After solution is complete the contents of the flask are transferred to a porcelain dish, the flask rinsed with concentrated hydrochloric acid, and the solution brought just to dryness, *not baked*, over a low flame. The residue is dissolved in 40 cc. of concentrated hydrochloric acid, evaporated nearly to dryness, diluted and filtered. The filtrate is heated to incipient boiling and 10 cc. of a 10 per cent. solution of barium chloride are added. The solution is again evaporated till crystals of ferric chloride appear, diluted with 175 cc. of cold water and allowed to stand six hours at room temperature or two hours in running water. We have found this precaution very necessary because of the solvent action of an acid solution of ferric chloride upon the barium sulphate.

In our experience, when the drillings are fine and solution is effected quickly, the evolution method gives with *foundry* irons results which agree very closely with those obtained by the gravimetric method.

The following results illustrate the concordance of the two methods:

	Evolution method. Titration with iodine of theoretical strength.	Gravimetric method as described.
1	0.078	0.079
2	0.083	0.083
3	0.108	0.109
4	0.073	0.072

The same agreement cannot, of course, be obtained with mottled or white irons.

CHARLES R. MCCABE.

MONESSEN, PA.

Note on the Atomic Weights of Carbon and Beryllium.—At the Philadelphia meeting of the American Chemical Society, Prof. F. W. Clarke, chairman of the International Committee of Atomic Weights, called my attention to the fact that my determinations of the equivalent of beryllium[1] being made on two compounds containing the same elements could be calculated entirely independent of the accepted factor for carbon; that the atomic weight of carbon could likewise be obtained independent of that of beryllium from the general average of the same determinations; that then both would depend solely upon the accuracy of the work itself and upon the accepted ratio between hydrogen and oxygen, and that a good value thus obtained for carbon would be excellent confirmation of the accuracy of my results on beryllium.

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[1] This Journal, **26**, 721.

This method of calculation by simultaneous equations was first applied by Strecker[1] in a discussion of Liebig and Redtenbacker's data relative to the atomic weight of carbon, and was afterwards applied by Clarke[2] in a discussion of Partridge's work on cadmium and later[3] in regard to its more general application.

Applying this principle to the general average of each set of my determinations a new figure is obtained for both carbon and beryllium.

As an average of seven analyses of beryllium acetylacetonate[4]

$$Be(C_5H_7O_2)_2 : BeO :: 2.18109 : 0.26422$$

whence, subtracting the BeO from the first factor and letting

$$BeO = x, \quad C = y, \quad H = 1.008 \quad \text{and} \quad O = 16$$

$$10y + 62.112 : x :: 1.91687 : 0.26422$$

or

$$(a) \quad 1.91687x - 2.6422y = 16.4112326.$$

As an average of nine analyses of basic beryllium acetate[5]

$$Be_4O(C_2H_3O_2)_6 : BeO :: 1.90430 : 0.47036$$

whence, as before,

$$12y + 162.144 : 4x :: 1.43394 : 0.47036$$

or

$$(b) \quad 0.35848x - 0.35277y = 4.7666282$$

combining *a* and *b* and eliminating

$$x = 25.112$$
$$y = 12.007$$

whence the atomic weight of beryllium is 9.112 and that of carbon is 12.007 as compared with 9.113 for beryllium as previously reported.

The rigorous rule in such a calculation would be to give each equation weight inversely proportional to the square of its probable error, but as in my first calculations the figures obtained for the atomic weight of beryllium from both the acetylacetonate and the basic acetate were identical, an application of this rule would have little influence upon the result.

The close agreement of the figures obtained by this method of calculation with the accepted weights is especially noteworthy

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[1] *Ann. Chem.* (Liebig), **59**, 280.

[2] *Am. Chem. J.*, **13**, 34.

[3] *Ibid.*, **27**, 321.

[4] This Journal, **26**, 737.

[5] *Ibid.*, **26**, 740.

when the fact is taken into consideration that a very small variation in the amount of beryllium oxide in either of the above equations would largely affect the result for carbon.

The conclusion seems warranted that the atomic weight of beryllium is very close to 9.112, or that there is an equal and balancing error in both equations.

NEW HAMPSHIRE COLLEGE,
June 15, 1905.

CHARLES LATHROP PARSONS.

Changes of Color Caused by the Action of Certain Rays on Glass.—In the Journal, Vol. 27, page 909, under the above title, appeared certain comments by S. Avery relative to glass becoming violet on exposure to the sun's rays. As there pointed out, the color appears to be dependent upon the presence of manganese originally in the glass, and the intensity of the color is approximately proportional to the manganese present. The occurrences reported by Mr. Avery and Sir Wm. Crookes resulted from exposures to the sun's rays in New Mexico and South America. Among the quotations from Sir Crookes, is: "It would be interesting to hear if travelers in other tropical countries have observed any such change of color of glass." Apparently, the inference is that there is a connection between the phenomenon and the sun's rays in the tropics.

My attention was recently attracted by a similar occurrence in the Butte District, in Montana, U. S. A. The northern part of this district contains large ore bodies, in which manganese as dioxide is a very prominent component. Seemingly, all colorless glass which is allowed to remain for some years on this surface, exposed to the sun's rays, shows a violet color of greater or less intensity. This color is not merely a superficial coating, but extends completely through the glass. The writer never investigated the cause, but is personally able to vouch for the fact of actual occurrence. The color would naturally suggest the presence of manganese, either originally in the glass or derived from extrinsic sources. On account of the proximity of bodies heavily charged with manganese, the latter inference was a possible one, although I considered it hardly probable in view of the fact that most colorless glass contains manganese. It is, however, evident that the phenomenon is not confined to the tropics.

CHAS. E. RUEGER.