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SCIENTIFIC AMERICAN SUPPLEMENT

No. 806.

For the Week Ending June 13, 1891.

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MAXIM'S FLYING MACHINE.

Mr. Hiram Maxim, well known for his many ingenious inventions, who is, moreover, a very practical and successful mechanic, has for some time past devoted considerable study to the subject of aerial navigation. His practical experiments in this direction, which have been many and various, appear to have crystallized into the form of a machine which might be called a steam kite. The experimental device consists of a thin sheet or kite 4 ft. wide and 13 ft. long, which is propelled by a screw capable of 2,500 revolutions per minute. According to information given by Mr. Maxim this machine, when properly inclined and pushed forward by the screw at the rate of 30 miles per hour, will maintain itself in the air; if the forward speed is increased to 35 miles per hour, it begins to ascend; at 90 miles its rising power is quite strong.

Mr. Maxim says he has already expended $45,000 on these tests, and is now at work on a large machine of silk and steel, with a plane 110 ft. by 40 ft., with two wooden screws 18 ft. in diameter. A petroleum condensing engine will furnish the power. In his previous experiments he found that one horse power would carry 133 pounds 75 miles per hour. He had proved that the screw would lift forty times as much on the propelled plane as it could push. A motor he says has been built, weighing 1,800 pounds, which pushes 1,000 pounds, and will consequently lift 40,000 pounds. The estimated weight of his engines, generator, condenser, water supply (2 gallons), petroleum (40 pounds per hour) and two men is about 5,000 pounds. Thus with a steam kite weighing in all 6,800 pounds he calculates on having an ascending power equal to 40,000 lb., or 23,200 pounds more than the dead weight, say eleven tons. It is devoutly to be hoped that Mr. Maxim will soon be able to demonstrate the success of his great passenger kite.

ANOTHER POLAR EXPEDITION.

A small and staunch steam vessel, the brigantine Kite, sailed from New York June 6 for Whale Island, on the west coast of Greenland, 77 degrees and 20 minutes north latitude. The vessel had on board Lieut. Peary, of the United States Navy, his wife, and five men, who designed making from that point an overland exploration, in a northeasterly course, to as high latitudes as possible, determining, if practicable, the northern coast line of Greenland, and acquiring all obtainable information relative to the polar seas. Explorers have many times been much further north along the coast line, and no great difficulty is anticipated in reaching the point sailed for, at the foot of Humboldt Glacier about the middle of July. Here the coast is bordered by mountains, which it is the intention of Lieut. Peary to climb, carrying his sledges and abundant supplies, with the idea that he will then be at the surface of a great ice plateau, which he intends to make his highway to the far north.

It is the intention of the explorer to get well established in winter quarters before the four months' season of darkness and extreme cold sets in, and supplies sufficient to last the party for three years have been taken, although it is said that game is abundant in that section. With the northward movement of the sun in the spring, the real work of the expedition will commence, the journey northward being made on snow shoes and with sledges. It matters not how deep the snow may be, in Lieut. Peary's opinion, and he is an experienced snow traveler, counting "deep, soft snow as the perfection of roads," but chasms and ragged ice, which he expects mainly to avoid in the route chosen, are the only obstaclas from which difficulty is anticipated.

But, even if Greenland extends only a little way beyond Lieut. Lockwood's furthest point, Lieut. Peary has before him a round trip journey of about 1,200 miles. Just as Nansen traveled, now over a hard crust, and then through deep, soft snow, Lieut. Peary is likely at times to find sledge hauling very hard work. Gen. Greely believes that the inland ice is not coterminous with the north coast of Greenland; and if this theory is correct, Lieut. Peary will probably find it difficult to reach the north coast by the route he proposes, for he and his comrades could not travel far overland, packing their provisions on their backs. At any rate, if defeated in his main purpose, he will perhaps be able to follow the ice edge east to the east coast, and completely determine the northern extension of the great ice cap of Greenland.

There is also aboard the Kite another party known as the West Greenland Exploring Expedition, of the Academy of Natural Sciences, of Philadelphia. This party consists of Prof. Angelo Heilprin, leader and geologist; Prof. Benjamin Sharp and Prof. J. F. Holt, zoologists; Dr. William E. Hughes, ornithologist; Dr. William H. Burk, botanist, and correspondent of the Philadelphia *Ledger;* Levi W. Mengel, entomologist; Dr. Robert M. Keely, surgeon; Alexander C. Kenealy, who will keep the journal of the expedition.

The scientists from the Academy will accompany Lieut. Peary on the Kite to Whale Sound. Thence the vessel will return direct to Upernavik and from there to Disco Bay. Some of this expedition will disembark there; others will cruise on the Kite in whatever direction seems best to them to obtain the information they seek.

The land division will explore the interior of the country, in particular an unnamed mountain back of Disco Bay, of which geographers know nothing, of whose denizens zoologists and of whose flora botanists are ignorant. Returning southward, several fiords will be explored, and the height of glaciers be determined as accurately as possible.

Near Godshaven there is another unnamed and unknown mountain which will be climbed and examined. From there the party will go to Ivigtut, and thence to St. John's, Newfoundland. Everywhere its members will make zoological and botanical collections and try to inform themselves of Greenland's geological formation. The last named party hope to be home again about the middle of next September. The expenses of both expeditions are borne in part by the Academy of Natural Sciences and in part by private subscriptions.

Recalescence in Steel and Iron.

In the current number of the *Philosophical Magazine* Mr. F. J. Smith gives an account of some new methods of investigating the points of recalescence in steel and iron. The object of the experiments was to discover the time connection which exists between the change of form and the change of temperature. Several methods of experimentation were tried, and the following was the one fiually adopted. The upper end of the steel wire to be tested was fixed vertically; the lower end was attached to a long light lever of aluminum, so arranged that a small change of length of the wire caused a large movement of the end of the lever, which traced a line on the smoked surface of paper rotating on an ordinary physiological chronograph cylinder. A platinum-platino-rhodium thermo-couple, twisted round the wire where it was heated, was in circuit with a Deprez-D'Arsonval galvanometer. By means of this combination the temperatures at which the changes of length of the wire took place were read. The movements of the beam of light reflected from the galvanometer were recorded on a moving photographic film. The outcome of the experiments was that the changes of form of the metal under examination took place at the times of change of temperature, so that a curve so traced on the smoked paper can be used as an index of the changes of form and the changes of temperature. Thinking that it might be probable that these changes might be accompanied by some sounds at the critical points, the following apparatus was constructed: A mica disk was fitted into a circular recess turned out of a piece of wood. The steel wire under examination was attached at one end to the center of the disk, at the other to a vertical post. The front of the recess into which the mica disk was fitted was furnished with two sounding tubes. On heating the wire a certain temperature was reached at which a sharp crackling sound was heard. As the temperature was increased this ceased; then, on removing the flame, at the same temperature at which the first sound was heard, a second similar sound occurred. This took place at the point of recalescence. As the wire cooled this ceased, and then, when a temperature of about 490° C. was reached, a very sharp sound was emitted. This third sound appears to take place at the second critical point observed by M. Osborn. The wire used in these experiments was steel pianoforte wire, annealed and straightened. The last experiment was also arranged so that the steel wire when heated should be in a strong magnetic field. Repeated trials showed that the sounds produced were in no way altered by the fact of the wire being in the magnetic field.

Lead Pipe Pierced by an Insect.

K. Hartmann, in *Gesundheits Ingenieur*, January 15, 1891, relates a case in which a lead pipe was cut through by an insect that was actually found with its head in the hole pierced by it. A workman was called in to repair a defective pipe which had been injured on a previous occasion, as was reported, by a "nail hole" occurring in a soldered joint. This time the worm (a wood wasp) causing the mischief was found *in situ*. The hole on the exterior of the pipe was of a rounded form, about one-quarter of an inch long by one-eighth inch wide, and the penetration was through the entire thickness of the metal. Though of rare occurrence, well authenticated instances of similar injuries by insects are on record.

THE tannin present in tea is absorbed by suitable animal substances, such as horn shavings, dried albumen, hide clippings, and the like. It is preferable to add the material to the tea in the dry condition before the infusion is made. But it may also be added to the infusion, or the infusion may be passed or filtered through a layer of the substance. The quantity of animal substance to be added to the tannin-containing material must be determined by the amount of tannin contained in it. In the case of tea the proportion may vary from one to two parts of animal substance to ten parts of tea.—*H. Grimshaw.*