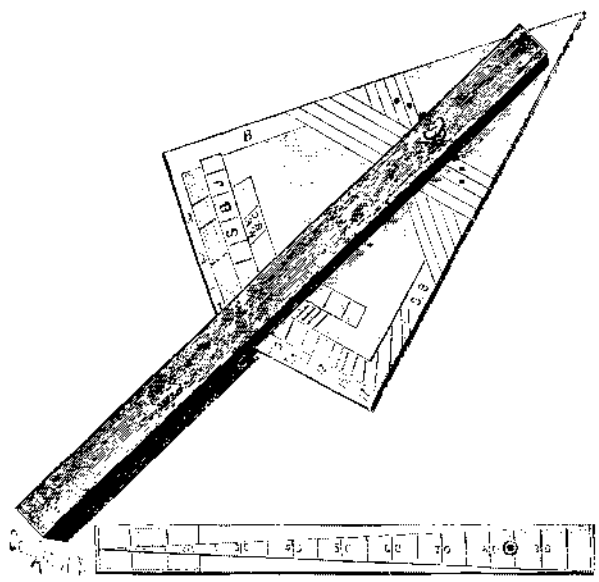
### A MEASURING AND DRAWING TOOL.

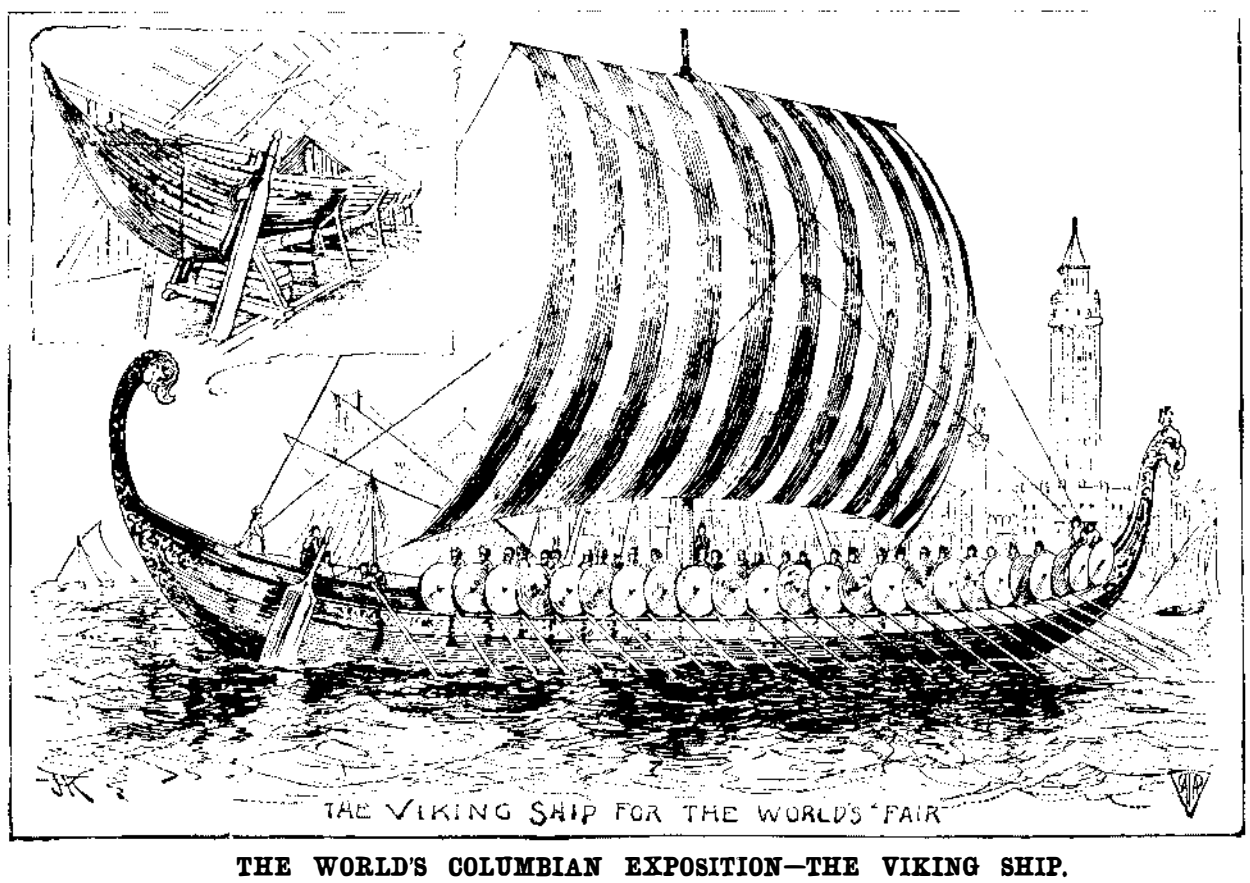
A readily adjusted and easily applied tool for conveniently finding bevels, pitches, degrees, and lengths in framing roofs and similar purposes, is shown in the accompanying illustration, and has been patented by Mr. L. O. Allred, Palestine, Texas. The larger view is a partial representation in perspective, and the smaller one is a plan view of the straight edge. Pivoted in a slotted bar which forms the straight edge is a plate made in the shape of one-eighth of a regular octagon, with two sides of equal length intersecting at the acute angle and two other sides of equal length intersecting at the obtuse angle, the long and short sides forming a right angle or square at their intersections on either side. The plate has a series of apertures to receive the pivot bolt connecting it with the straight edge, and the upper edge of the latter indicates on various graduations and scales on both faces of the plate. On the faces of the plate are also arranged tables for figuring lengths. The edges of the sides of the plate have marginal lines marked B, SB, T, ST, for blade, sub-blade, tongue, and sub-tongue, and the margins are divided by lines indicated by even and uneven numerals, the lines being drawn from the centers of correspondingly marked apertures in the plate forming pivotal points of the straight edge, by means of which the rise, pitch, and run of a roof may be indicated. Numbers on the tongues and sub-tongues, and in rise columns, have the same meaning as corresponding figures at pivotal points or centers, and when the tool is set for a certain pitch of roof or rafter, the blade shows the bottom or lower end cut of the timber, and the tongue the upper end cut. Every pivotal point on either face of the plate is a center from which the tool can be set and used for laying off correctly a square, square miter, octagon, octagon miter, degrees, etc.



ALLRED'S MEASURING AND DRAWING TOOL.

### A VIKING SHIP.

Within a comparatively recent period the remains have been dug up, at various places in Norway, of ancient Scandinavian vessels, models of which are to be exhibited at Chicago. Our illustration represents one of these models, which has recently sailed for America, after visiting most of the towns on the Norwegian coast. It is an exact copy of an old Viking vessel, the remains of which were discovered in 1880, near Sandefjord, Norway. The model is splendidly built, of the best materials; but it is said that the modern work in no way surpasses the original, so far as that has been preserved. Not a little apprehension has been felt at the risk of an Atlantic voyage with such a vessel, the original Viking vessels having been intended only for cruising along the European coast and in the Mediterranean, where they made numerous voyages during the ninth, tenth, and eleventh centuries. The great lug sail has been made in four parts, laced together, and reefing consists in removing one portion and lowering the sail accordingly. The men have to sleep on the bottom boards, and provisions are carried in tinned iron cases. All decorations, such as the shields, dragon's head and tail, etc., were stowed away, and fenders were fixed along the sides. The rudder, which is placed at the side, is said to prove quite as effective as a modern one placed at the stern. The vessel is 74 feet long between stem and stern, 16 feet broad amidships, and draws 5 feet of water, its original being by far the largest craft found from the olden times. Local tradition in the neighborhood where the remains of the ancient vessel were dug up had it that here was the last resting place of a mighty king, who had been buried with costly treasures near his body.




THE WORLD'S COLUMBIAN EXPOSITION—THE VIKING SHIP.

### SIMPLE HYGROSCOPE.

BY GEO. M. HOPKINS.

In the sultry days of summer we hear a great deal about humidity. This means great discomfort to almost every one.

To be really comfortable on a hot summer's day we do not need shade, cooling drinks, and fans so much as dry air. When the air is dry, nature's method of cooling by spontaneous evaporation of moisture from the skin is carried on to the comfort and satisfaction of those who are compelled to spend the heated term in a warm climate; but when the air is overcharged with moisture nature's cooling process ceases and discomfort results.

To determine by observation how thermal and hygroscopic conditions are related to the enjoyment of existence in hot weather, it is necessary, in addition to a thermometer—which nearly every one possesses—to have a hygroscope or hygrometer of some kind that will either indicate the hygrometric state of the air or afford a means of actually measuring the percentage of moisture in the air.

The annexed engravings illustrate a hygroscope—which may be used for measuring the moisture in the air with tolerable accuracy, and which might therefore be called with equal propriety a hygrometer.

The instrument depends for its action on the expansion and contraction of a strip of cardboard (Bristol board), formed into a helix and rendered impervious to moisture on the outer surface. The helix is rigidly held at one end while the opposite end carries an index which moves over a graduated dial.

The simplest form of the instrument is shown in Fig. 1. In this the upper end of the helix is glued to a cork which fits tightly on the wire projecting from the center of the dial. The lower end of the helix is cemented to a paper index which is perforated to receive the wire. To reduce friction, the hole in the index is black-leaded by twirling in it the point of a very soft lead pencil.

The form shown in Fig. 2 (in which parts are broken away) is like that already described, except in the manner of supporting the helix and in the arrangement of the index. The index in this case is attached to a common needle or pin, which passes through hole in the center of the dial and is inserted cork in the end of the helix. In the end of th farthest from the dial is glued a cork, which i ported by an angled wire projecting from the ba the dial.

When the cardboard helix is as dry as it can made a zero mark is drawn opposite the point of t index, and on a very damp and sultry day the instrument is placed in a steamy atmosphere until the index has moved as far as it will go from the zero mark; the coil is then inserted in the mouth without bringing it in contact with the tongue or lips, when it is breathed upon until the index stops moving and a mark is made opposite the point of the index. This mark is numbered 100, as it is assumed that the atmosphere surrounding the helix at the time of making the 100 mark was saturated. The space between the 0 and 100 marks is now divided into 100 equal parts. The helix must be fixed so that it will not change its position relative to the scale, otherwise the adjustment may be lost.

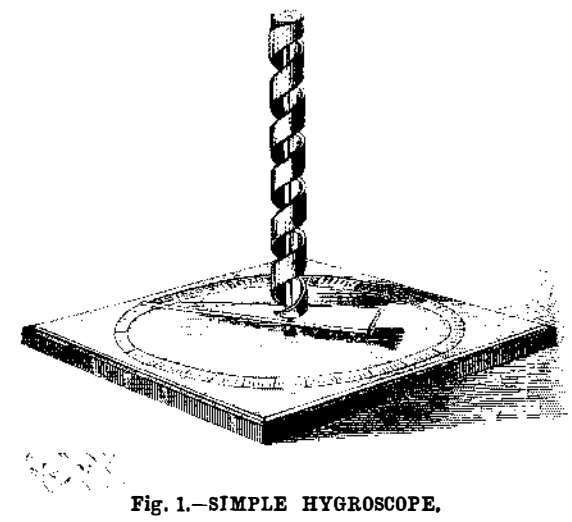


Fig. 1.—SIMPLE HYGROSCOPE.

The percentage of moisture in the air will be indicated by position of the index on the dial. If it points to 75, the air is within 25 per cent of saturation. If 80, 20 per cent, and so on. The index makes something more than a half turn between 0 and 100.

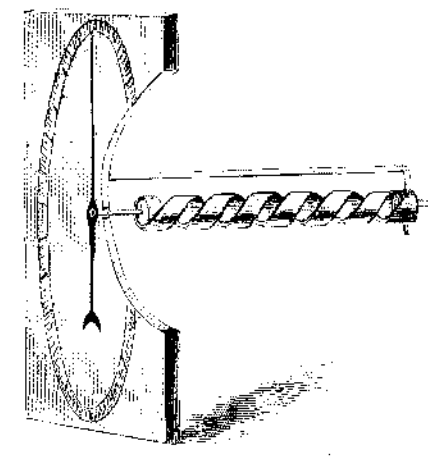


Fig. 2.—SENSITIVE HYGROSCOPE.

The important part of the instrument is the paper helix, but its preparation is very simple. A strip of thin Bristol board, ¼ inch wide and 6½ inches long, is wet on one side and wound on a lead pencil or similar object, with the dry side next the pencil. The ends are secured by winding a small rubber band several times around the pencil, as shown in Fig. 3.

When the paper helix thus formed is perfectly dry and before it is removed from the pencil the outer surface only of the cardboard is covered with two coats of

Fig. 3.—FORMING THE HELIX.

shellac varnish, the first coat being allowed to dry thoroughly before the second is applied.

The helix is now allowed to remain in a warm dry place for a week or more, to allow the varnish to become perfectly dry and hard. Neglect of this last precaution will insure failure, as the paper will not return to its original form after being expanded unless the varnish is hard.

A SOLDER FOR ALUMINUM.—R. Heaton.—The solder is an alloy of aluminum and tin, suitable proportions being 45 parts tin to 11 parts aluminum. The metals are melted separately, poured together, and then cast into suitable strips or ingots. No flux is required.

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