynamic potential. In the seventh chapter we find the phase rule outlined and ten chapters are devoted to the application to concrete cases. The general order is: multivariant systems, univariant systems, inversion points, displacement of equilibrium, systems with constant boiling- or melting-points, solid solutions, critical states, dissociation of gases. This comprehensive survey is followed by a chapter on apparent false equilibria and by one on false equilibria while the last two chapters are on systems with a non-uniform temperature and on chemical dynamics and explosions.

While one must regret that the arrangement of material is so haphazard, the way the material is treated is excellent and will