TABLE "G."

Cubic Centimeters Ethylene Absorbed in Benzene Test.

		Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
Ethylene present.....		1.0	2.0	3.0	4.0	5.0	6.0
	Per cent.	cc.	cc.	cc.	cc.	cc.	cc.
Benzene present.....	0.0	0.05	0.10	0.10	0.15	0.20	0.25
Benzene present.	0.5	0.00	0.05	0.05	0.10	0.10	0.15
Benzene present.....	1.0	0.00	0.00	0.00	0.05	0.05	0.10

CONCLUSIONS.

From the results obtained the unsatisfactory character of the ammonium nickel nitrate method is apparent. As pure water absorbs benzene to practically the same extent as the ammonium nickel nitrate solution, it appears that the method really depends on the solubility of benzene vapor in water, or ammoniated water, and that the presence of the nickel compound has no influence. The results by the method are inaccurate and vary widely according to the amount of benzene in the gas and the quantity already present in the absorbing solution.

Concentrated sulphuric acid, on the other hand, absorbs benzene vapor as readily as could be desired, and can be used for a large number of tests without renewal, giving as accurate results after a hundred tests as when first prepared. The defect due to the absorption of ethylene is insignificant but may be easily corrected for (see Table "G"). Traces of the higher olefines, however, may give a value slightly too high for the benzene percentage, though this error, as shown by our tests of rich and lean gases from a variety of coals, must be small, if not inappreciable.

LABORATORY OF THE SOLVAY PROCESS CO.,
SYRACUSE, N. Y., June, 1906.

NOTE.

Solubilities of Permanganates of the Alkali Metals.—The article by Baxter, Boylston and Hubbard on "The Solubility of Potassium Permanganate,"[1] reminds the writer that in the course of some work on the preparation of various permanganates, at Johns Hopkins University in 1900, a few solubility determinations were made, the results of which have not been published except in his dissertation. They are reproduced below, together with some extracts from the dissertation. The permanganates of rubidium and caesium were made by neutralizing the pure

[1] This Journal, **28**, 1336.

carbonates with electrolytically prepared permanganic acid (6 per cent. solution). All the salts were freed from manganese dioxide by filtering their solutions through asbestos.

At	0°	100 cc.	solution	contain	2.84	gram	$KMnO_4$.
"	15°	"	"	"	5.22	"	"
"	15.3°	"	"	"	5.30	"	"
"	30°	"	"	"	8.69	"	"
"	2°	"	"	"	0.46	"	$RbMnO_4$.
"	19°	"	"	"	1.06	"	"
"	60°	"	"	"	4.68	"	"
"	1°	"	"	"	0.097	"	$CsMnO_4$.
"	19°	"	"	"	0.23	"	"
"	59°	"	"	"	1.25	"	"

"In making the determinations, the following method was employed: A glass-stoppered bottle, containing water and a large excess of the recrystallized salt, was placed in water kept at a constant temperature. The bottle was allowed to remain in the bath for several hours, and was agitated thoroughly at short intervals. With a corrected thermometer the temperature of the saturated solution was determined and the latter was then drawn by suction through a glass tube containing a plug of asbestos. The first portions of the filtrate were discarded. The strength of the filtered solution was determined by titration against an accurately standardized solution of oxalic acid, a method whose error is smaller than that encountered in reading the thermometer. Care was taken to keep the temperature of the filtering apparatus the same as, or a little higher than that of the solution, in order to prevent any of the salt from crystallizing out.

"When saturated solutions of caesium permanganate at the boiling temperature are made, a little decomposition is observed, and more manganese dioxide is precipitated than when rubidium is subjected to the same treatment. On cooling, the flaky oxide is easily removed from the heavy, difficultly soluble salt by washing with cold water.

"To our best knowledge, only one previous determination for rubidium permanganate is on record, and not having been published in a chemical journal escaped our notice until after the curves were drawn. Muthmann and Kuntze[1] found at 7° in

[1] Z. Krystallogr. 23, 377.

100 cc. of solution 0.603 gram of the salt. This value falls on the curve given in the plate.

"We see then that in solubility the permanganates bear a general resemblance to the chlorplatinates in that those of most of the heavy metals are very soluble, while those of the alkali metals, and particularly of caesium dissolve in water with difficulty. The saturated solution of the latter at 0° is light violet in color, and even permits one to detect the presence in it of free acid with litmus paper. At the same temperature strontium permanganate is about 2,700 times, and calcium permanganate nearly 3,000 times, as soluble."

The specific gravity of the saturated solution of potassium permanganate at 15° is 1.035; hence, according to the writer's determination above, 100 parts of water dissolve 5.31 grams at this temperature. This value confirms the accuracy of Baxter, Boylston and Hubbard's curve and shows that the widely recorded value of Mitscherlich is considerably too high.

AUSTIN M. PATTERSON.

SPRINGFIELD, MASS.,
Oct. 4, 1906.

REVIEW.

REVIEW OF ANALYTICAL WORK DONE ABROAD IN 1905.

BY BENTON DALES.

Received September 10, 1906.

IN THIS review the same general classification is used as in that of last year, and the articles are reviewed with the same purpose, namely, that an experienced chemist may be able to repeat the work. The effort is made to include a reference to the more important articles published; the review could not be made complete in reasonable space except it were a mere bibliography. The writer acknowledges his indebtedness to the *Chemisches Central-Blatt* for abstracts and for the general classification.

GENERAL ANALYSIS.

Büeler de Florin (*Chem. Ztg.* **29**, 569) made some improvements upon Secchi's method of determining the transparency of liquids. The latter recommended sinking a white disk in the liquid till it was no longer visible to the observer's eye; the distance from liquid surface to disk he called the limit of visibility of the liquid. To avoid the effect of position of the sun, clouds, etc., Büeler de Florin sank into the liquid an incandescent lamp of known lighting power and worked as much as possible at night.