

Correspondence.

A SLIGHT ERROR CORRECTED.

To the Editor of the SCIENTIFIC AMERICAN:

On page 125 of the SCIENTIFIC AMERICAN of August 21st is an article headed "A Record Cross-Country Motor-Boat Trip," in which you place the location of dam No. 6 at Rochester, Pa. Dam No. 6 is located about five or six miles below Rochester; while dam No. 5 is located at Freedom, about one and one-half miles above Rochester, and twenty-four miles below Pittsburg. This is a small error, and perhaps need not be corrected. My only excuse is that I am an interested reader of your paper and have a few moments time to spare.

DEWITT HOWE.

Freedom, Pa.

A HEAT PARADOX.

To the Editor of the SCIENTIFIC AMERICAN:

The fact can be discovered by the physical experiment, that if a conducting rod is heated, and then partly cooled very rapidly, the quick cooling will increase the temperature of the still hot adjacent section.

Therefore, a paradoxical phenomenon of heat being directly generated by cold can be demonstrated, which depends on the conductivity of the rod and the proportion of the part cooled.

The degree of this increase of temperature is directly proportional to the heat of the rod and the degree and the quickness of the cooling.

Force used by the heating, in expansion, is retransformed into heat, of rapid contraction, by quick cooling, and is conducted along the rod faster than the cold, it being yet partly hot, and increases it in temperature that can be measured, which proves that force from the rapid contraction caused by the quick cooling is conducted along the rod as heat.

Lucerne.

A. F. WOOD CHENOWETH.

EARLY SUGGESTIONS OF INVADING ENGLAND BY BALLOON.

To the Editor of the SCIENTIFIC AMERICAN:

The recent crossing of the English Channel by M. Blériot has aroused worldwide attention. It may be interesting to know that in June, 1803, Boulard and Le Campion, two French cartoonists, predicted the invasion of England by a balloon. Boulard's drawing is entitled "La Thilorière or the Descent on England. Design for a Montgolfière (balloon) capable of carrying 3,000 men and which will cost only 300,000 francs. There will be fixed to it a lamp which will give out a volume of flame sufficient to prevent its cooling. Extracted from the Publiciste of Thursday, 13 Prairial of the year XI. [2 June, 1803.] Paris, chez Boulard, No. 175 Rue St. Denis, etc." Campion's picture, designed and engraved by Echard, is called "The Tower of Calais, new aerostatic machine constructed by M. Romain by order of the government, to cross from France to England in conjunction with M. Pilatre de Rozier." A third and still more curious plate shows the invasion of England as carried out by the combined operations of warships, flat-bottomed boats, and balloons of all shapes and sizes, while cavalry and artillery approach Dover through a subterranean passage. A glance at these cartoons, which are reproduced in Messrs. Wheeler and Broadley's interesting work entitled "Napoleon and the Invasion of England," shows that the Frenchmen of that period had some gift of prophecy, fanciful though it was. Although no airships have been built to carry 3,000 men, still Zeppelin's exploits come close to realizing the dream of the French artist.

GERALD ELLIS CRONIN.

Brooklyn, N. Y.

SHEET LIGHTNING.

To the Editor of the SCIENTIFIC AMERICAN:

In connection with Mr. A. A. Graham's letter in the issue of August 28th, 1909, I would like to say that the facts at our disposal at the present time would seem to indicate that sheet lightning is to be expected at high altitudes.

First. The atmosphere is very rare.

Second. It is probable that the atmospheric dust, if not wholly lacking, is present in but small quantities, of the lightest material.

Third. The temperature is low and the clouds are very apt to consist of minute ice crystals.

If it is correct to reason from the laws governing the discharge of an induction coil, we may draw the following conclusions:

Likening the chain lightning to the so-called spark of the coil, we can safely say that such a discharge is unable, owing to the lack of dust, to form an incandescent path.

If the sheet lightning is compared with the brush discharge of the coil, the following facts are brought out:

The thinness of the air would tend to produce sheet lightning.

The clouds of ice crystals, having insulating properties, would perhaps act in much the same way as a

piece of varnished cambric placed between the terminals of a coil.

Such discharges would be noiseless.

In conclusion, I would like to ask if any of your readers have satisfactory explanations of the coloring (violet to yellow) of lightning flashes.

Pinebur, Miss.

W. H. DUNN.

LATIN-AMERICAN TRADE.

To the Editor of the SCIENTIFIC AMERICAN:

Do you know that the total foreign trade, exports and imports, of the twenty-one republics, including the United States, in 1907 was \$5,500,000,000?

Do you know that of this, the share of the twenty Latin-American republics was \$2,077,000,000?

Do you know that these figures show that Latin America does more than one-third of the total commerce of the American republics, divided as follows:

Exports to foreign lands.....\$1,072,000,000

Imports from foreign lands..... 1,005,000,000

Do you know that further analysis of these figures shows a total foreign trade between Latin America and the United States of \$558,000,000?

Do you know that this total represents only about one-fourth of the total foreign trade of the sister republics of the United States, divided as follows:

Exports to the United States.....\$318,000,000

Imports from the United States.. 240,000,000

Do you know that these figures show a balance of trade against the United States of approximately \$78,000,000 a year?

Do you know that the Latin-American countries bought last year from other nations than the United States \$756,000,000?

Do you know that from the United States these countries purchased only \$240,000,000?

Do you know that Latin America purchased more than three times as much from other countries as she did from the United States?

This demonstrates the great possibilities of trade development for the United States in Latin America.

John Barrett, in a speech before the Trans-Mississippi Commercial Congress in San Francisco, October 6th, 1908, said:

"Without unwarranted enthusiasm, let me point out to you my confident belief that the next ten years will be a Latin-American decade—that all the world will be then studying and watching Latin America as it now does Japan and the Orient, and that a material, economic, intellectual, and political advancement will be witnessed in Latin America which will rival what has been accomplished in the United States. Were it not for the lamentable ignorance which prevails throughout the United States in regard to the peoples, institutions, resources, and governments of this section of America, this statement would not seem in the least surprising. Those of us who have traveled from Cuba to Chili and from Brazil to Bolivia are keenly aware that this great onward movement has already begun, and that Latin America has entered upon a new era of splendid activity and world-wide influence.

"Twenty republics varying in size from the area of Brazil, which is larger than that of the United States proper by 200,000 square miles, to Salvador, the smallest, which would take in Rhode Island six times over, having a combined population of nearly seventy millions, and a foreign commerce valued at more than \$2,000,000,000 per annum, are going ahead so rapidly that no man can safely prophesy the limit of what they will accomplish during the next ten years. Gifted with a variety of climates and of resources, blessed with a marvelous intermingling of cool plateaus and tropical lowlands, provided with vast navigable river systems and long extent of accessible coast line, supplying numerous important products which the rest of the world must purchase, and possessing great mineral wealth and a people of deep sympathies and high intellectuality based on an old and worthy civilization, they all challenge our best study and keenest appreciation."

I am indebted to the International Bureau of American Republics for the above data.

New York, N. Y.

ALFRED J. THOMPSON.

TREES AS WITNESSES IN EARLY SURVEYING.

To the Editor of the SCIENTIFIC AMERICAN:

Your very interesting account of "Making a Tree to Speak," in the issue of the SCIENTIFIC AMERICAN of August 14th, is rendered more complex in Pennsylvania than in the West for two reasons: First, by the system of surveys, or rather the lack of system in the early surveys; and second, by the fact that they are much older, and consequently much harder for a surveyor to determine. Throughout northern and eastern Pennsylvania the surveys were made at dates varying from 1749 to 1804. The earliest surveys were isolated tracts, usually taken up by settlers, and surveyed by authority of warrants granted by the Proprietors to the applicants, and executed by a deputy surveyor, to whom the warrant was directed. About

1767 explorations were made by agents of the Proprietors of the river valleys, and in 1769 large areas were sold to settlers, and the lines run and marked upon the ground by what Mr. Cooke calls the "blazed line," or by chopping off a small slice of bark from the opposite sides of the trees which the surveyor passed. The corners of the surveys were usually marked by cutting three notches in the corner tree in the direction from which the surveyor approached it and on the side from which he left it. Besides this corner tree the surveyor marked other trees standing near by, with three notches on the side facing the corner tree, and called witnesses. These surveys of 1769 were located in the river valleys, and generally at the mouth of some stream of considerable size, affording abundant water power as it came to the river. In 1772 the surveys were extended up the smaller streams, sometimes for long distances, taking the land which was deemed tillable, and this plan was followed until 1789. At this date there arose a great demand for the lands, and large bodies were sold by warrants to the applicants, who had them surveyed; and frequently the surveyor had no regard for the previous surveys, and laid the new warrants on top of the older ones. In the year 1793 a company known as the Holland Land Company took warrants for thousands of acres located in the northern part of the State, and sent surveyors to make the location. Again these surveyors paid no attention to any of the former surveys, and used the same style of marking as had previously been used by the older surveyors. In 1802 to 1804 the surveyors from the State of Connecticut, claiming under the original charter granted by the King of England, "extending from the Atlantic to the Pacific," came into the State and began their surveys, and again used the same system of marking, paying no attention to any of the former surveys. This act led to what is termed in history the Pennimite and Yankee war, which later, by the decree of Trenton, decided that the Connecticut settlers should hold seventeen townships in Luzerne County, but that the State of Connecticut should release all its claim to other parts of the State of Pennsylvania.

Now, after the lapse of from one hundred and seven to one hundred and sixty years the surveyor finds difficulty, with the full meaning of the word, in determining how these old surveys were located. The timber in many places was removed before the lines were fully settled, and where it remains it requires a great amount of skill on the part of the surveyor to detect the traces of the ax-marks in the bark of the trees, and still more skill to count the rings, to determine to which set of surveys the mark belongs. This difficulty is increased by the fact that the old surveyors were careless in their locations, and occasionally the marks are found as much as two miles from where they purport to be, and the courts hold that the monuments on the ground are the controlling factor in making the location.

To show the importance of "making a tree speak" to determine a location, a surveyor recently had occasion to retrace the lines of a survey made sixty years ago. The corners were all obliterated. Some had been trees, some were called "stones," and one was called a "pine knot." A dispute arose over the location of the pine knot. A surveyor was called, and after trying in vain to locate the pine knot from the other corners as called for, came upon a marked line tree bearing the date of this particular survey, and traced it out until he came to a point where tradition said the other line of the survey came to the pine knot. Making search, he found a marked tree on that line, and bringing the two lines to an intersection on the bearings called for, was preparing to set a permanent monument, when a workman dug up a piece of wood. On examination this proved to be the pine knot in question. By removing the accumulation of decayed wood and dirt, the notches with which it had been marked were so clearly discernible that the location was settled.

Different kinds of timber show a variety of ways of healing over the cut, and some become so overgrown in a few years that they are more difficult to determine than some other species after a much longer period. The various species of pine lose the marks in a few years, where they are of rapid growth, because the bark shells off. Some species of oak and the hemlock will hold a mark for a long time, and frequently it is found that the marks show very plainly after a lapse of over one hundred years. In the Connecticut survey above referred to, some corners were trees on which Roman numerals were cut, and yet after a lapse of over one hundred years the letters can be found in the old wood of the tree by cutting away the new growth, which has closed over the flattened surface where the numerals were cut. So, taking it all, the trees do speak, and tell an indisputable story, and stand as silent witnesses to the hardships of the surveyors of that early day in climbing over the mountains and leaving their trail in the timber to be found by future generations.

Millville, Pa.

BOYD TRECOTT.