

INTERESTING CORRESPONDENCE.

RAIN WATER SALT-WORKS IN YUCATAN.

MESSRS. EDITORS:—As the SCIENTIFIC AMERICAN is the nucleus of all that is valuable in regard to natural phenomena, I submit the following curious facts, hoping that they may be interesting to many of your readers.

When we compare the productions of men with those of nature, we must acknowledge that, though our efforts be great and the results admirable, natural productions are wonderful and grand beyond the power of man's imitation. This is particularly the case in the tropics, where the display of nature's wonderful productive power dazzles and bewilders the natives of a less congenial climate. Those who have not seen the banana tree, the mamey, the zapote, the papaya, the camote and innumerable other tropical fruits and productions, cannot believe such fabulous power of vegetation as really exists. Can you imagine a volcanic limestone formation, with here and there hardly more than a handful of earth in its cavities, producing giants in the vegetable kingdom, where, in our latitude, not a handful of grass would grow? With such a soil, men almost feel justified in saying that they do not need to work, nature being so rich that they have enough to supply all their necessities.

Along the northwest coast of Yucatan, from Campeachy to Sisal (a distance of about 120 miles), and on the northern coast, from Sisal to Telchac, and from the mouth of the river Lagartos to Chiquila, and, I think, from Telchac to Tilam (a distance of about 180 miles), there exists a piece of soil varying in breadth from half a mile to 3 miles, separated from the waters of the Gulf of Mexico only by a narrow strip of sand, this latter forming a bulwark against the sea-water and a protection to this soil, which is composed of a kind of clay from which the Indians manufacture their drinking cups or vessels in general use. (I send you a specimen of this soil, in case any of your readers or yourselves should be willing to make the analysis before I can have it made.) Into this soil tanks or reservoirs are dug to the depth of from 24 to 36 inches, with an area to suit the proprietor. There are a good many of these tanks which are nothing but natural cavities, from 2 to 5 feet deep, saving even the labor of digging a tank, the inexhaustible and lasting source of wealth and income. The only care that has to be taken is to situate a tank in such a manner that at no time the salt water of the gulf ever has access to it; this seems to be a paradox, if not an absurdity, but the fact is that if such is the case, there is no production of salt for one and even several seasons. Another fact is that in digging these tanks it is not unusual to find small springs of perfectly sweet water. These salines are not (as in Europe) leveled and prepared with art, divided into many receptacles for purifying sea-water, and effecting its concentration; here nature does all the work, and its operation for the production of salt by the agency of sweet water, is as follows:—

The tanks being clean, they are filled with rain water during the rainy season, which begins in May and lasts till September, but generally with intervals sufficient to gather two harvests from May till October. In November and December enough rain generally falls again to produce a third one in March or April. As soon as the rain ceases, a kind of fermentation takes place, raising the temperature of the water gradually to 100, 110 and 120 degrees Fah., a temperature much above that of the atmosphere, after which the water begins to clarify itself by precipitating to the bottom a kind of brownish, gelatinous matter about $\frac{1}{2}$ of an inch thick. Up to that time the water has sustained its perfect sweetness, though there has been some concentration by evaporation; but from the time of the clarification it begins to acquire a salty taste, almost imperceptible in the beginning, augmenting quite rapidly until, by the constant influence of the sun, evaporation being sufficiently advanced, crystallization sets in, and crystals shoot out everywhere on the surface of the water, agglomerating and augmenting until the whole surface of the tank is covered with a crust of salt from 4 to 5 inches in thickness, which, by its own weight, precipitates to the bottom of the tank, where it is broken with a kind of pick-ax and taken out by hand by the native Indians; they wash it in the remaining water, load it upon carts and bring it to the depot, where they put it into bundles surrounded by huano leaves, in which it is sent to the interior of Mexico. (For curiosity's sake, I brought one of the bundles, which I submit

herewith to your inspection.) This salt is of a light gray color and very pure. Some of the salines produce white salt, which has less value because they say that it salts less; the chief reason is its bitter taste, which seems to indicate the presence of sulphate of magnesia. Some of the proprietors told me that it was a kind of froth forming on the surface of the water, which is carefully collected and laid aside for crystallization. There is also the rose-colored salt, containing, probably, some of the mineral oxyds, may be oxyd of iron. An analysis of these products will alone clear this question.

When the harvest is made, the tanks are cleared, which is very little work, and nature's bounty fills them again with its spontaneous production, so that man has nothing to do but to reap always and forever, the supply being inexhaustible.

LOUIS KOCH.

New York, May 31, 1860.

[We are obliged to our correspondent for the above interesting description of the remarkable salines of Yucatan. The continuation of his letter, which we omit, cites an article on this subject in the *Mejoras Materiales*, written by M. Villeveque—formerly French consul in Campeachy—which contains some profound reflections in regard to the source from which the salt is derived. The specimens brought by Mr. Koch of the formation in which the vats are dug are evidently full of salt, and the suggestion is so obvious that this salt is simply dissolved by the rains and washed into the pits, that we respectfully suggest to Mr. Koch to make a thorough examination of the facts in their bearing upon this hypothesis, on his return (in June) to that country of tropical marvels. If any of our scientific friends would like to examine specimens of this salt and the formations in which it occurs, they will find them at our office.—EDS.]

VENTILATION OF MINES—THE STEAM JET.

MESSRS. EDITORS:—Being a constant reader of that valuable paper, the SCIENTIFIC AMERICAN, and having noticed frequent allusions to the ventilation of mines, I have thought it would interest some of your readers to peruse a description of a system of ventilation lately introduced by Mr. Wm. Milnes, Jr., of this place. Mr. Milnes owns and works a very extensive colliery at St. Clair, in Schuylkill county; and in order to ventilate his works, he has driven an air-way of 30 feet area to the surface, where there is an arched flue, 30 feet in length, containing a grate or furnace on which a very strong fire is constantly kept up. At the end of the flue is a chimney, 6 feet internal diameter and 60 feet high. The air-way is connected with the different parts of the works by means of brattices and doors, so that all the workings receive their proportionate supply of pure air. This plan of furnace and chimney worked very well until lately, when, the works becoming more extensive, it was found necessary to increase the ventilation. The furnace was driven to its fullest extent, sometimes using resin and oil to increase the draft, but it failed to draw off the explosive gases. After fully investigating the matter, Mr. Milnes concluded to introduce what is known in England as the "steam-jet system," and with the co-operation of Messrs. Pomeroy & Son, machinists, he has done so with the most gratifying results.

At the foot of the chimney he erected two boilers, 30 inches diameter and 20 feet long, from which a steam pipe is carried into the chimney, and so arranged as to distribute 25 jet pipes equally throughout the area of the chimney; these pipes point directly up and have an opening of $\frac{1}{8}$ of an inch, through which the steam passes at a pressure of about 75 pounds to the square inch. This plan works admirably, and it was found, by actual measurement, to have nearly doubled the amount of air passing through the air-way. So well pleased was Mr. Milnes with the result, that he has since put up two more boilers and increased the number of jets to 45, with proportionate effects.

In an answer to a recent correspondent, you truly remark that, where ventilation depends exclusively on a fire, it cannot be regular. There are other causes besides those mentioned by you, that operate against the furnace system. It is well known that no chimney will draw as well when the atmosphere is dull and heavy as it will in clear weather. This is one of the principal causes of explosions in mines, as they almost invariably take place during the former state of the atmosphere; for instead of having an increased ventilation at such times (which they should have, as the air is not so pure), it is dimin-

ished in consequence of the chimney not drawing. The explosive gases accumulate in such weather, and the workmen are either compelled to leave the mine or run the risk of an explosion. With the steam-jet system, as it is adopted by Mr. Milnes, this is all avoided, as the ventilation is under the perfect control of the proper persons. Should it become necessary to increase the draft, all that is to be done is to increase the pressure of the steam, and it is accomplished. Mr. Milnes assured me, a few days ago, that it would have been impossible to have carried on his works during the greater part of this Spring, had it not been for the steam jet, as the weather has been very bad for ventilation.

R. ALLISON.

Pottsville, Pa., May 30, 1860.

HINTS TO IMPROVERS OF COTTON GINS.

MESSRS. EDITORS:—Having read several articles in the present volume of your valuable paper (pages 212, 246, 278 and 292) in relation to the process of ginning cotton and the construction of cotton gins, I will take the liberty of throwing out a few hints for the benefit of those now engaged in making experiments with a view to supersede the old saw or Whitney gin. I am well aware there are many good roller gins now made for the purpose of ginning Sea Island cotton, but as that kind of cotton commands from 30 to 50 cents per pound, the planter can afford to operate a machine that is or may be capable of turning out only 150 to 200 pounds of lint per day; but he could not use that kind of a gin for his Upland cotton, which (as a general rule) will not bring more than 10 cents per pound in the market; hence the almost universal use of the saw gin. A good 60-saw gin, driven by four mules, will turn out from three to four bales of Upland cotton per day—averaging 500 pounds each. In producing a gin for general use, to supersede the Whitney, the questions to be taken into consideration by the inventor are: "Can I get up a machine that will turn out as much lint per day as the saw gin? if not, will the superior quality of the lint or staple induce the planter to throw aside the gins now in use? and further, can they be adapted to the gearing, power, building, &c., now in use? and last (but not least), can or will the negro understand and operate the machine as readily as the saw gin?" Now, if any of the numerous readers of the SCIENTIFIC AMERICAN can make or have already produced a machine that can gin from three to six thousand pounds of seed cotton per day, and the lint be worth one cent per pound more than that ginned by a saw gin, and the machine requires no greater number of hands to operate it, no more power to drive it, and costing no more than the Whitney—then I will say (with your correspondent, "A. J. H.,") that the fortunate inventor will soon own plantations and gin his own cotton as it ought to be done.

H.

Camden, N. J., May 28, 1860.

AGRICULTURAL CAPACITIES AND CLIMATE OF WESTERN TEXAS.

MESSRS. EDITORS:—On page 243 of the present volume of the SCIENTIFIC AMERICAN, under the head of "Steam Plowing in Texas," Mr. D. M. Richings, after speaking very highly of the whole State for general agricultural purposes, says, of western Texas, that "owing to the drouths that annually visit that portion of the State, it cannot be said to be at all calculated for planting or farming." Mr. Richings has probably been led into this error, not by his own observation, but by the representations of people residing in other parts of the State, where there is a prevailing prejudice, as is common in all new and rich countries, in favor of their own locality above all others. The fact that there is not so much planting and farming done in western Texas as in other parts of the State, is calculated to foster these impressions. But there are two more obvious reasons for it. One is because the country is not as fully settled—the other, that the present inhabitants are satisfied with more profit from the spontaneous productions of the earth, without labor, than they can make anywhere else with all the labor at their command.

The agricultural readers of the SCIENTIFIC AMERICAN, I presume, would like to know why planting and farming cannot be done to advantage where the most luxuriant grasses grow spontaneously, of the richest species, at all seasons of the year, of some variety or other. There is scarcely any vegetable growth of the farm that requires more rain or moisture than a heavy crop of grass, such as grows in western Texas every year. This fact is known