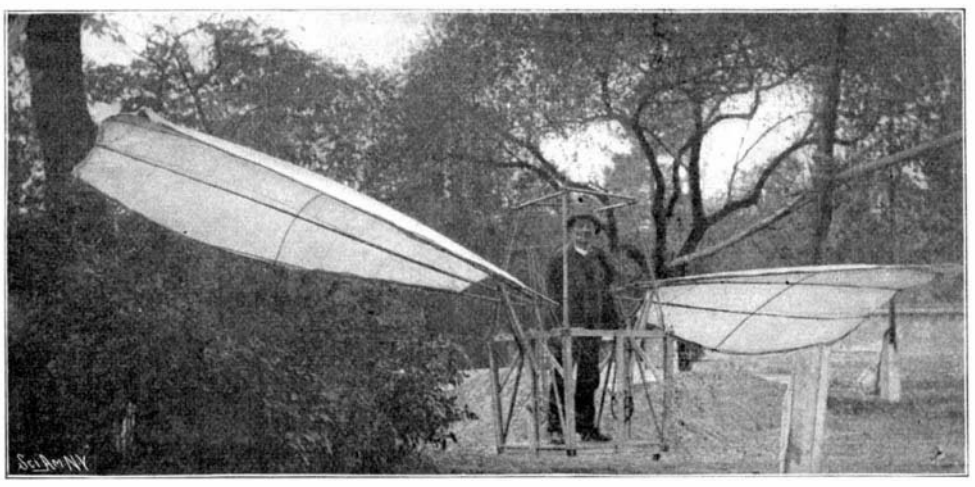
MARCEAU'S "BUTTERFLY."

In the little town of Neuilly, France, lives a certain Emilien Marceau, who is a printer by trade. It happens that the printing business is not particularly brisk in Neuilly, for which reason Marceau must turn to other things in order fully to occupy his mind. From his shop windows he had ample opportunity to watch the birds and butterflies as they flitted by. After he had watched the birds and butterflies for several years, he was seized with the desire to fly. And thus it came about that Marceau joined the ranks of airship inventors. Butterflies fly because they have wings; therefore, a flying machine must have wings, he thought. He built himself a rude car, fitted with outriggers on which wings were pivoted, and coupled up these wings with a man-driven mechanism, consisting merely of a sprocket and chain which gave a reciprocating movement to the wings. With a kind of poetic fitness, or rather unfitness, Marceau christened his machine the "Butterfly." Here is Marceau's lucid account of the "Butterfly's" soaring possibilities:

"My car weighs 61½ pounds; I weigh 165 pounds; total weight, 226½ pounds. I fasten a balloon to my car, capable of lifting 220 pounds. I drive my machine by muscular force alone; and this muscular driving power gives me an additional lifting capacity of 44 pounds. That means I have about 38 pounds to spare. I must rise; my figures are conclusive."

Unfortunately, Marceau has not the wherewithal to purchase a balloon, so that the conclusiveness of his cogent reasoning, however satisfying it may be to himself, is still open to question. Some day he may get his balloon; if he does, he will learn more about gravitation than was ever dreamed of in his philosophy.



MARCEAU'S "BUTTERFLY."

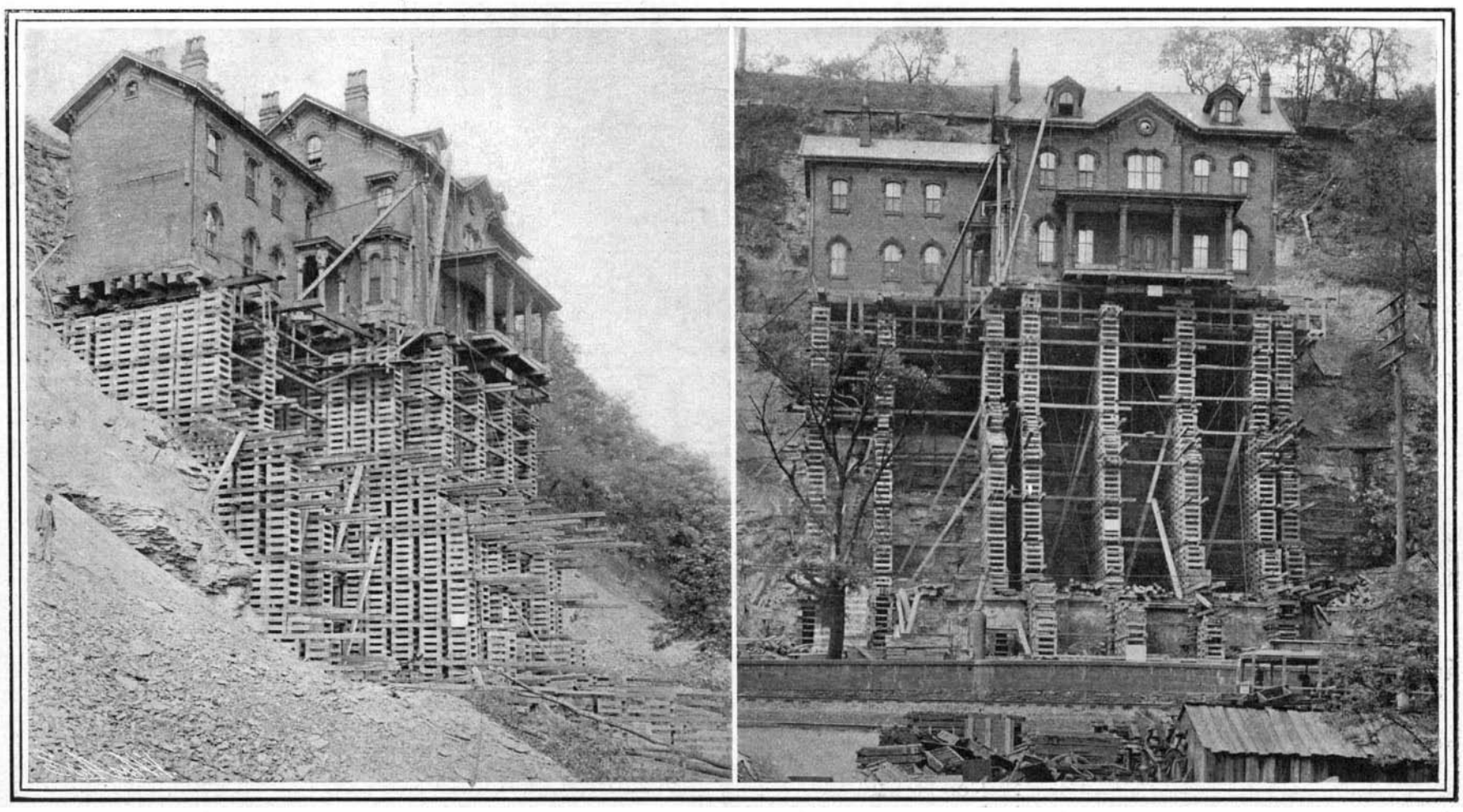
A VERTICAL HOUSE MOVING.

There have been some remarkable feats of house moving chronicled from time to time in the columns of the SCIENTIFIC AMERICAN; but surely the one of which we here present illustrations, in which a fine old mansion was lifted 160 feet from the banks of the Monongahela to the summit of the cliffs above, is the most remarkable of them all. The building, which is known as the Brown mansion, has stood for several generations at the foot of the lofty and precipitous cliffs which line the river at this point. It was built by a Capt. William Brown, father of the present owner, and has been a landmark at Brown's Station on the Baltimore & Ohio Railway for many years. Among the many improvements of their track which are being carried out by the Baltimore & Ohio Railway Company is the straightening out of their line, by the elimination of the sharper curves, especially on those portions of the line which follow the windings of the river. At Brown's Station, where this house was located, the railway company required for improvement purposes the ground on which the building stood; and when the site had been sold to the company, the question arose as to what disposition should be made of the old mansion. At the top of the cliff, 160 feet above the former site of the house, is a fine stretch of orchard land belonging to the present owners of the house, and, largely from sentimental reasons, it was decided to move the building up the face of the cliff and place it on this elevated site, which commands a fine view of the river and the surrounding country. The difficulty of the task will be understood when it is stated that the building measures 85 feet by 40 feet, and weighs about 800 tons. The first operation was to insert eight large timbers, measuring 12 inches by 16 inches, and 85 feet in length, beneath the building, while between these and the structure were laid about 200 7-inch steel needle-beams. While this was going on, the face of the cliff was stepped out into four benches of about 30-foot lift each. The building was then raised a little at a time by hand jacks, and the eight walls of timber cribwork built up beneath it. The blocking was all carefully sized to 6 inches by 8 inches. The cribwork was stiffened in both directions by means of 8 x 8-inch waling pieces, and it was sway-braced by half-inch chains with turnbuckles. When the house had been lifted 30 feet, it was drawn onto the first bench by means of two winches on the top of the cliff, each driven by two horses, a 2-inch line with four-part blocks being used. Another lift of 30 feet was then made to the next bench, and the various operations were repeated, until the house was landed on its new site, 200 feet back from the old site and 160 feet above it. As may well be imagined, a vast amount of timber was required for this work, amounting in all to 20,000 carefully-sized sticks, which required twenty cars to transport them. The actual cost of this house moving is not given out, but it is well understood that it considerably exceeds the original cost of the house itself. We are indebted for our illustrations and particulars to Messrs. John Eichleay, Jr., Company, the contractors for this unique piece of engineering work.

New Iron-Hardening Process.

Phosphorus, as is well known, has the property of imparting a certain degree of surface hardening to iron, but not without producing brittleness. The iron is made to assume a coarse structure, in which the crystals are comparatively loosely bound together. This effect of phosphorus of loosening the coherence of the molecules of the iron greatly facilitates the absorption of carbon by the iron. The carbon rapidly penetrates the iron to a considerable depth, imparting great toughness to the core and nullifying the comparatively slight defect constituted by the inconsiderable brittleness of the surface. Two Prussian inventors apply this principle in their process for hardening iron by heating the same in a tempering powder consisting of organic nitrogenous substances, containing a high percentage of fusible ash and employing phosphorus as the medium for the introduction of carbon into the iron. Without prejudicially affecting the welding properties of the iron, it imparts such a degree of hardness thereto that it can neither be cut nor chipped by the best steel used. In order to harden the surface of about 200 kilogrammes (441 pounds) of iron to a depth of 1 millimeter (.0394 inch) by means of this process, the pieces should be imbedded in a retort, muffle, or the like, in bone dust, to which is added a mixture of 300 grains of yellow prussiate, 250 grains of cyanide of potassium, and 400 grains of phosphorus. The receptacle is well closed, luted with clay, etc., and raised to a clear red or white heat, whereupon the material treated is immersed in a glowing condition in a water or other bath.—From Oliver J. D. Hughes, U. S. Consul-General, Coburg, Germany.

With a view to stimulating invention and of inducing inventors to effect improvements in existing appliances, the Industrial Society of Mulhouse in Alsace has issued a programme of prize medals which it is prepared to award in February, 1904, for (1) a new type of fixed boiler to utilize more than 80 per cent of the heat generated in the firebox; (2) an apparatus to register the total effective work of steam engines; (3) a gas engine to utilize poor gas and developing 250 horse power and upward; (4) improved methods of steam raising, whether by gas, mechanical stoking, or other means; and (5) improved wool combing and carding machinery. Copies of the programme and any further information can be obtained from the secretary of the society at Mulhouse.



This old mansion, measuring 85 by 40 feet, and weighing 800 tons, was raised from the banks of the Monongahela River to the summit of the bluff, a vertical lift of 160 feet.

VERTICAL HOUSE MOVING.