ing-point was observed. The result of our previous analysis follows:

	Calculated for $C_6H_5C(NHC_{10}H_7)=NCSNHC_6H_5$. $C_{24}H_{19}N_3S$.	Calculated for $C_6H_5NHCSNHC_{10}H_7$. $C_{17}H_{14}N_2S$.	Found.
Nitrogen	11.0	10.0	10.0

This material is therefore phenyl-β-naphthylthiourea.

Benzoylthioureaimidoisobutyl Benzoate and Aniline gave a product melting from 145°–146°. This is identical with benzoylphenylthiourea described by Miquel,[1] as melting at 148°–149°. Our previous analysis is appended:

	Calculated for $C_6H_5C(NHC_6H_5)=NCSNHCOC_6H_5$. $C_{21}H_{17}ON_3S$.	Calculated for $C_6H_5NHCSNHCOC_6H_5$. $C_{14}H_{12}ON_2S$.	Found.
Nitrogen	11.6	10.9	11.2

When benzenylphenylamidine was mixed, either dry or in benzene solution, with benzoylrhodanide, a small amount of well crystallized material, melting at about 162° was obtained, in addition to some varnish. As the properties of these products had nothing in common with those of the above compound, the mixture was not further examined.

Benzoylthioureaimidoisobutyl Benzoate and o-Toluidine were stated to react, giving a product melting from 116°–117°. The same product has now been prepared from benzoylrhodanide and orthotoluidine, which, as Dixon[2] states, melts at 118–119°. On mixing this with our material the melting-point was not altered. Our former analysis is annexed:

	Calculated for $C_6H_5C(NHC_6H_4CH_3)=NCSNHCOC_6H_5$. $C_{22}H_{19}ON_3S$.	Calculated for $C_6H_5CONHCSNHC_6H_4CH_3$. $C_{15}H_{14}ON_2S$.	Found.
Nitrogen	11.2	10.3	10.8

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A SPECIAL CRUCIBLE FOR CARBON COMBUSTIONS.

BY PORTER W. SHIMER.

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IT may, perhaps, be remembered that in a former paper by the writer on "Carbon Combustions in a Platinum Crucible,"[3] the crucible was cooled externally by means of wet wick in contact with its upper part, drawing its supply of water from a circular trough kept full by the overflow from a hollow stopper.

[1] *Ann. Chem.* (Liebig), [5], **11**, 313.
[2] *J. Chem. Soc.* (London), **55**, 622.
[3] This Journal, **21**, 557, July, 1899.

By this arrangement with wet wick and water-cooled stopper, it is possible to use an ordinary platinum crucible for carbon combustions and other work in which it is necessary to heat substances to high temperatures in special atmospheres. While wet-wick is effective, it is somewhat troublesome and needs a little attention. To displace the wick and trough, I have devised a special crucible provided, in its upper part, with a platinum cooling chamber about $\frac{1}{2}$ inch wide and $\frac{1}{8}$ inch deep, having short platinum inlet and outlet tubes at opposite sides. The water, after flowing through the stopper, is conducted to the cooling chamber of the crucible by bent glass and rubber tubing, through which it flows to waste.

The rubber band, by which the crucible is tightly closed, is thus effectually cooled on its inner side by contact with the cold stopper, and on its outer side by contact with the cold top of the crucible. The lower part of the crucible may be heated to the

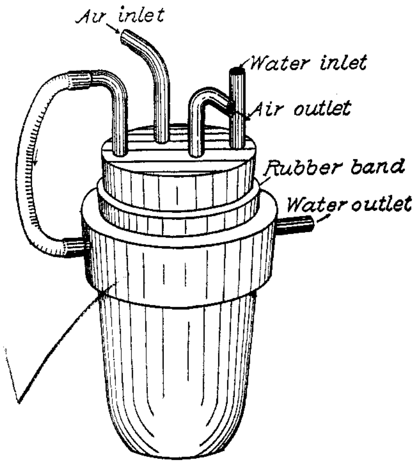

Fig 1.

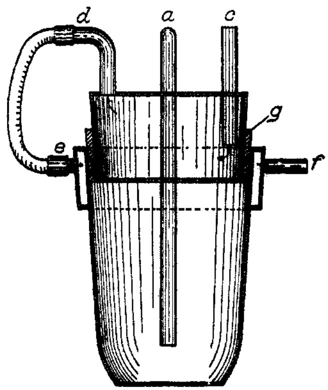

Fig 2.

full temperature of the blast-lamp without affecting the rubber in the least. In addition to the greater neatness and convenience of this form of crucible, it also has the advantage of greater stiffness by reason of the cooling chamber, and a smaller flame is needed to bring the crucible to a red heat. The flame of a good Bunsen burner gives enough heat for the combustion in air of carbon from steel. For graphite and direct combustions, of course, a blast-lamp is necessary. Direct combustions of difficultly soluble alloys may be made very readily in this crucible by mixing the finely divided alloy with lead chromate in a small porcelain crucible and placing the latter in the platinum crucible for combustion, as practised by Mr. C. A. Buck, of the Bethlehem Steel Co.

The construction of the crucible and stopper will be readily understood by reference to Figs. 1 and 2. The air or oxygen inlet is at *a*. The cold water enters the stopper at *c*, and leaves it at *d*, from which point it is led by means of a rubber tube to *e*, where it enters the platinum chamber surrounding the top of the crucible. The water runs to waste at *f*; or, the direction of the flow of water may be reversed, the water entering at *f* and escaping at *c*. The band of pure, black rubber, such as can be had at most stationers, is shown at *g*. It is essential that these bands be of the best quality of rubber obtainable, for such a band will make an absolutely tight joint with the crucible, and one band may be used for many combustions. Before inserting the stopper into the crucible, the band should be wetted with a little water, to lessen friction and secure a tight joint.

For the determination of combined water in ores, minerals, and cements, it may be mentioned here, the circulating water must be preheated to prevent condensation of the water driven out by the ignition of the sample on the cool stopper and upper part of the crucible.

[CONTRIBUTIONS FROM THE CHEMICAL LABORATORY OF THE PENNSYLVANIA STATE COLLEGE AGRICULTURAL EXPERIMENT STATION.]

THE COMPLETE ANALYSIS OF FEEDING MATERIALS.

BY C. A. BROWNE, JR., AND C. P. BEISTLE.

Received March 5, 1901.

IN the ordinary analysis of feeding-stuffs it has been the general custom to determine only a few of the many constituents present; for the computation of rations or for the determination of feeding values an estimation of the moisture, fat, protein, ash, and fiber is all that is usually required, the percentage of undetermined matter being simply designated "nitrogen-free extract."

This method of procedure, while sufficient for many purposes, is by no means scientifically accurate, and chemists have for a