nesian race, having straight hair. They are tall, well formed, and vigorous, much addicted to war, yet not characteristically savage. Rev. Mr. Doane of Ponape describes the Rukite as of "a soft saffron tinge, his form symmetrical, limbs round, and of good length between joints, step easy, eye round, black, and lustrous, not dimmed by the use of ava or toddy from the cocoanut-blossom, lips rather thin for a Micronesian, hair wavy and long. I thought him a fine-looking native. Some of the women are quite beautiful." The islanders are skilful in navigating their proas, which are fitted with outriggers; and they often make long voyages without compass, though not infrequently a boat-load is drifted away, and is lost. The people throughout the islands formerly tattooed themselves, a custom which is rapidly passing away. Their houses are simply roofs on posts about four feet from the ground. In these attics they sleep with a wooden pillow and a mat covering. Until recently, there was little clothing seen on men or women. There was no marriage-rite known, though the pairing of men and women was respected. Each of the Micronesian groups has a distinct language, and within the Caroline islands the variations are more than dialectic. There are at least six or eight distinct languages within the group.

The Caroline islander as found, was not an idolater, though full of superstition. He had neither images nor temples, though certain places were avoided because he believed that they were inhabited by spirits. In a few places priests were found whose aid was sought in curing the sick. As to the government of the islands, there has been hitherto no attempt on the part of foreign powers to exercise control over them. Each island has its chief, who is absolutely independent, though sometimes controlled by a council of the people. His authority is hereditary, and is derived in the line of the mother. On a few of the islands, there is more than one tribe, in which case each division is ruled by its own chief. There is no confederation known throughout the group.

A remarkable change has been effected in the islands within the last generation. In 1852 American missionaries, under the care of the American board of foreign missions, were located on Ponape, and have since occupied Kusaie, Ruk, and the Mortlocks. From these points they have extended their labors through the agency of native helpers to several islands of the group, as well as into the Marshall and Gilbert Groups. There are at present twelve American missionaries, men and women, to be found on the islands, who are aided in their work by the Morning star, a barkentine with auxiliary steam-power, which enables them to visit the islands, and locate the native helpers. On its present voyage this vessel is expected to land teachers on the island of Yap. Since the landing of these missionaries, the whole condition of society on many of the islands has been entirely changed. In some places the whole population is found in schools; and on most of the islands occupied by Christian teachers the people are respectably clad, and are accepting the civilization and religious truth offered them. Within Micronesia the missionaries have under their care more than forty churches, with over four thousand church-members.

As to the question of the sovereignty of the Carolines, which is now in dispute between Spain and Germany, it may be said that, though Spain may claim possession on the ground of prior discovery, she has not for three centuries enforced that claim, or occupied any of the islands, unless it may be a single one nearest her Philippine possessions. Germany has no claim save on the ground that a dozen traders, more or less, have taken advantage of the improved condition of affairs, due to the labors of American missionaries, and have carried on a small trade in the dried fruit of the cocoanut. The interests of civilization and humanity do not require that either of these nations should assume control.

E. E. Strong.

SCIENCE IN COMMON SCHOOLS.

Bones.[1]

Bones are the framework of the human body. If I had no more bones in me, I should not have so much shape as I have now. If I had no bones in me, I should not have so much motion, and grandma would be glad; but I like motion. Bones give me motion, because they are something hard for motion to cling to. If I had no bones, my brains, heart, lungs, and larger blood-vessels would be lying round in me sort of loose-like, and might get hurted; but not much, lest it is hard hit.

If my bones were burned, I should be all brittle, and you could crumble me up, because all the animal would be out of me. If I was soaked in a kind of acid, I should be limber. Teacher showed some bones that had been soaked. I could tie a knot in one. I had rather be soaked than burned.

Some of my bones don't grow snug, and close to my other bones, like the branches to the trunk of a tree do; and I am glad they don't; for if they did, I could not play leap-frog, and other good games I know.

[1] Composition by a boy in one of the lower grades of a New-England grammar school.

The reason they don't grow that way is because they have joints. Joints is good things to have in bones. There are two or three kinds. The ball-and-socket joint, like my shoulder, is the best. Teacher showed it to us, only it was the thigh-joint of a cow. One end was round, smooth, and whitish: that was the ball end. The other end was saucer-like: that is the socket, and it oils itself.

Another joint is the hinge-joint, like my elbow. It swings back and forth oiling itself, and never creaks like the schoolroom-door does. The other joint aint much of a joint. That is in the skull, and it don't have no motion.

All of my bones put together in their right places makes a skeleton. If I leave out any, or put some in the wrong place, it aint no skeleton. Cripples and deformed people do not have no skeletons.

Some animals have their skeletons on the outside. I'm glad I aint them animals; for my skeleton, like it is on the chart, would not look well on my outside.

This composition is an excellent illustration of 'how not to do it.' An illustration of so-called science *teaching*, telling facts to children instead of leading them to find out facts for themselves, of learning instead of the acquisition. In this case the fault lies partly with the topic. A child learns by sight and by touch, not by *faith*. While it is possible for an excellent teacher to illustrate an abstract or an abstruse subject which cannot be seen or touched, so that the child may grasp the essential points, it is not probable that one in a hundred of those now engaged in teaching will do so without too great an expenditure of time. Teachers as well as housewives often fail to remember that children and uneducated persons are able to grasp but one idea at a time. The above composition shows plainly that too many words were used in the attempt to give too many ideas to the child in too short a time.

Professor Hyatt ('Science guide' No. 1., p. 6), has well expressed the creed of those who are advocating elementary science in public schools, when he says, "The idea is not to teach, but to lead the mind to work out for itself the simple physical problems herein described, and thus almost unconsciously to arrive at the conclusions.

"The time spent in making each step is, therefore, of no consequence. The quality of the knowledge gained, and not its quantity, is alone to be considered. This sort of knowledge cannot be given by another to the scholar: it must be gained by work."

The following composition, also the work of a boy in a New-England grammar school, is an example of 'how it may be done,' and done, we venture to say, successfully; for, in clearness and accuracy, it will compare favorably with the answers to examination questions on similar topics written by boys of seventeen or eighteen in our higher schools.

Iron Ores.

This morning the teacher passed each boy three specimens. One of the boys brought his specimens to the desk, and the teacher tried them with a magnet. One of them was reddish, the other was yellowish, and the other was black. The yellowish one and the reddish one we found was not magnetic, but the black one was magnetic. These specimens were all iron ore, from which iron is obtained. From the black ore, we found that the best iron was obtained from it.

We were then told to rub each specimen on a piece of paper. The red specimen made a red mark, and the yellow specimen made a yellow mark. From the other specimen, which was black, the most of us could not make it mark on account of its hardness; but our teacher told us if they were some powder on it, we could make it mark a black streak.

Then the teacher took some small pieces of the yellow ore and put them in a test-tube, and held the tube over the flame of an alcohol-lamp, and each line filled around to see what it formed in the tube, which was water. There was no water in the tube when the ore was put in, therefore it must have come from the ore. This ore is called limonite or bog-iron ore, because it has so much water in it, and is found in wet, marshy places. The name of limonite came from a word meaning meadow.

The teacher then took them out of the test-tube, and tried them with a magnet, and found they were not magnetic. It was proved that they were not pure iron, because they would not stick to the magnet.

We found that these pieces of iron-ore contained iron and oxygen, therefore they were iron oxides. When these pieces were rubbed on paper they made a streak like the red ore. The name of this red ore is hematite, which means blood-red. Hematite is composed of iron, oxygen, and no water; and once it was supposed to be limonite, and the water driven out of it by the heat of the earth.

Teacher then took the pieces of limonite which was heated in the test-tube, and put them in a piece of charcoal, which is a form of carbon, and blew the flame of an alcohol lamp on the charcoal by a blowpipe. After she got the most of the oxygen out of the pieces, she then took them on a piece of paper, and tested them with a magnet, and found the smallest pieces were magnetic, because they were heated the most. The black ore is magnetite, which contains the best iron. ELLEN H. RICHARDS.

The composition on bones, by a boy nine or ten years old, who has been made a subject for science-teaching, illustrates very strongly the dangers that lie in the way of a too early introduction to too difficult matter. It is by no means a bad specimen of the way in which a scientific lecture is reproduced in the young student's mind; it is, on the contrary, a remarkably favorable one. A great part of the information conveyed has been properly assimilated, and made a part of the real furniture of the boy's mind; and it is reproduced with vigor and originality. It is very different from a mere committing to memory of hard names, which might have been the effect; but it has still important warnings to convey.

The wise teacher will always take the examination-papers of her brighter pupils as a sure and searching test of the value of the instruction which she has endeavored to give. There are three plain and easy lessons which she will derive from the one before us. She will shut her eyes to the unchildlike and uncanny air of 'smartness,' — the *gamin*-like quality which is attractive in a French novel, but nauseating in real life in America; and she will attend only to the scientific ideas expressed. She will draw two morals for her next lesson on bones, and one for her scientific teaching in general. She will see that the connection between bones and the general idea of motion is far too difficult to be given to a young child. Hereafter she will tie strings or elastic bands to sticks, perhaps, and show how particular movements may be effected; but she will omit to give principles in regard to the production of motion in general. She will also refrain from calling the bony outside of certain animals a skeleton. Such fanciful extensions of the meaning of popular names will do for older children; but older children can also learn to say 'exoskeleton' and 'endoskeleton,' and the content of a name in a child's mind is a matter which is no more to be trifled with than the logical sequence of ideas. In the third place, the teacher will notice — what she has often noticed before — that it is a hazardous thing to supply a young child with reasons. Facts may be safely given in any amount, so long as they are simple, and such as he could find out for himself if put in the proper circumstances; but reasons should be given as sparingly as possible. He has not yet any means of knowing what kind of a thing a reason is; and it is of the utmost consequence that he should not be hopelessly set adrift on this subject. Probably the most characteristic of all the qualities of the untrained mind is the facility with which it is able to give a reason for every thing that happens.

CHRISTINE LADD FRANKLIN.

THE RESULTS OF THE KRAKATOA ERUPTION.[1]

IN the spring of 1884, Messrs. René Bréon and Korthals sailed from France, under instruction from the minister of public instruction, to explore the island of Krakatoa, and study the effects of the great eruption of Aug. 27, 1883. When they arrived at the bay of Bantam, they gradually passed from islands thickly covered with a tropical vegetation, to those burned and devastated by the rain of cinders and the tidal-waves. Upon Cape St. Nicolas, the cocoa-trees were parched and yellow; and the only signs of vegetable life were the young shoots of the year, which were springing from the tops of the half-dead trees. On the coast of Bantam, the shock of the wave had broken off a reef twenty to twenty-five metres high, and ingulfed it beneath the sea. The wave which rushed with such force upon this coast destroyed the forest for a distance of three hundred or four hundred metres inland, leaving nothing standing except the great Ficus religiosa, which stretched their dry and barkless stems toward the heavens. But already nature was repairing the damage, and the powerful tropical vegetation was springing up amid the ruins.

In the bay of Lampong, there were signs of a more powerful shock. A band of land devastated by the tidal-wave rises to a height of twenty-five metres above sea-level, and the destruction begun by the sea was still farther extended inland by the rain of burning cinders which were thrown from the volcano. They proceeded up the bay, and anchored in front of the site of Telok-Betoeng, which was destroyed by the tidal-wave. It was situated on a plain but a few feet above sea-level, and was the home of a number of European merchants and dignitaries, in addition to the Malay population. The place where the town stood is now a marsh, covered with cinders, and incumbered with trunks of trees, beams, and *débris* of all kinds. A little back of this, on the sides of a hill, some European houses, and a native hut, still remain, — thanks to their position above the reach of the waves. A small river flows to the sea through the old site of the village; and near this stream, in a dense forest three kilometers from the seashore, there is a native fishing-vessel, lying where it was tossed by the inrushing waters. Near by there are others; and, a few hundred metres from there, on a bend of the stream, a large steamer, the Barrow, forms a bridge from bank to bank. It is reported that the water rose to a height of three hundred metres, which cannot be a great exaggeration of the facts.

Leaving Telok-Betoeng, they proceeded to Sebuku, one of the group of islands to which Krakatoa belongs. This is not a central volcanic cone like its neighbors Sebesie and Krakatoa, but rather a fragment of land detached from Sebesie or Sumatra by some ancient eruption. The forests on this island are much more confused than those on the border of the bay of Lampong, and one can readily see that the centre of volcanic activity is being approached. Con-

[1] Condensed from *La nature*.