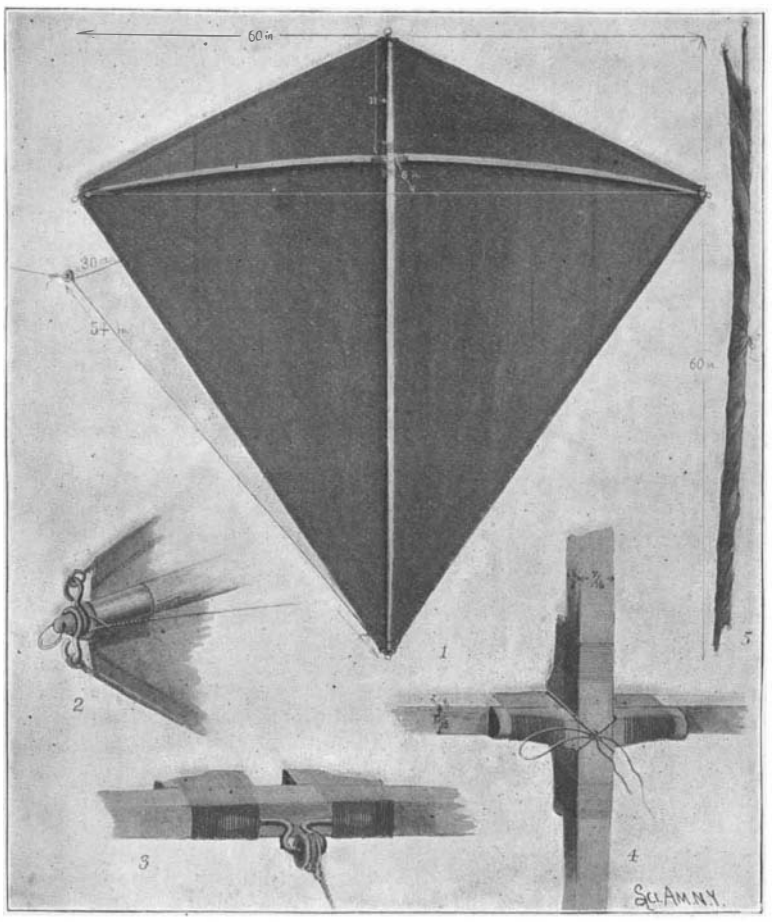
A FOLDING MALAY KITE.

The kite has long ceased to be the plaything of the boy, and experiments on kite construction and flying are now conducted under the patronage of governments and learned societies. The United States Weather Bureau has considered the subject of kites and auxiliary apparatus for the meteorological exploration of the upper air to be important enough to call for the research of specialists, and the results have been embodied in an interesting monograph. Articles upon the subject have been published in many scientific journals and in the proceedings of learned societies. The number of amateur kite fliers grows larger year by year, and some of their achievements in this direction have been notable. Cameras have been sent up and photographs obtained. Meteorological instruments have been elevated to high altitudes, and even telephone wires have been carried by kites and messages have been transmitted by their aid.

Doubtless many of our readers would like to make the modern kite, either for making observations or simply for pleasure. Dr. Claison S. Wardwell, of 35 West Thirty-eighth Street, New York, has placed at our disposal one of the kites which he has made for his own use. It possesses many ingenious expedients, which might perhaps not occur to the amateur kite maker. It is a tailless "Malay" kite of the Eddy type, constructed so that it folds in small compass and is what is known as the five foot size.

Fig. 1 shows the completed kite with the principal dimensions noted on it. Fig. 2 shows the metal cap which is secured to the end of the stick and also the bent wire terminal which secures the cover. Fig. 3 shows the construction of the joint in the cross stick and the attachments for the bridle. Fig. 4 shows the two sticks joined together with waxed braded fish line, and Fig. 5 shows the kite folded.



DR. WARDWELL'S FOLDING MALAY KITE.

The best material for the sticks is straight grain spruce, as this wood has been found to be less liable to bend under strain or to break at the cross stick. Of course, considerable care should be exercised in cutting out pieces which are free from imperfections. The sticks are $\frac{7}{16}$ inch wide and $\frac{3}{8}$ inch thick and 5 feet long. The sticks can be rounded at the edges and scraped smooth. Blocks are glued on to each stick as shown in Fig. 4. On no account should the wood of the stick be scored or cut away at the joint, as this would impair the strength of the joint. The blocks may be secured to the sticks with good carpenter's glue. They should be accurately fitted, so that the joint is a firm one. After gluing, the joint is tightly wrapped with waxed thread and varnished with shellac. The ends of the sticks are provided with No. 32 or No. 38 blank cartridge shells to which a piece of large sized wire is soldered. This wire is afterward drilled to receive the split ring which holds on the bent wire terminal. The stick is shaped at the end to receive the shell, which is secured to it with hot shellac. The sticks are tied together at their juncture with waxed braided fish line, which may be readily untied.

The bridle eyelet, made of hard rubber, is supported by annealed brass wire (No. 13) hammered thin at the ends and bent into shape, as shown in Fig. 3. This is attached to middle of cross stick with waxed thread and varnished. The cross stick is bent to the proper bow ($\frac{1}{10}$ of its length) and secured with No. 22 spring brass wire, loops having been formed at each end to pass over the ends of the sticks, as shown in Fig. 2. Bend No. 13 spring brass wire into the shape shown in Fig. 2 for the terminals and secure them in place with split rings. Now connect the ends of the sticks with No. 1 picture cord, using great care in the measurements, and allowing the perpendicular stick to bow forward slightly. Now remove the brass bow wire from the cross stick. The kite is now ready for the cover, which may be made from tissue or Manila paper, Chinese silk, or best quality of percaline. With the paper cover the paper is fastened on with good mucilage, leaving the cover flat and smooth. The cover opposite the center of the cross stick and the corners should be reinforced with percaline glued on. Take a few stitches at the corners around the wire. Now place on the bow wire and the cover will be found to have an even and sufficient slack. With a silk or percaline cover, place on the bow wire, and having cut off four pieces of No. 1 picture wire, fasten the two short wires to one bent wire terminal, and the two long wires to another terminal. Place the terminals on the ends of the sticks and draw the wires to the proper position and fasten temporarily. Cut out the cover and baste it on the frame evenly, so that it will lie smooth. Allow about ½ inch hem. Unstring the wire and stitch the cover with a sewing machine, leaving openings at all the corners. String the wire to position again through the hem of the cover and attach permanently to the other terminals while in position on the frame, then reinforce all of the corners. Cut ½ inch hole for the bridle eyelet and its holder, opposite the center of the cross stick, and reinforce the opening with a circle of cloth about 3 inches in diameter. Attach the upper string of the bridle, which is 30 inches in length, to the hard rubber eyelet as shown in Fig. 3. The lower string, which is 54 or 56 inches in length, is attached to the split ring or bent wire terminal as shown in Fig. 1, allowing 8 or 10 inches extra to each string for adjustment.

In placing the cover on the frame, first place the two side terminals on the ends of the cross stick, then place the upper terminal in position. Lastly stretch on the lower terminal by bowing the midrib slightly forward, then fasten all the corners with the split rings. The bridle should be provided at the point where the flying string is attached with a hard rubber eyelet similar to the one shown in Fig. 3. In using a cloth cover, it is not necessary to make as much provision for slack.

The weight of a 5 foot kite with sticks $\frac{7}{16} \times \frac{3}{8}$ inch material constructed in this way is as follows:

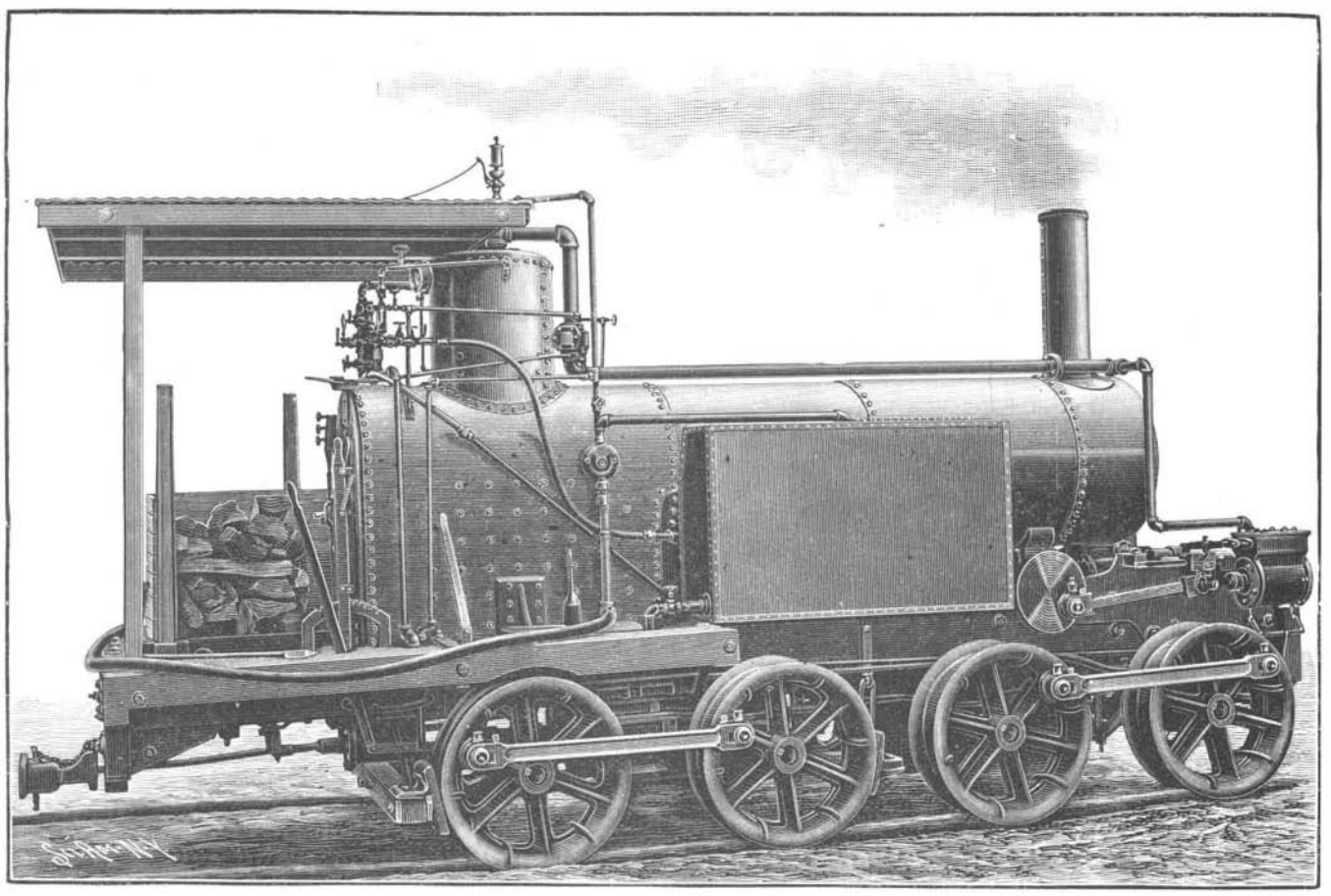
Frame	6 ounces.
Percaline cover with wire edges	4¾ "
Chinese silk cover with wire edges	2½ "
Manila paper cover with wire edges	3½ "

A 6 foot kite with sticks ½ × ⅜ inch will weigh as follows:

Frame	7½ ounces.
Tissue paper cover with cord edges	1¾ "

The manner of flying a kite of this description was shown in the SCIENTIFIC AMERICAN for September 15, 1894. It is possible to send up a number of the kites tandem, as shown in the engraving in that issue.

An American flag is excellent to attach to the kite line in light airs and should be in possession of every kite flier. A flag 5 × 8 feet of tissue paper will weigh 4 ounces. A 6 foot pine spar ⅜ inch in diameter will weigh 1½ ounces. A tissue paper flag 10 × 15 feet weighs 13½ ounces. An 11 foot jointed pine spar ½ inch in diameter and tapered weighs 6 ounces. The flag is maintained in position so that its lower edge is horizontal, the spar being perpendicular to the ground by means of three cords which secure the top, middle and bottom of the staff. These cords are secured to the main line by hard rubber eyelets, the main line passing around them, a piece of thin leather preventing chafing. The guy line passes through the eyelet. The upper guy rope is, therefore, short. The middle one, which may be dispensed with in light winds, is longer, and the bottom guy rope is longest of all. At the star end of the flag a hem is made by gluing thin muslin to it. The light spar is run through this hem and tied at intervals with cord. The flag can, of course, be pasted to the spar, but arranging it so that the spar can be withdrawn is preferable.



LOGGING LOCOMOTIVE FOR WOODEN TRACK.

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Our publication on August 1 of a cut and description of a logging locomotive, which the designer termed a steam missionary, has brought to our office a photograph of a machine which the builders think is "an improvement on Mr. Stephens' locomotive." It will be seen from the illustration that the locomotive in question is an eight wheeled geared tram engine built especially for logging use. The wheels are 30 inches in diameter, with a double flanged 12 inch face; and they are mounted in sets of four on flexible trucks, so as to allow easy running on very rough roads. All the wheels are used as