A HOME-MADE BAROMETER.

BY S. LEONARD BASTIN.

To acquire a certain amount of weather lore should be the object of every gardener. All the changes which come about in the course of the year are so intimately associated with the well-being of plant life, that the elementary study of meteorology is a matter in which every horticulturist should engage. In this connection the possession of a fairly reliable barometer is essential. But in their cheapest forms the instruments are somewhat expensive, and considering that in essence the barometer is one of the simplest contrivances, it occurred to the writer that it would not be a very formidable matter to make one.

As is well known, a barometer is nothing more than a contrivance for measuring the weight of the air. A glass tube closed at one end and filled with mercury, then immersed in a bath of the mineral without the admission of air, is an elementary form of the instrument. When the tube is upright, the column of quicksilver is seen to fall four or five inches, leaving a vacuum at the top. It will be evident that the height of the mercury in the tube responds to the variations in the weight of the atmosphere pressing on the bath of mercury. The relations of the movements of the "glass" to the weather are of course simple enough. When the atmosphere is heavy it causes the mercury column to rise, indicating fair weather; and conversely when the atmosphere is under low pressure the mercury column subsides, indicating the approach of a storm.

Inserting the Tube in the Mercury Receptacle

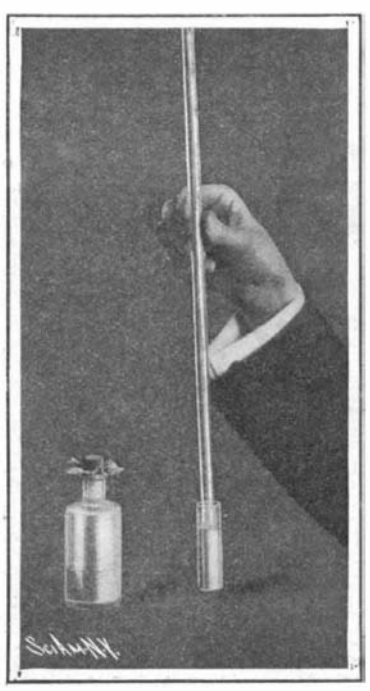
Filling the Mercury Tube.

For the construction of a home-made barometer, purchase about three-quarters of a pound of mercury, a glass tube three feet in length and closed at one end, and a small glass receptacle four or five inches long. This should be large enough to take the end of the long glass tube, allowing a quarter of an inch or so all round. The wood necessary for the construction of the frame is likely to be found in almost any house. It is desirable that this work should be taken in hand in the first place. To make the frame take a board about three feet three inches long and four inches wide; make the whole nice and smooth. Now cut two strips of wood, say thirty inches long and one and a quarter inches in width. Screw these to the board far enough apart to allow the glass tube to be dropped in between them, at the same time taking care to place them four inches from the bottom of the board. Along the bottom of the board fasten a strip of wood sufficiently wide to support the glass receptacle. Add two pieces of wood to either side of the board, these to run up to where the two long strips terminate. In this way will be formed the three sides of a little box. A piece for the top of the box must have an archway scooped out in the center to allow for the passage of the tube. A square piece of thin wood may be cut to form the lid of the box. After applying some stain to give the wood a finish the frame is complete.

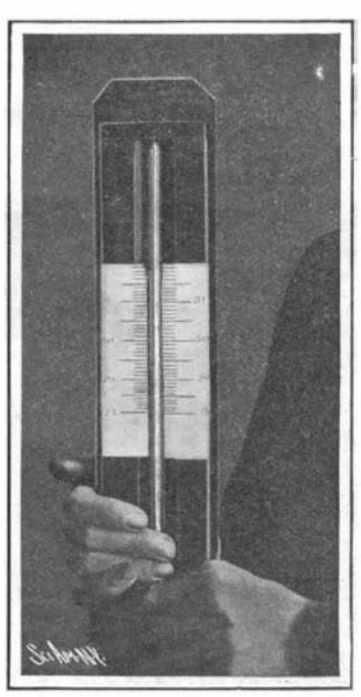
The next matter for consideration is the filling of the small glass receptacle and the tube with mercury. In filling the tube a funnel formed out of a sheet of paper will be found useful. When the tube is full, place the finger over the orifice. Then invert the tube, and without admitting any air immerse the end in the mercury contained in the receptacle This is likely to be rather a difficult undertaking, and perhaps the best way of all to accomplish it is to tie a piece of skin or leather very tightly over the upper end of the tube after it is full; then immerse, and finally cut away with a penknife the twine which binds the skin. If this has been accomplished without letting in any air, the column of mercury will be observed to fall several inches. If atmospheric bubbles are to be seen working their way upward, the tube must be refilled.

The tube and receptacle must now be carefully removed to the case. The contrivance is best fixed into its position by looping wire round the tube in about four places, and twisting these tightly at the back. The scale is easily prepared. Consult a reliable barometer in quiet weather, and when this stands at 30.00, make a slight mark in the woodwork opposite the level of the mercury in the home-made article. On a piece of paper rule out your scale for the two sides of the glass to the extent of about four inches; dividing each into tenths. Put the central inch at 30.00, and number the inches up and down accordingly. Paste the slips of paper on either side of the tube, and cover the receptacle with the lid which has already been prepared, and the instrument is complete. The barometer should be kept in an upright position, and must never be hung where the sun will fall on it. It is not claimed that this contrivance will work with extraordinary accuracy, but if reasonable precautions are taken in its construction, the instrument should record the variations in pressure with fair reliability.

The Mercury Tube Inverted.



The Tube Immersed in the Mercury Receptacle.



The Scale in Place.

Fastening the Tube to the Frame.

A HOME-MADE BAROMETER.

Reliable English authorities place the world's production of spelter during the year 1906 at 688,300 tons of 2,240 pounds each, showing a slight increase over the 647,720 tons produced in 1905. Of the total production of 1906 Europe is credited with 491,045 tons, of which Belgium produced 150,060 tons; Rhine, 67,615; the Netherlands, 14,420; Great Britain, 51,670; France and Spain, 52,940; Silesia, 134,180; Poland, 9,460, and Austria and Italy, 10,610. Australia produced 1,010 tons, and the United States outranked any other nation, her production amounting to 196,545 tons, as against 180,360 tons in 1905. Besides producing the largest quantity of spelter, America showed the largest increase of any of the producing countries.

American Grain Losing Ground.

At a recent meeting of delegates representing all the leading grain dealers of Europe, it was decided that no decisive action would be taken at present with regard to grain trade with the United States, the delay being for the purpose of giving American exporters an opportunity to improve existing conditions, and to afford them time to make a thorough investigation of the complaints of European dealers. If, however, no improvement appears within a reasonable time, it is declared that an absolute boycott of American grain will be instituted. Even at the present time there is absolutely no sale for American grain in many localities, this being especially noticeable in the Rhenish - Westphalian district, where Argentinian wheat has taken the place formerly held by that from the United States.

At the meeting referred to, many cases were cited where American grain arrived in extremely bad condition, being moldy and not grading to sample, and in a number of instances bordering very closely upon swindling. Formerly there was a most flourishing trade in all American grains in the Rhenish-Westphalian district.

The Platinum Deposits of California.

Members of the U. S. Geological Survey, who are now in San Francisco, are investigating the recent discoveries of platinum in several counties in California. A bulletin will soon be issued on the tests of black sands which were conducted on the Pacific coast and elsewhere more than a year ago. The inquiry was started originally for the purpose of locating rich deposits of platinum. The investigation developed that there is platinum in 120 places in the United States; but that some of the largest and most profitable fields for commercial exploitation are in Del Norte, Siskiyou, and Trinity counties, in California. Platinum is also found in considerable quantities in Plumas and Butte counties.

A tin mine in the extreme north of the province of Kwangsi, China, is operated on a small scale, its product being exported through the port of Wuchow. Another tin mine is to be opened in the prefecture of Wuchow.

THE WONDERFUL SULPHUR MINES OF LOUISIANA.

The extraordinary richness and extent of the mineral resources of the United States are proverbial, and all things considered, in the whole range of the mining industry it would be impossible to find a deposit which, relatively, in its richness and purity exceeds the sulphur mines of Louisiana. These are unique both in their geological formation and in the originality and daring of the methods adopted for the recovery of the metalloid.

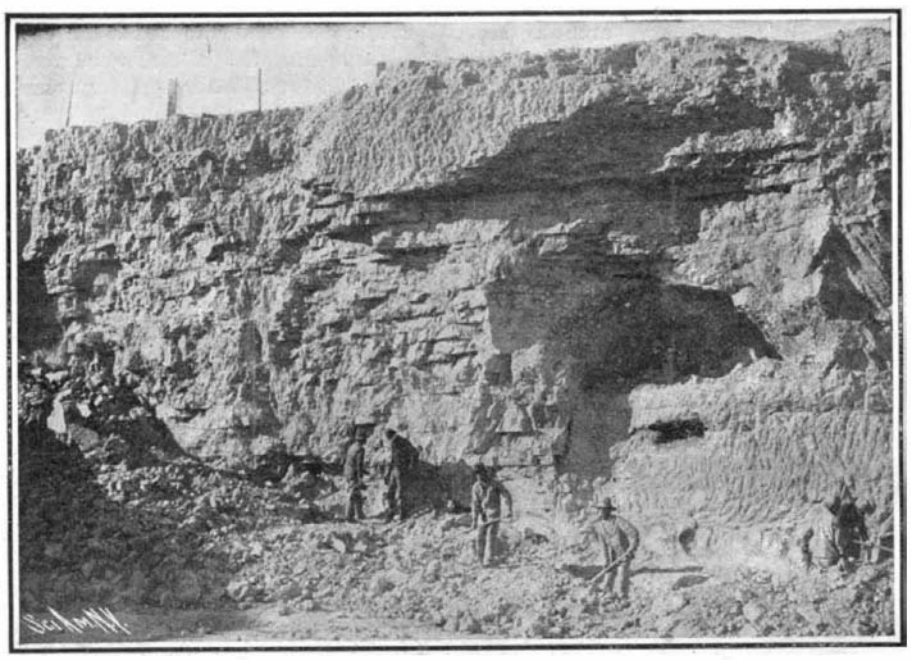
The deposits in question are situated near the little town of Lake Charles near the coast of the Gulf of Mexico, and close to the border between Louisiana and Texas. They belong to the Union Sulphur Company, to the untiring patience and inventive skill of whose president, Mr. Herman Frasch, is due the present ingenious and very successful method of recovery. Before proceeding to a description of this method, it is necessary to make clear the character of the deposits and the probable method of their formation. The large number of boreholes which have been sunk have revealed the presence, at great depth, of a vast extinct geyser, whose operations must have ceased far back in geological ages, the sulphur layers having been deposited in the tertiary age, either Eocene or Miocene. After passing down, first through 200 feet of clay and then through 200 feet of quicksand, and 80 feet of sand and gravel, the drills revealed the presence of a vast cone or mountain of limestone, approximately oval in form, the lip of the cone having a width of about 200 feet, and the mouth measuring from one-third to one mile across. A portion of the top of the cone is covered by a deposit of broken limestone, which varies in thickness from nothing to 150 feet, at the edges. After the drills had penetrated through this overlying stripping, they entered a huge deposit of sulphur and limestone, consisting of about 30 per cent of limestone and 70 per cent of pure sulphur. Below this was found a deposit of gypsum 450 feet in thickness, and underlying the gypsum is a deposit of salt. Surrounding and covering the walls and summit of this cone, with its valuable contents, is a bed of sand.

The discovery of this mine resulted from the efforts of a company which was formed in 1868 to search for petroleum, the presence of which was indicated by oozings from the surface of the ground. Two years later, attempts were made to extract the sulphur which the borings for petroleum had revealed; but the impossibility of controlling the abundant sub-surface waters of this region, which is almost at sea level, rendered all attempts to recover the sulphur by the ordinary mining methods abortive.

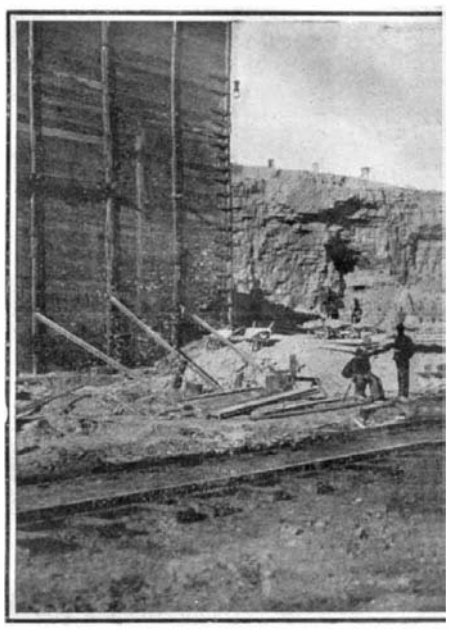
The present successful system may be said to date from the year 1891, when the first patents on a process for recovering sulphur by liquefaction were taken out; but it was not until the year 1895 that the inventor succeeded in securing the property containing this deposit, and not until seven years later that the many difficulties in the way of mining the sulphur in this novel manner were overcome and the process brought to a state of perfection which made the new method a financial success. The quality of the product of the Union Sulphur Company is excellent, showing upon analysis a purity of more than ninety-nine per cent.

Briefly stated, the sulphur is melted by means of superheated water which is forced down into the deposit through iron pipes. The melted sulphur, being insoluble in water, and of greater specific gravity, falls to the bottom of the well, whence it is raised to the surface by means of an air pump. On the surface it is allowed to congeal in the form of huge square masses, and subsequently is broken up and loaded on to the cars for shipment.

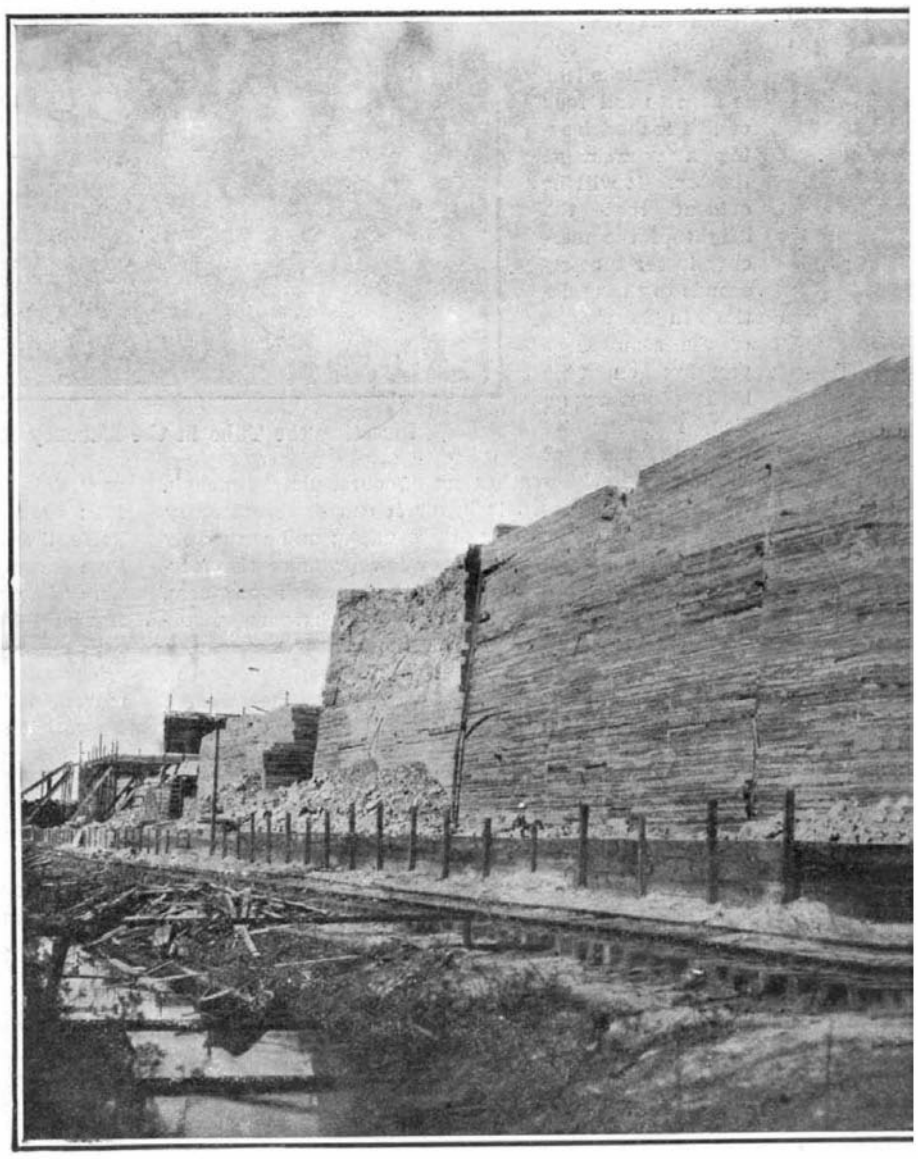
The details of the process are as follows: A well is drilled in much the same way as for petroleum, to the bottom of the sulphur bed. Down this well is run a system of pipes, one within the other, until it extends not quite to the bottom of the well. The outermost pipe is 10 inches in diameter; within this is a 6-inch pipe, inside of which is a 3-inch pipe, and within that a 1-inch pipe. Water, heated in a battery of boilers to a temperature of 335 deg. F., is forced down through the annular space between the 10-inch and the 6-inch pipes, and issues through a number of perforations in the side of the pipe at a point two or three feet above the bottom of the well. The water, because of its great heat and pressure, forces its way through the seams and crevices of the limestone rock, attacking and melting the sulphur, and causing it, because of its superior gravity, to drain down to the bottom of the well. Here it enters the bottom of the pipe through a number of perforations, and passes up through the annular space between the 6-inch pipe and the 3-inch pipe. Normally, the two columns of liquid, water and sulphur, would stand in equilibrium at different levels, whose height would be inversely as their respective specific gravities, the water column being twice as high as the liquid sulphur column; so that



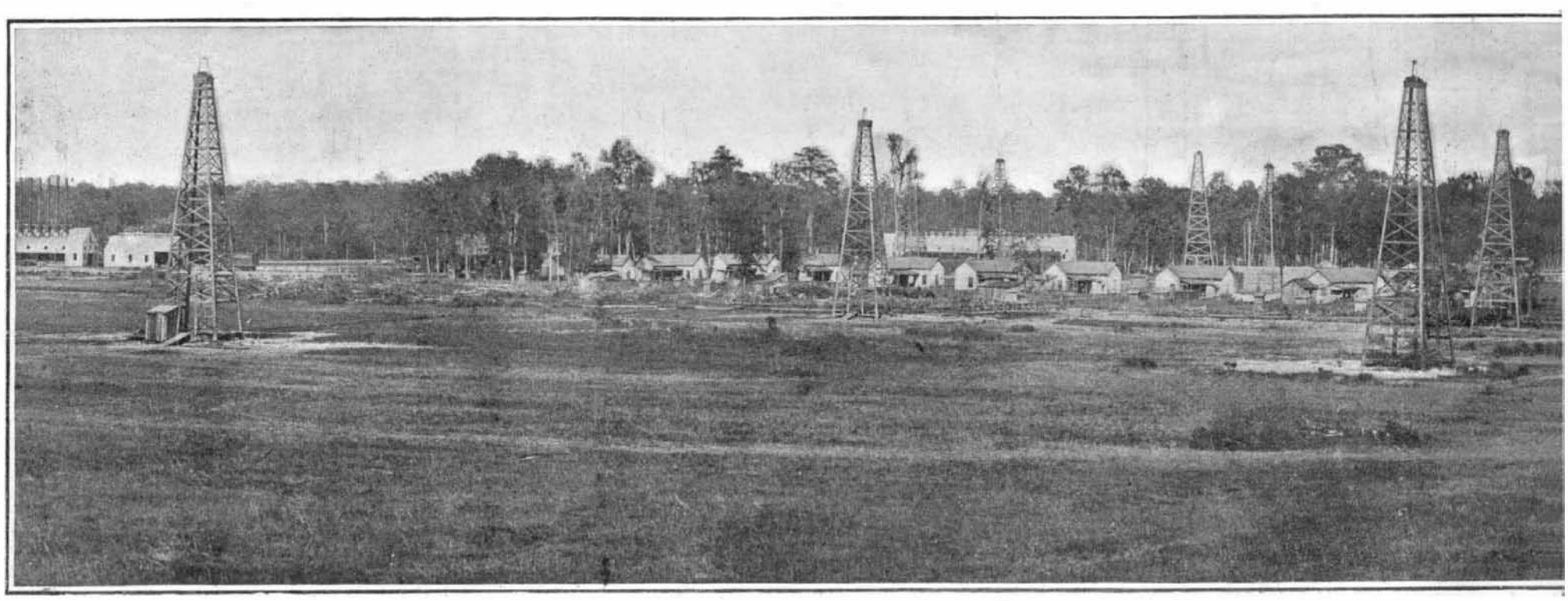
Wall of Sulphur, Showing a Pocket of Liquid Sulphur Long After Exterior of Mass Had Solidified.



Breaking Down and Lo



Solid Mass of Pure Sulphur, 40 Feet High, Af



Panoramic View of the Sulphur Recovery Works, Showing the Thi