

many weary days working up a process fit for manufacturing, but finally found it and began to put our product on the market. We had marketed perhaps a ton of the material in small lots when some one in New York discovered that picric acid was not a dye but an acid imported for manufacturing purposes and therefore not dutiable, and to our astonishment and dismay succeeded in convincing our learned Treasury officials that such was the case. This, with a disastrous fire which came shortly after, convinced us that we were not yet ready to do up the Germans.

7. In Clarke's tables giving the average composition of the earth's crust, so far as known to us, the rare element titanium—as we used to consider it—figures as ninth in importance, making up as TiO_2 0.6 per cent.; strange as it may seem there is more titanium than phosphorus in the earth's crust. Of the ten elements there given, titanium alone has so far found little industrial use. A beginning has, however, been made by Peter Spence & Co., of Manchester, who had a most interesting exhibit at St. Louis.

It was not my purpose to attempt anything like an enumeration of all the industrial problems confronting the chemist. What has been said will be sufficient to convince those who are hunting trouble that much remains to be done.

NOTES.

Some Observations on the Use of Alkaline Waters for Laundry Purposes.—The attention of the writer has been called recently to a somewhat interesting condition which develops when strongly alkaline artesian waters are used for laundry purposes in steam laundries. The starched portion of a garment, when placed upon the steam rollers to be ironed, develops a deep yellow color. Fehling's solution gave a test for glucose, and iodine revealed the presence of dextrin. A probable explanation of this phenomenon then would be that the starch is converted into dextrin by the heat of the steam rollers; this in turn is converted into glucose, and the glucose reacts with the alkali present in the water, forming some alkali compound which has the deep yellow color. No complaint has come from the domestic laundries; probably because an ordinary flat-iron is not heated to a sufficiently high temperature to cause the reaction.

A partial analysis of the water was made with the following result:

Total solids.....	66.5	grains per gallon.
Chlorine.....	6.2	
Free ammonia.....	6.6	parts per million.
Albuminoid ammonia.....	0.01	
Oxygen consumed in moist combustion ...	0.675	
Hardness.....	3.8	

A quantitative analysis of the water residue was not made, but a qualitative test reveals the presence of alkali sulphates and carbonates in considerable amount.

It will be noticed that the amount of free ammonia is very great; considerable concern was at first experienced on this account, but every precaution possible was taken in the analysis, and the results were checked by the analysis of samples of known purity; the results obtained were very uniform and are probably correct. Wanklyn and Chapman, in their treatise on water analysis, are authority for the statement that such a condition is sometimes met with in deep waters that are organically pure.

As was to be expected, considerable trouble has been caused in the steam boilers by the use of a water containing so great an amount of solid matter.

As soon as attention was directed to the yellow color produced in the laundried clothes, efforts were made to find some method of neutralizing the alkali. The laundry process, as formerly used, was as follows:

Soak in clear cold water, pass into hot suds, then to a bleaching solution, rinse in hot water, pass into a sour bath acidified with oxalic acid, pass into a hot water rinse, pass into a hot bluing solution, rinse twice in cold water, once in hot water and again in cold water, pass into the starch solution and from the starch solution to the steam rollers to be ironed.

As modified for use with the alkali water the process is as follows: Soak in cold water, pass into hot suds, rinse in clear cold water, bleach in a hot solution, pass into suds again, rinse four times in cold water, pass into a cold bluing solution acidified with acetic acid, pass then directly to the starch and then to the steam rollers to be ironed. The principal difference is in what is known as the sour rinse, passing directly from that to the starch, thus giving no opportunity for the acid to be washed out, but, as it remains in the clothes, enabling it to neutralize the alkali and thus prevent the reaction with the glucose on the steam rollers.

This method gives excellent results with water that could not be used at all with the former method on account of the yellow color invariably produced.

I can find no mention of a similar phenomenon in any literature to which I have access.

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The Determination of Sodium Carbonate in the Presence of Sodium Fluoride.—The ordinary volumetric method of estimating sodium carbonate by the use of standard acid and methyl orange cannot be employed in the determination of this compound in the presence of sodium fluoride.

If a trial titration were to be made of sodium carbonate in the presence of the fluoride, it is found that after the carbonate has been completely acted upon by the acid, the methyl orange indicator, instead of turning a distinct red, turns gradually into a darker shade of yellow, almost unnoticeable, and at an indefinite point, thus making this method worthless in a case of this kind.

A modification of the ordinary volumetric method which I have been using and have found to give excellent results, is outlined below.

One gram of the sample of fluoride is dissolved in about 100 cc. of water and to the solution is added 25 cc. of a 5 per cent. solution of calcium chloride, thereby precipitating calcium fluoride and also calcium carbonate, if there were any alkaline carbonate present.

The mixture is then titrated with N/10 hydrochloric acid, using methyl orange as indicator. As the number of cubic centimeters required by the calcium carbonate is equal to the amount required by the equivalent quantity of sodium carbonate, the per cent. of the latter may be obtained directly by multiplying the number of cubic centimeters of N/10 acid by 0.53.

The end reaction is very distinct and no difficulty is experienced in finding the point. It is very important that the solution of calcium chloride employed be perfectly neutral. If it should be found acid, add a few drops of methyl orange and dilute sodium hydroxide until neutral, and if found alkaline add methyl orange as before and dilute acid until neutral.

Barium chloride may be used in place of the calcium salt, but I give preference to the latter as the precipitate is not so dense and so gives a sharper titration.

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