

instead of being yellowish green, as our present knowledge upon the matter would lead us to expect.

7. That if the ammoniacal solution prepared as above is acidified *before* the application of the ferro-cyanide thereto, the precipitate which then ensues is of the colour we should look for that is yellowish-green.

8. That as far as I have yet examined this dark precipitate, it appears to be the ferri-cyanide of cobalt.

It thus appears that both zinc and cobalt oxides may, when in contact with certain salts, give us reactions which are altogether different to those which we have hitherto been cognizant of; consequently these oxides are capable of, and actually do in these cases, assume an allotropic form.

The characteristic of these oxides when in this form, is that they change the quantivalence or degree of basicity of ferro- and ferri-cyanic acids, so that they are transformed the one into the other (the acids themselves being, as you may remember, isomeric). Thus accomplishing that for which an oxidation or de-oxidation process has hitherto been deemed necessary.

I should in this connection inform you that manganese oxide, in solution, when boiled with ammonia in excess refuse to afford a precipitate with potassic ferri-cyanide. We only get this by acidifying the solution.

It seems therefore that careful cognizance should be taken of these facts by anyone making a qualitative analysis for the metals referred to, and using for this either of the tests above-named. The urgent necessity there may be for "acidifying" and then "boiling" the solution in the one case and of acidifying in the other, is clearly shown. If these precautionary operations are not taken zinc may be mistaken for lead, and cobalt for copper.

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ART. LIII.—*On a Periodide and an Iodo-Carbonate of Lead.*

By WILLIAM SKEY, Analyst to the Geological Survey Department.

[Read before the Wellington Philosophical Society, 4th December, 1880.]

IF to a solution of a lead-salt and borax iodine dissolved in an aqueous solution of potassic-iodide is added a crystalline precipitate copiously forms, and which differs from the only plumbic-iodide which we now know in being of a brick-red colour (instead of yellow), and in being far less soluble in water than it.

I have not had time to fully analyse this new compound, but it is undoubtedly the per-iodide of lead. I merely note it here and the manner of its production, as it forms the basis of the salt which I desire especially to bring before your notice.

When this periodide is exposed to the air it gradually acquires a blue colour, but if allowed contact with sodic-bicarbonate in quantity this colour is produced instantaneously and voluminously with a beautiful and striking effect. In shade it is not to be distinguished from that of the compound of iodine with starch.

The new salt thus produced is almost, if not entirely, insoluble in water, hot or cold, also in potassic-iodide or alcohol, nor is its appearance changed by these liquids.

Treated with any ordinary acid, even with the acetic, it is instantly decomposed, carbonic acid and iodine being liberated. Any free alkali also decomposes it; carbonic acid, even, in conjunction with water, decomposes it, but very slowly, iodine being liberated in a free state. By spontaneous evaporation, it can be had in acicular crystals.

It appears to be composed of iodine and carbonic acid with lead and oxygen.

The effect of a long-continued contact of this salt with carbonic acid and water is to produce another compound of quite a different kind. This is insoluble in acetic acid and quite colourless.

There are two points in connection with this subject which I would particularly desire to bring to your notice; they are—first, that this reaction of per-iodide of lead with carbonic acid is a very delicate and beautiful test for this acid; thus when shaken up in a finely granular form (as precipitated) with ordinary spring or rain water, mixed with a little borax if need be, or if breathed upon, the presence of this acid is revealed by a greenish colour being instantly communicated to the water, which colour soon passes to a blue if the acid is present in more than a very minute quantity. This is a striking demonstration for the lecture-room, and the only chromatic test as yet known for the presence of the acid cited.

The next point I wish to note is the striking resemblance of the colour of this new compound to that of iodine with starch. This is strongly suggestive of the idea that in both compounds the iodine is in the same molecular state, and consequently that the compounds themselves possibly are in some fundamental points analagous.

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ART. LIV.—*The Dimorphisim of Magnesia.*

By WILLIAM SKEY, Analyst to the Geological Survey Department.

[Read before the Wellington Philosophical Society, 4th December, 1880.]

WHILE trying to electro-deposit gold from sea-water, so as to verify Sonstrad's observation regarding gold in sea-water, and if possible to estimate it, I ap-