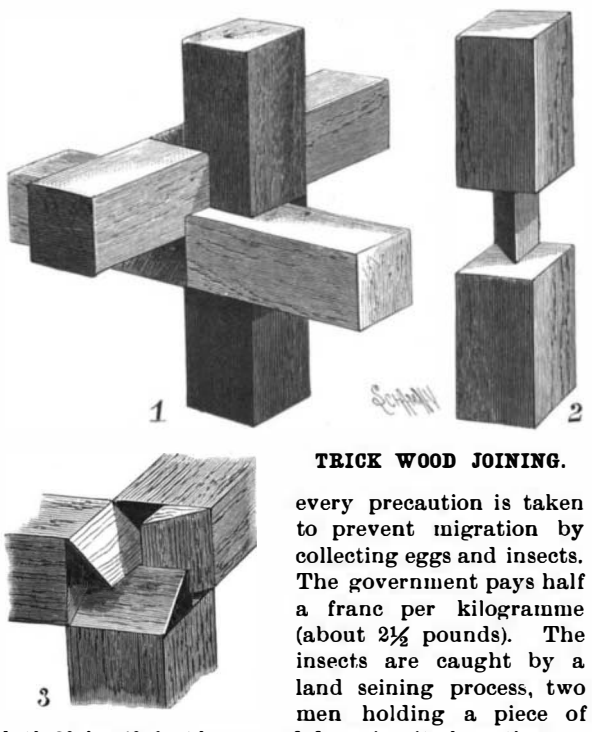
TRICK WOOD JOINING.

In the Scientific American for April 25, 1896, we published an article on trick wood joining, a study of which led one of our correspondents, Mr. Wilhelm Segerblom, of Wakefield, Mass., to design the curious puzzle which is illustrated in the accompanying illustrations, Figs. 1, 2, and 3. The problem is to join three pieces of wood, each at right angles to the other two, and so made that, when joined, they show no signs of cutting. They must be capable of being slipped together or taken apart with ease.

The puzzle, as herewith illustrated, consists of three short lengths of wood, each one inch square in section and five inches in length. At the center of each stick seven-eighths of the wood is cut away for a length of one inch, leaving the remaining one-eighth in the form of a triangular prismatic section of the shape shown in Figs. 1 and 2. One side of this prism is flush with the side of the stick, another side lies in a plane bisecting the stick diagonally and lying in its longitudinal axis, while the third side of the prism lies in a plane also passing through the longitudinal axis and bisecting the stick normally to its side. As each of the sticks is cut away in the same manner, they are in every respect identical.

The puzzle is to fit the pieces together so that each shall be at right angles to the other two and their axes shall intersect at a common point, and shall lie in two planes which are at right angles to each other. When this has been done, the center prisms will lie in the position shown in Fig. 3, where one-half of each stick is shown cut away in order to show the method of interlocking. In Fig. 1 the pieces are shown in the act of sliding into position. It will help the reader to work the puzzle successfully if he understands that the pieces slide into engagement with a diagonal and simultaneous movement; that is to say, it is impossible to lock two pieces and then interlock them with the third. The movement of the pieces is indicated by the arrows in cut 1.



TRICK WOOD JOINING.

INSECT MIGRATIONS.

BY PROF. C. F. HOLDER.

In the early spring, when insects seem to come to life, the hot sunshine bringing them out, many interesting phenomena may be seen. In the San Gabriel Valley I have several times observed a migration of yellow butterflies (Colias) that was remarkable for its duration and the vast numbers that undoubtedly formed a part of the swarm. My point of observation was the town of Pasadena, and for three or four days I watched the continual stream of yellow butterflies fluttering on, all flying in the same direction to the northeast. In looking out of a window two or three or more were in sight continually and others as far as the eye could see.

By personal observation I found that over an area of 16 square miles they were as numerous, a column of millions all moving in the same direction. Wishing to determine the limits of the migratory horde, I wrote to the towns 60 or 70 miles north and south, and the reply was that the same conditions existed there; so that from San Bernardino to Santa Barbara this living stream, representing millions of insects, extended. Why they were moving can only be conjectured. The yellow butterfly is famous for its migrations, and they have been met with out at sea, covering decks and rigging of vessels. Darwin mentions a column of these forms that was at least 50 miles wide and which was many hours in crossing a South American river. In this instance they were all moving in a given direction, following the dictates of some singular instinct.

The migrations of locusts are most devastating in their results. The accompanying photograph shows a doorway in Colorado Springs during such a passage. The numbers of this horde were incalculable, and the insects were swept out of houses like snow. There is hardly a Western or, for that matter, an Eastern State that has not suffered from time to time by these pests. In Colorado they so covered a railroad track that the wheels of the engine refused to catch and the train was brought to a standstill. It appeared to be caught in a dense fog, and the cab became so filled with the crawling, nauseating horde that the engineer retreated to the cars to wait until it had passed.

There is something especially disagreeable in these migrations, and history tells us that they have often occasioned great loss of life. The Bible records that John the Baptist fed upon locusts; and the practice is still followed by the Arabs in Arabia, Egypt, and Syria. The insects are ground in hand mills, the flour or meal being stewed in butter. In the south of France every precaution is taken to prevent migration by collecting eggs and insects. The government pays half a franc per kilogramme (about 2½ pounds). The insects are caught by a land seining process, two men holding a piece of cloth 30 by 40 feet long, and dragging it along the surface, scooping them in.

Some of the most remarkable migrations have been observed in Africa. Mr. Barrow, the noted traveler, saw the ground covered with migratory locusts for 2,000 square miles. The insects during the flight were blown into the sea by a northwest wind and were beaten upon the beach, forming a bank 4 feet in height for 50 miles. When the wind changed, the odor became intolerable for miles, and could be noticed 150 miles from the sea, the air, in the language of the observer, having become poisoned by the fetid exhalations.

The South American countries are frequently devastated by these insects. Several years ago a migration passed the village of Luxan, near the river of that name. At a distance it had the appearance of a reddish cloud that was supposed to be the smoke of a terrible fire from the pampas country. Finally it reached the town, and was found to be a cloud of migrating locusts. They moved at a rate of about 15 miles an hour, and, when they alighted, changed the green of the surface to brown.

In Russia the migrations of locusts are considered national calamities, and were not the accounts of them well substantiated, they might well be doubted. In 1825 the government literally declared war against an invading horde of these locusts, and placed thirty thousand men in the field to oppose an army of locusts that was devastating the land. The call for help came from the inhabitants of Odessa and Kiev. This vast region was fairly enveloped in the clouds of locusts that covered the ground and high in air formed a black cloud of ominous appearance. The sun was darkened, the air filled with noxious odors. The migrating horde crawled into the houses and even the beds of the people, and changed what had been a fertile region into a desert. Every green thing, every leaf or twig that showed any evidence of life, was destroyed, and thousands of men, women, and children were faced with starvation.

The Russian farmers at first fought them by fire, whole towns and villages combining; but, while millions of the insects were consumed, it made no appreciable impression upon them. In some places the locusts would settle upon green spots to a depth of four feet, and when in the air and borne along by a heavy wind, the sound was appalling. The appeal was finally made to Moscow, and the emperor ordered out thirty thousand men, armed with shovels, bags, and fire. They formed a line of battle two miles in length and moved ahead, covering the locusts, raking them into piles and burning them. The men found the insects so firmly intrenched that it was impossible to make any impression upon them. The army wagons became blocked in the living mass and the horses were unable to move them, the insects crawling over the men and animals, which, finally maddened with fear, struggled and rolled in the seething, horrible mass. An official report stated that through the governments of Ekaternberg and Kherson, for hundreds of miles to the Black Sea, the locusts lay in a solid mass two feet thick. A naturalist traveling through the country in the interests of the government met the migrating horde fifty miles from Kiev, and they almost stopped his carriage, reducing the rate of speed from eight miles an hour to one.

On the island of Phanagoria the insects left the ground, and from a distance of five miles they resembled the smoke of an enormous volcano, hanging in the air at a height of six hundred feet. Thousands of people are said to have starved to death from this cause alone. In Algeria the French forces were once ordered out to make common warfare against the enemy.

Migrating locusts have long been a scourge in this country. Kansas and Nebraska and Colorado have been particularly unfortunate. In Nebraska during a certain raid, the sun was not visible for three days—a remarkable example of the numbers of insects constituting a migration.

A PEST OF LOCUSTS AT COLORADO SPRINGS.

Ice Bubbles Explode.

A traveler in Siberia tells of a remarkable occurrence among the frozen regions of that country. In the intensely cold nights, he writes in Good Words, the silence was sometimes broken by a loud report as of a cannon. This was the bursting of one of the ice bubbles on a river—a phenomenon I had neither heard nor read of before.

The streams coming down from the hills were frozen on the surface some 6 to 9 inches thick. The water beneath flowed faster than it could escape, and the pressure, on the principle of a hydraulic press, became irresistible. First, the elasticity of the ice was seen by the rising of circular mounds some 6 to 8 feet high. The bursting point came at last with a report like an explosion. The water escaped, but soon froze again. I have seen scores of these ice hillocks in a few versts of the river.

A Gold Medal for Prof. Dewar.

A gold medal has been conferred on Prof. James Dewar, F.R.S., of London, by the Smithsonian Institution, in recognition of his discovery of processes by which air may be liquefied; it is what is known as the Hodgkins medal. Mr. Hodgkins left $200,000 to the Smithsonian Institution, half of which was to be spent in aiding and rewarding the discoverers of new elements or properties of the air. The first call upon the fund was made some two years ago, when $10,000 was divided between the principal discoverers of the new element "argon," and four silver and eight bronze medals were conferred upon those whose efforts aided in the discovery. The gold medal given to Prof. Dewar is three inches in diameter and was made in the mint at Paris.