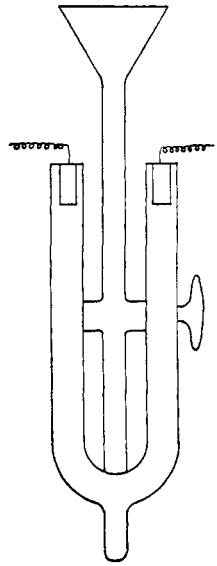
In the figure is shown a U-tube of a convenient pattern, after Nernst. The lighter liquid is introduced first through the side tube. That the color is due to the undissociated salt is confirmed by conductivity and molecular-weight determinations. The conductivities of mixtures of ferric chloride and ammonium sulphocyanate were 20 to 30 per cent. less than their mean conductivities,



while the rise in boiling-point of a mixture of the two salts is always much less than the sum of the rise in boiling-points due to the two substances taken separately.

McGILL UNIVERSITY,
MONTREAL, April 25, 1903.

NOTES.

Note on Carbon Combustion in a Platinum Crucible.—In a recent paper[1] John V. R. Stehman, referring to the writer's special crucible[2] for carbon combustion, makes the statement that "the prevalent idea regarding his form of apparatus seems to be a fear of the rubber gasket causing error by burning directly or by be-

[1] This Journal, **25**, 237.
[2] *Ibid.*, **23**, 227, and **21**, 557.

coming hard and brittle, allowing small pieces to drop into the crucible when the stopper is pushed into place."

While it may be admitted that, prior to experience with the apparatus, such a fear is quite natural, the fact is that long use by many most careful chemists has proved this fear to be quite groundless. Even when the lower half of the crucible is hot enough to burn graphite in air, those parts of the apparatus which are in contact with the rubber gasket are so well cooled by the circulating water that the rubber is wholly unaffected. That there is no error from this cause is shown by the fact that the blanks are always under 0.0005 gram and that sharp results are easy to get on standard carbon samples.

However, a rubber band should not be used until it becomes hard and brittle, not so much from fear of rubber falling into the crucible as from the difficulty of getting a perfectly tight joint with the rubber in this condition.

While, therefore, there is no reason to fear the use of rubber, an asbestos gasket may be successfully used in place of it, if desired. For this purpose, cut a paper pattern, about one-half inch wide to fit accurately around the lower part of the stopper and overlapping about one-sixteenth of an inch at the ends. Cut asbestos paper, of the thickness of a rubber band, over this pattern. Soak the asbestos gasket at least twenty-four hours in a large beaker of water to extract all soluble carbonaceous matter; it is said dextrine is used as a binding material. Fit it, while wet, around the stopper, scraping it down carefully where the ends overlap. Saturate the gasket with water and press it, with a turning motion, into the crucible; there is no difficulty in getting a tight joint. Now test a succession of blanks, which, if the soluble carbonaceous matter has been well extracted, will not exceed 0.0005 gram. The asbestos must be well wetted before putting in the stopper and, just before beginning a combustion, it is well to place a few drops of water in excess around the upper part of the crucible. This will make any possible leak visible and will ensure a saturated and tight joint during the course of the combustion. The writer has tried an asbestos gasket with his crucible on carbon determination with results equally as satisfactory as with the rubber gasket. When determining combined water, however, rubber must be used, for wet asbestos is inadmissible and dry asbestos does not give a tight joint.

While on the subject of carbon determination, it may be well to call attention to two other matters of detail. The writer has recently seen copper oxide for combustion which, instead of having the usual dead-black color and porous appearance, had a reddish color and semi-fused appearance and was not as effective as an oxidizer.

The copper oxide for the small brass tube should be as fine as possible (free, of course, from powder), consistent with keeping the tube open and free. In filling the tube, unless special care is taken, the copper oxide particles may become wedged in spots, leaving empty spaces in the tube. The filling should be slow, using only a little copper oxide at a time and testing it constantly with a wire to be sure the tube is full in every part where it is to be heated.

Where water-bottles are used for furnishing the air-pressure it is well to use water in which a little cupric sulphate has been dissolved. The solution is filtered and, being an inhospitable field for bacterial activity, remains clear and free from the carbonaceous gases which are given off from stagnant water in sufficient amount to affect carbon determinations.

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The Color Test in High Carbon Steels.—Parker says of it that it is "liable to great variations";[1] Galbraith that it "should be abandoned";[2] Tucker, that "its inaccuracy is well recognized";[3] Hadfield that "it had long been a matter of knowledge in the Sheffield steel trade, that the color test was apt to give misleading results";[4] Metcalf in his book "Steel" characterizes it as "the wildest guess work in the best hands." Campbell in his book "The Manufacture and Properties of Iron and Steel," and elsewhere, repeatedly and emphatically expresses distrust of the method.

It is the writer's experience also that the color method as usually carried out is unreliable. The same drillings do not always dissolve to the same shade. This difficulty can only be overcome by the use of two precautions not generally known and practiced. (1) One gram must be taken.[5] (2) The acid must, before using,

[1] *Chem. News*, **42**, 88.
[2] *Journal Iron and Steel Institute*, **181**, 234.
[3] *Ibid.*, **96**, 1, 137.
[4] *Ibid.*, **96**, 2, 187.
[5] Weighed out into a 41 cc. test-tube provided with a mark at 25 cc. Twenty cc. acid is used for solution. After cooling, the liquid is diluted to the mark, mixed by placing the thumb over the tube and inverting a number of times, and 5cc. withdrawn for comparison.