CHEMISTRY

Three Common Elements in Group IV

"A Classic of Science"

Tin and Lead are Among the Oldest Metals Known to Man Silicon, Recently Isolated, is Familiar in Sand: SiO_2

The Tin Islands

THE GEOGRAPHY OF STRABO, literally translated, with notes. The first six books by H. C. Hamilton, Esq., the remainder by W. Falconer. In three volumes. London: 1854. (The Geography of Strabo dates from about the years 17 to 23 A. D.)

THE CASSITERIDES are ten in number[1], and lie near each other in the ocean towards the north from the haven of the Artabri. One of them is desert, but the others are inhabited by men in black cloaks, clad in tunics reaching to the feet, girt about the breast, and walking with staves, thus resembling the Furies we see in tragic representations.[2] They subsist by their cattle, leading for the most part a wandering life. Of the metals they have tin and lead; which with skins they barter with the merchants for earthenware, salt, and brazen vessels. Formerly the Phoenicians alone carried on this traffic from Gades,[3] concealing the passage from every one; and when the Romans followed a certain ship-master, that they also might find the market, the ship-master of jealousy purposely ran his vessel upon a shoal, leading on those who followed him into the same destructive disaster; he himself escaped by means of a fragment of the ship, and received from the state the value of the cargo he had lost. The Romans nevertheless by frequent efforts discovered the passage, and as soon as Publius Crassus, passing over to them, perceived that the metals were dug out at a little depth, and that the men were peaceably disposed, he declared it to those who already wished to traffic in this sea for profit, although the passage was longer than that to Britain.

Assaying Lead and Tin

GEORGIUS AGRICOLA DE RE METALLICA, Translated from the First Latin Edition of 1556 with Biographical Introduction, Annotations and Appendices upon the Development of Mining Methods, Metallurgical Processes, Geology, Mineralogy & Mining Law from the earliest times to the 16th Century, By Herbert Clark Hoover and Lou Henry Hoover. Published for the Translators by The Mining Magazine, Salisbury House, London, E. C., 1912.

Lead ore may be assayed by this method: crush half an *uncia* of pure lead-stone and the same quantity of the *chrysocolla* which they call borax, mix them together, place them in a crucible, and put a glowing coal in the middle of it. As soon as the borax crackles and the lead-stone melts, which soon occurs, remove the coal from the crucible, and the lead will settle to the bottom of it; weigh it out, and take account of that portion of it which the fire has consumed. If you also wish to know what portion of silver is contained in the lead, melt the lead in the cupel until all of it exhales.

Another way is to roast the lead ore, of whatsoever quality it be, wash it, and put into the crucible one *centumpondium* of the concentrates, together with three *centumpondia* of the powdered compound which melts ore, mixed together, and place it in the iron hoop that it may melt; when it has cooled, cleanse it of its slag, and complete the test as I have already said. Another way is to take two *unciae* of prepared ore, five *drachmae* of roasted copper, one *uncia* of glass, or glass-galls reduced to powder, a *semi-uncia* of salt, and mix them. Put the mixture into the triangular crucible and heat it over a gentle fire to prevent it from breaking; when the mixture has melted, blow the fire vigorously with the bellows; then take the crucible off the live coals and let it cool in the open air; do not pour water on it, lest the lead button being acted upon by the excessive cold should become mixed with the slag, and the assay in this way be erroneous. When the crucible has cooled you will find in the bottom of it the lead button. Another way is to take two *unciae* of ore, a *semi-uncia* of litharge, two *drachmae* of Venetian glass and a *semi-uncia* of saltpetre. If there is difficulty in melting the ore, add to it iron filings, which, since they increase the heat, easily separate the waste from lead and other metals. By the last way, lead ore properly prepared is placed in the crucible, and there is added to it only the sand made from stones which easily melt, or iron filings, and then the assay is completed as formerly.

You can assay tin ore by the following method. First roast it, then crush, and afterward wash it; the concentrates are again roasted, crushed, and washed. Mix one and a half *centumpondia* of this with one *centumpondium* of the *chrysocolla* which they call borax; from the mixture, when it has been moistened with water, make a lump. Afterwards, perforate a large round piece of charcoal, making this opening a palm deep, three digits wide on the upper side and narrower on the lower side; when the charcoal is put in its place the latter should be on the bottom and the former uppermost. Let it be placed in a crucible, and let glowing coal be put round it on all sides; when the perforated piece of coal begins to burn, the lump is placed in the upper part of the opening, and it is covered with a wide piece of glowing coal, and after many pieces of coal have been put round it, a hot fire is blown up with the bellows, until all the tin has run out of the lower opening of the charcoal into the crucible. Another way is to take a large piece of charcoal, hollow it out, and smear it with lute, that the ore may not leap out when white hot. Next, make a small hole through the middle of it, then fill the

[1]The Scilly Islands.
[2]This is probably a description of the appearance of the Druids.
[3]Cadiz.

large opening with small charcoal, and put the ore upon this; put fire in the small hole and blow the fire with the nozzle of a hand bellows; place the piece of charcoal in a small crucible, smeared with lute, in which, when the melting is finished, you will find a button of tin.

Silicon

ANNALS OF PHILOSOPHY, new series, January to June 1824, Vol. VII. and twenty-third from the commencement. London: 1824. (Proceedings of Philosophical Societies: Royal Society.)

A Letter from Professor Berzelius to the President was read in which he describes the results of various chemical researches in which he has recently been engaged; and several memoirs on which accompanied the letter . . .

The fifth memoir relates to the combinations of fluoric acid. A portion of this memoir now printing describes a method by which the author has succeeded in obtaining the base of silica in an insulated state. It consists in acting by potassium on dry silicated fluate of potash, by which means a mixture of various substances is obtained, which yields hydroguret of silicon by being well washed with water: and when that substance is heated in a crucible the hydrogen is burned off, and the silicon obtained pure. Prof. B. then proceeds to give the results of various experiments upon this substance; among which are the following. It is obtained in various states of aggregation, and its combustibility varies accordingly, it much resembling carbon in this respect: as usually obtained it is combustible when ignited in atmospheric air and in oxygen gas; but in its densest state it may become incandescent in the air without burning. It is very difficult to effect its complete combustion: 200 parts of silicon unite to 208 of oxygen to become silica. It will not burn when heated with nitre, but is brought into combustion by carbonate of potash; a curious circumstance which the author attributes to certain relations of affinities. Silicon burns when ignited in chlorine, forming with it a transparent colourless fluid, having the smell of cyanogen. It is combustible in vapour of sulphur, producing a gray sulphuret, but cannot in this case be completely burned.

Prof. B. next describes the results of the same mode of decomposition as applied to ittria, glucina, and zirconia; giving the chemical habitudes of zirconium, which can be obtained in larger quantities than the bases of the former earths. He then states that he has used the term *fluate* instead of *fluoride* throughout this letter, not because he thinks the President's ingenious theory of the subject less probable than his own (though he has not been able, by his own experiments, to determine which is the true one); but because, as he was writing in a language foreign to him, he wished to employ the plainest terms: and concludes by requesting Sir Humphry to lay the above results before the Royal Society.

Science News Letter, July 9, 1932

ECONOMIC GEOGRAPHY

Russia Seeks Warm-Water Port As Pacific Gateway for Siberia

Japan's Manchurian Venture Threatens Vladivostok, Now Ice-Free Most of Year, Thanks to Ice-Breakers

Following is the fourth and last of a series of articles on the tangled and vexed situation in the Far East as seen by leading geographers.

A LONG struggle over warm-water ports looms ahead in the Far East.

This is the outlook as seen by one of those cautious prophets of science, a political geographer. The geographer is Dr. Isaiah Bowman, director of the American Geographical Society, with headquarters in New York City.

One of Russia's vital requirements in the Far East, he explains, is a port open to her trading ships all the year round. Such a port is known as a warm-water port, to distinguish it from ports that are ice-bound in winter.

Throughout Czarist history, Russian leaders worked to gain warm-water ports for the vast Russian domain, not only in the Far East, but in every other direction. So far as the Far East was concerned, the Czarist regime never completely solved the problem. It was left to the Soviets, and is now one of the key points in Far Eastern strategy.

Russia seemed near a solution of the port problem in the Far East when she gained a twenty-five year lease on Port Arthur and Dairen in South Manchuria, back in the eighteen-nineties. The most southerly seaport in Russia's own Pacific territory, Vladivostok, was at that time ice-bound for the greater part of the year. So it was necessary to look farther south, into another country—Manchuria—for the desired outlet.

But the favorable position which Russia gained in South Manchuria was lost long before the twenty-five year lease was out. The Russo-Japanese War broke, and the outcome was that Russia had to withdraw from South Manchuria, giving up her seaports.

Since then, Russia has concentrated on Vladivostok. She has wrought a complete change in its character, turning the port, to all intents and purposes, into a real warm-water port. This is done by ice-breaking ships that keep the harbor open. As the effectiveness of these ice-breakers has been increased, Vladivostok has come close to being an all-year port. According to advices at the Soviet Union Information Bureau, in Washington, the port is now closed only a few weeks in the year, and the prospect is that Vladivostok will eventually be kept entirely free of ice.

Still, the port problem is far from solution. The Chinese-Eastern Railway,