PLACES VISITED BY COLUMBUS IN THE WEST INDIES.

The apparently exhaustive investigations which have been prosecuted within a few years past into all the details connected with the discovery of America by Christopher Columbus still leave much to be desired in the way of full and accurate information, such as is now everywhere sought, as we approach the four hundredth anniversary of that momentous event. There is no question, however, of the identification of the localities shown in our first page pictures, and their close association with the name and the doings of Columbus in all his voyages, which has made them memorable from that day to this. The pictures are from sketches drawn by our artist during a visit made a few years ago to these interesting localities, and offer a striking contrast to the scene which presented itself to the Spaniards on their first landing—their eyes meeting pictures of a wild luxuriance of tropical vegetation and dense populations in almost childlike helplessness, while the landmarks they left have to-day a mediæval appearance and a worn-out aspect suggestive rather of ancient than of modern history.

Four of the pictures are of Santo Domingo scenes, including the old fort, the ruins of the house built by Diego Columbus, and the cathedral where it is certain the body of Columbus long rested, and where it is claimed the remains now are. The city is on the right bank of the Ozama River, at its mouth, looking southward toward the Caribbean Sea. It is the oldest existing city founded by white men in the new world and was originally called New Isabella. Its population is at present about 6,000, and the ancient houses, such as are still standing, are remarkable for their solidity. Baracoa, where Columbus first landed in Cuba, and of which two views are given, is on the north side of the island, near its eastern end. The harbor is small but deep, and back of the town are high, craggy mountains of curious shape, the highest of which is called the Anvil of Baracoa. The houses are built of adobe, and the place is the center of a large fruit trade with the United States.

Columbus discovered the island of St. Domingo, or Hayti, on his first voyage. Exactly what land he first sighted in the early morning of the 12th of October, 1492, or about midnight between the 11th and 12th of October, has been a matter of a great deal of discussion. Five different islands are claimed as the locality of the first landing—Grand Turk, Mariguana, Watling, Cat, Samana—and in regard to none of them is the proof absolutely complete. On the third day, however, October 14, he lifted anchor, and for ten days sailed among the smaller islands of the archipelago. The Cuban coast was first struck on October 28, and then that of Hayti, on the northern side of which the ship of Columbus was wrecked, and out of her timbers was built a fort called La Navidad, where some forty of his men were left. With the rest of his company and the two smaller vessels the return voyage to Spain was commenced on January 4, 1493, Palos being reached March 15. The enthusiastic reception that was accorded him by the court and the people, the high-sounding titles with which he was honored, and the great excitement which his discovery aroused in all parts of Europe are familar to all, though it requires no little study and discrimination to understand just how the reports spread abroad about the new-found world presented themselves to different investigators.

The second voyage was commenced on September 25, 1493, when seventeen vessels, having on board some twelve hundred souls, set sail from Cadiz, Columbus this time being accompanied by his brother Diego and a number of persons of some distinction. On November 22, when La Navidad was again reached, it was found that the fort had been burned and the colony dispersed. A new settlement was at once begun, expeditions were sent inland to find gold, desultory mining operations were commenced, and twelve of the ships were sent home with captive Indians and products of the soil, Columbus himself continuing his explorations with three caravels, and discovering the island of Jamaica. At this time he supposed that Cuba was a part of the mainland of Asia, and forced his men to sign a paper to that effect. The government of Columbus over the new territories was unfortunate in many respects, and the adventurers who constituted the larger portion of the Spanish colonists were very turbulent, seeking mainly to find gold, and treating the natives with great harshness. Many charges against the management of Columbus were made to the home government, and he returned to Spain to answer them in June, 1496. He was received kindly at court, and, although enthusiasm in the new lands was declining, public funds were readily provided for another venture.

Columbus sailed from San Lucas, on his third voyage, May 30, 1498. He discovered Trinidad July 31, and skirted the northern coast of South America a short distance near the mouth of the Orinoco, thence returning to Hayti, when he found his colonists had established a fortified post and founded the town of Santo Domingo, his brother Bartholomew ruling there in his absence, and being succeeded by another brother, Diego. Detractors at home continuing to criticise Columbus, Francisco de Bobadilla was sent out to supersede him, arriving at Santo Domingo August 23, 1500, when Columbus and his brother were arrested and sent back to Spain in irons. This degradation caused a tide of feeling in his favor again, and a fourth expedition was readily provided for, although it was determined that Columbus should not again assume the government of the islands.

Columbus sailed from Cadiz on his fourth and last voyage, May 9, 1502, with four vessels, arriving at San Domingo June 29. On July 14 he sailed westward to find, as he supposed, the richer portions of India, naming many places which have been since renamed, and making a landing, August 14, on the coast of Honduras, thence following the coast down to Costa Rica, Columbus being ill in bed a great deal of the time. The natives here wore gold plate on their necks, and from a town called by the natives Veragua the descendants of Columbus years after borrowed the ducal title of his line. Columbus traced the Gulf side of the Panama Isthmus, little thinking how narrow a stretch of land separated him from the great ocean which lay just ahead of him before the real India was to be reached, of which he thought he had found a portion. There being indications of gold, from the articles made of the precious metal found in the possession of the natives, Columbus attempted to found two colonies on this coast—efforts which had to be abandoned on account of quarrels which arose with the natives—and on May 31, 1503, he sailed northward to Cuba and thence to Jamaica, where he beached his old and unseaworthy vessels in the harbor of St. Anne's Bay, in a small inlet still called Don Christopher's Cove. A year of disappointment, grief, and want followed, Columbus clinging to his wrecked vessels, and his crew mutinying and roving about the island. His needs were tardily supplied, but finally vessels were sent for him and his companions, and they were brought to Santo Domingo, where Columbus remained until his final departure for Spain, September 12, 1504. He reached San Lucas on November 7, lay ill for a time at Seville, and was received at court with but scant courtesy in May, 1505. While still hoping for a further commission to explore and govern new colonies in the seas over which he had four times sailed, the infirmities of age and the hardships he had endured brought him to his end on the 20th day of May, 1506, aged 70 or 71 years, the best authorities differing to this extent.

Diego Columbus, the ruins of whose house are shown in one of the views, succeeded to the governorship of the island in 1508, and his house was so strongly built that complaints were made that he was constructing a fortress, with the intention of declaring himself independent of the authority of Spain.

After the death of Columbus, at Valladolid, his remains were transferred to the Carthusian monastery of Las Cuevas, Seville, but they were exhumed not later than 1541, and taken to San Domingo, where they were interred in the cathedral, shown in one of the views. It was the wish of Columbus to be buried in this island, but the cathedral was not completed till 1540. In 1795 the town came into possession of the French, and the descendants of Columbus had permission to remove the relics to Havana, for interment in the cathedral there. The vault was somewhat hurriedly opened, however, and, although the after ceremonies were conducted with great state and ceremony, it is claimed that the remains thus transferred were those of Diego, the son, while the genuine remains of Columbus were left undisturbed in the cathedral at San Domingo. The matter has been the subject of a great deal of controversy, but cannot be said to have been satisfactorily settled.

The Electrification of Steam Jets.

In December, 1890, Mr. Shelford Bidwell exhibited some striking experiments before the Physical Society on the electrification of steam jets. The image of a jet was thrown upon the screen, and was seen to be practically transparent. Upon the jet being electrified, however, the image became immediately dark and dense. Mr. Shelford Bidwell stated that he had examined the absorption spectrum of the jet, and that when unelectrified there was very little action, but that electrification caused a total disappearance of the violet. He concluded that the observed effects were due to electrification increasing the size of the water particles contained in the steam jet. In a paper read before the Royal Society in March last, Mr. John Aitken traverses this conclusion, and enumerates a large number of facts tending to show that the dense form of condensation is not due to an increase in the size of the drops, but to an increase in their number accompanied by a diminution in their size. Lord Rayleigh's experiment showing that it is only very feeble electrifications which cause water drops to coalesce, while strong electrifications have the diametrically opposite effect, is also cited in support of the author's contention. Mr. Aitken remarks that it has been generally stated that the effect of the electrification is sudden and marked. If, however, the discharging point is extremely fine, or if we assist the discharge by means of a flame, then we may begin with electricity of a very low potential, and the increase in the density of the jet may be made to begin by almost imperceptible degrees.

Notes on Color.

The colors of the spectrum are arranged in a particular order, and this is found to be in the order of their wave length. Most of us at some time or other have been on the sea, or by the sea, and have noticed the waves rolling, one after the other, sometimes in quick succession, with only a few feet between the highest points of their consecutive crests, in other cases many yards between. Thus, as we note the quick and short waves, the length of the wave being taken as an imaginary straight line measured from crest to crest, and slow and long waves on the sea, so we find with light long and short waves; but it must not be supposed for one moment that the length of the waves of light are anything like the length of the waves of the sea. We have here to do with waves of almost infinitesimal length, yet these minute wave lengths have been accurately measured, and the results are expressed in "tenth metrets," or ten millionths of a millimeter, which is sometimes expressed as $\frac{1}{10^{10}}$ meters, or as $\mu\mu$. A millimeter is about one twenty-fifth part of an inch. In the spectrum the colors are arranged in the order of their wave length, beginning with the long waves of red, and passing gradually to the short waves of the violet. Unfortunately we find one defect consequent on the use of a glass prism, and that is that it compresses the space occupied by the longer wave lengths and unduly elongates that occupied by the shorter. To avoid this defect it has been customary to use, instead of the prism of the spectroscope, a diffraction grating, which is a sheet of glass or metal ruled with an exceeding great number of fine parallel equidistant lines; thus Professor Rowland has ruled concave diffraction gratings with 43,000 lines to an inch without an appreciable periodic error of one hundred-thousandth part of an inch; with these reflection or diffraction gratings a spectrum is obtained, which is called the normal spectrum, in distinction to the prismatic spectrum, or that yielded by prisms, and in the normal spectrum the colors will be arranged in equable manner with reference to their wave length.

The spectrum is supposed to be divided into 1,000 parts.

THE NORMAL SPECTRUM.

	Parts.
Red	330
Orange red	104
Orange	25
Orange yellow	26
Yellow	13
Greenish yellow and yellow green	97
Full green	87
Blue green	16
Cyan blue	51
Blue	74
Violet blue and blue violet	117
Pure violet	60
	1,000

If the room in which our spectrum is formed be well darkened, and we shut off the visible spectrum by receiving it on a piece of dead black paper, with very careful observation we can observe a continuation of the spectrum at each end, that beyond the red being a very deep red, or rather a chocolate, that beyond the violet a faint gray; the former are termed the infra-red, the latter the ultra-violet.

The existence of these invisible rays may be confirmed by two very simple experiments. Thus, by taking the infra-red first, we can prove their existence by moving a thermopile and galvanometer from the violet to the red end of the spectrum; as the thermopile advances along the spectrum the needle of the galvanometer will be deflected from zero, its normal position, more and more, till we pass beyond the end of visible red, when it reaches a point of maximum deflection and then gradually goes back to its original position. The existence of the ultra-violet rays may be proved in a somewhat different manner. It is easiest proved by using a solution of sulphate of quinine in dilute sulphuric acid, and diluting with water, or else by using an alkaline solution of æsculin—an active principle obtained from the horse chestnut. Having made our solution, it should be placed in a thin, white glass vessel, such as an ordinary test tube, and entering our darkened room, let us see what happens if we hold the test tube in the various colors of the spectrum. In the red, it appears red; in the yellow, yellow; in the green, green; in the blue, however, our solution begins to appear a peculiar bright blue, which increases as we pass through the violet, and still continues visible after we have left the violet and passed into the space where we suppose the ultra-violet rays to reside. Nor is this appearance visible only in the darkened room, but if the tube containing our solution is held in bright sunlight against a piece of black velvet, and looked at, not through, the peculiar blue shimmer, which is termed fluorescence, is plainly visible.—*Amateur Photographer.*

Diligence in Business.

In these days of hurry and strife for the first places in the race of life it is even more important than in former years that a man be diligent in his business and look after its every detail closely.

We see among our greatest business men of to-day those who started in life as poor boys and who have now become the heads of large establishments. How have they come to do this? Was it because they had better chances than are now held out to the average young man? That has not been so in the majority of cases, but they have striven after their high positions and have endured hardships to overcome obstacles. They have been diligent in business, and are now reaping a richly deserved reward.

In some respects it may be harder for a young man, or, in fact, any man in business, to make a great success, because of the amount of competition that has to be met. It needs men who will not give up for anything to battle against this competition.

Close attention must be given to the slightest details, and everything has to be done carefully. The cost must be measured in every transaction. Application is necessary if you would attain the best results.

Look out for the little things. They do not seem to count at the time, but every item helps to count up on either side of the balance sheet. By that it is not meant that one should be close, but he should be careful.

The "tricks of the trade" ought to be let alone. They do not help any in the long run. If a customer finds that he is not being treated fairly, he will leave in an instant. It is fair to say that there is very little underhanded business being done. It does not pay, and business men have come to see it.

Give all you can for the money, and you will hold a customer and gain others. Don't run down another man's stock in order to make a sale. If your neighbor has poor stock, the customer will find it out if he tries. Business men should work together as much as possible and try to make the standard of business principle as high as possible.

Let a man start out with fixed principles and with determination to win by the practice of fairness toward all, and he is bound to succeed. He needs to look out for his business and see that those under him are as honorable in every way. A man who does that will find friends both with customers and fellow business men.

All lines of business must be run systematically in order to attain the best results. It will not do to let one thing after another pile up until one is literally snowed under. It is best to go through with every thing in a systematic manner. Take up each item in its regular order and work while you work. Recreation that is taken when you are conscious that you have done the work of the day faithfully is always sweetest.

Always be on the lookout for chances to improve methods in business and keep up with the times in all lines. There are new articles coming up continually. Some of them possess merit and some do not. It is a study by itself to find out which are the best to handle. Much may be gained or lost in this respect.

There are numerous ways in which business must be watched. One must love the business he is engaged in, and seek to make it all that it should be. The mark of excellency cannot be placed too high. Reward for his labors is sure to come to the diligent man, and that was well known in the time of Solomon, who said: "Seest thou a man diligent in his business? He shall stand before kings; he shall not stand before mean men."—*Stoves and Hardware.*

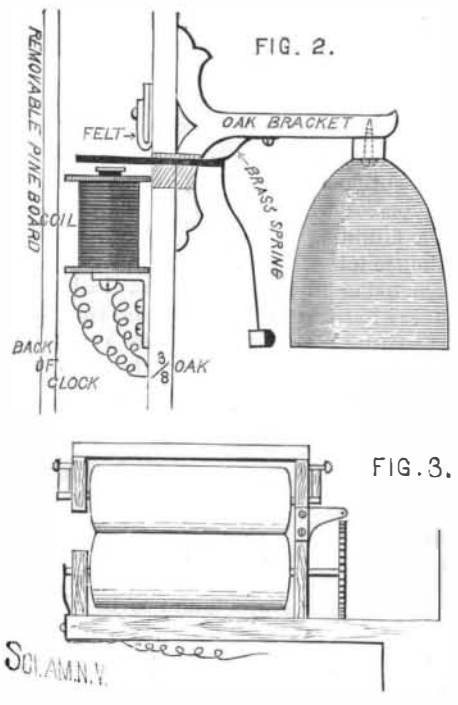
BOILS.—Dr. M. Spehn recommends very highly, as far superior to all other treatment, the use of chloral externally in this troublesome class of affections. He directs that the boil be kept covered with a tampon of cotton-wool soaked in the following solution:

℞ Chloral hydrat..... 3 iiss.
Aqua,
Glycerin.....aa f 3 v.—M.

—*Amer. Med. Mag.*

CLOCK WITH ELECTRIC CHIMES.

We give an engraving of an electric chime clock made by one of the readers of the SCIENTIFIC AMERICAN, after instructions given in our issue of May 21, 1892, the builder of which informs us that it works well and gives him a great deal of satisfaction.



Figs. 2 AND 3.—DETAILS OF ELECTRIC CHIME CLOCK.

Owing to the fact that the bells procured by him were too small to receive the electro-magnets, he placed them outside of the bells, in the manner illustrated in Fig. 2, the bells being suspended from brackets attached to a board at the back of the clock, the electro-magnets being secured to the rear surface of this board. The armature lever is attached to a spring, which serves as a pivot, and also retracts the armature after it has made a stroke. A small disk of felt is secured to the pole of the magnet and a loop of felt is attached to the back board. The armature plays between these two pieces of felt, and is, therefore, noiseless in its operation. The upper roller of the pair which moves the perforated paper is supported in an overhanging frame, as shown in Fig. 3, so that an endless piece of music can be slipped between the rollers and played over and over.

The clock movement is an 8-day lever movement. This, being a compact form of clock, affords ample room for the favorable disposition of the bells and machinery. The case is of very neat design, made entirely of quartered oak, well filled and finished. The glass doors and sides are beveled. Taken altogether, it is as fine a piece of hall, dining room, or parlor furniture as one would wish to have.

We regret that the maker of this creditable piece of work insists upon withholding his name. His reason is that he has found by experience that when he furnishes a popular article to the SCIENTIFIC AMERICAN he requires a secretary to reply to the almost endless number of queries which such an article provokes.

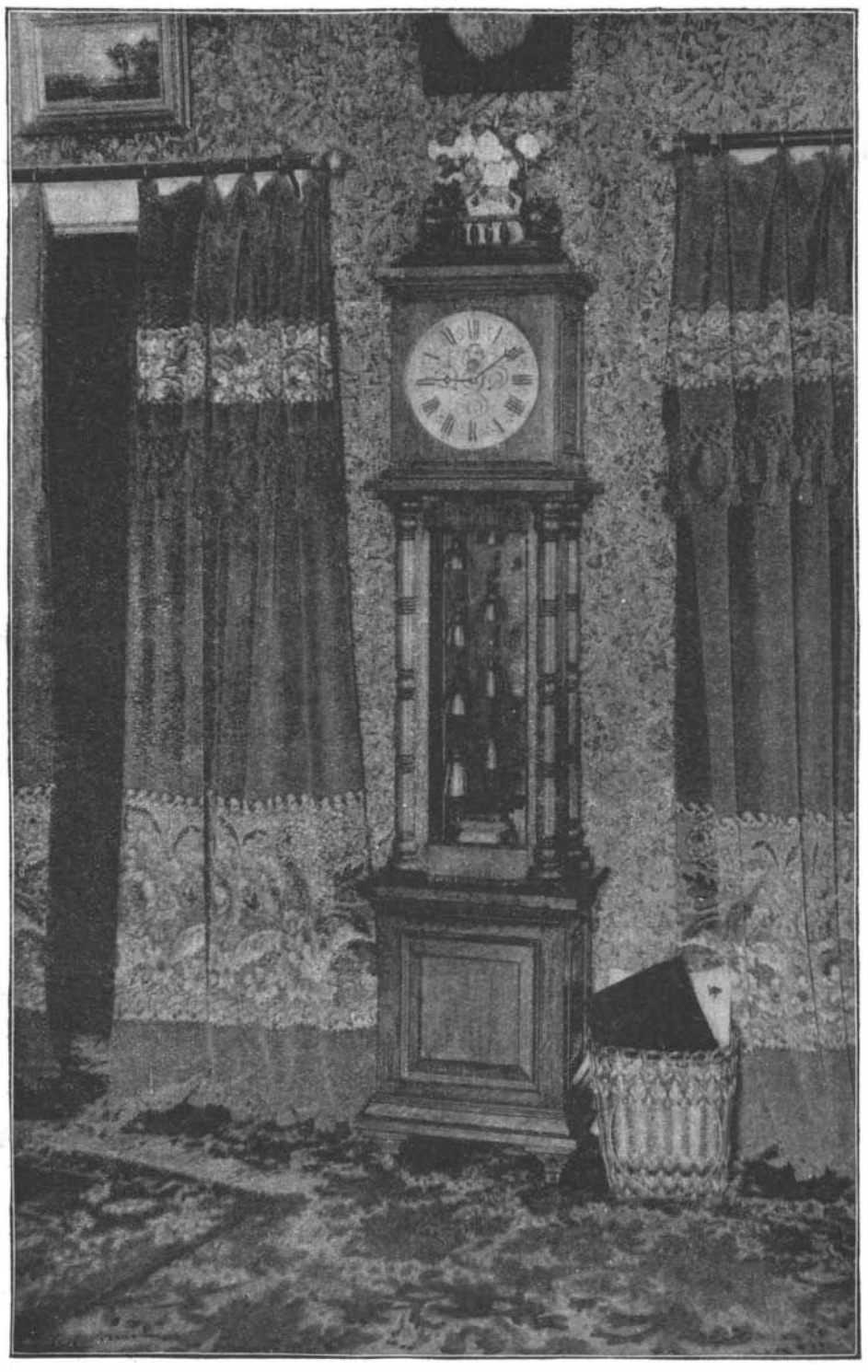


Fig. 1.—ELECTRIC CHIME CLOCK.

Saccharin in a New Role.

This new substance is growing in importance in proportion as new uses are being discovered for it, and this is of constant occurrence. The fruit-preserving industry has been hitherto checked by the association with microscopic organisms attached to the skin of some fruits, and which, when brought in contact with cane sugar, is apt to ferment the latter. To prevent this chemical action, fruit bottlers have found it necessary to add an excess of sugar, or to raise the fruit to a high temperature, to kill the germs of fermentation. Both processes are attended with injury to the flavor of the fruit, and it has been recently discovered that this result can be prevented by the use of saccharin. When used alone it is claimed that perfect sterility is secured by simply raising the temperature of the bottled fruit to 180° Fah. for about two hours and a half. The proper proportion of saccharin for this purpose is one and one-fourth ounces to four gallons of water. It is claimed for this process that it preserves the flavor as well as the color and form of the fruit better than the old method of preserving with sugar. This discovery comes to us so well indorsed that we hope those of our readers who are interested in the subject will test it and report results. If it is all that is claimed for it, it is a discovery of no little importance, or, at least, is worth trying.—*Confectioners' Journal.*

Cold Storage for Salmon.

It is well known that by arrangement among the salmon packers on the Pacific coast the catch of salmon has been restricted to the requirements of the market under existing conditions, says the California *Fruit Grower*. Better facilities for preserving the fish are now being realized, with the result that this delicious food fish is likely to find a much wider distribution in a fresh state than ever before. Late dispatches from Victoria, B. C., announce that a cold storage system has lately been completed by San Francisco parties for the Cunningham cannery on the Skeena River. Into these refrigerators the fish are placed as soon as taken from the water and subjected to a temperature of 20° below zero. Here they remain six or seven hours, and are then removed to another room with a zero temperature, where they are held some two weeks, and then hermetically sealed in cases for shipment. The general introduction of cold warehouses adjacent to the fishing grounds is destined to effect a notable change in the salmon industry, enabling canners and others to utilize the heaviest runs, instead of being restricted in their catch to the number they are able to use up from day to day. The fish may now be caught in larger quantity and stored in cold rooms for future treatment in the intervals between large "runs."

AN electric flying machine was recently made to rise 70 feet and fly about 400 yards.