THE SUN'S POSITION AT DIFFERENT SEASONS OF THE YEAR.

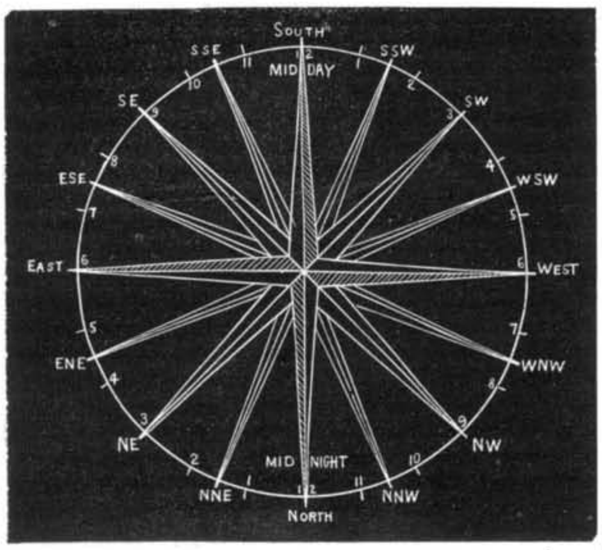
It is a universally known fact, says Herr Jaffe, in consequence of the inclination of the earth's axis at the ecliptic, the sun sometimes stands higher and sometimes lower over the horizon. It is, however, less known that, simultaneously with this change of altitude, a variation also takes place in the sun's relative position to the points of the compass. With us, as in the whole temperate zone of the northern hemisphere, the sun's position at noon is due south; and from this one is led to assume, since the earth performs a revolution every twenty-four hours, and every point upon its surface describes an entire circle, that the sun always stands in the east at six A.M., in the west at six P.M., in the southeast at nine A.M., and in the southwest at three P.M., etc.

At Vienna, on the 48th degree north latitude, the following, however, is proved to be the case. The sun stands:

	E. A.M.	S.E. A.M.	S. NOON.	S.W. P.M.	W. P.M.
On the 21st December	—	9·10	12	2·50	—
On the 21st March	6·0	9·50	12	2·10	6·0
On the 23d of September	6·0	9·50	12	2·10	6·0
On the 21st of June	7·10	10·30	12	1·30	4·50

Whoever wishes to test the accuracy of this statement should proceed as follows: Divide the circumference of a circular dial, Fig. 1, into twenty-four equal parts, mark these

Fig. 1.

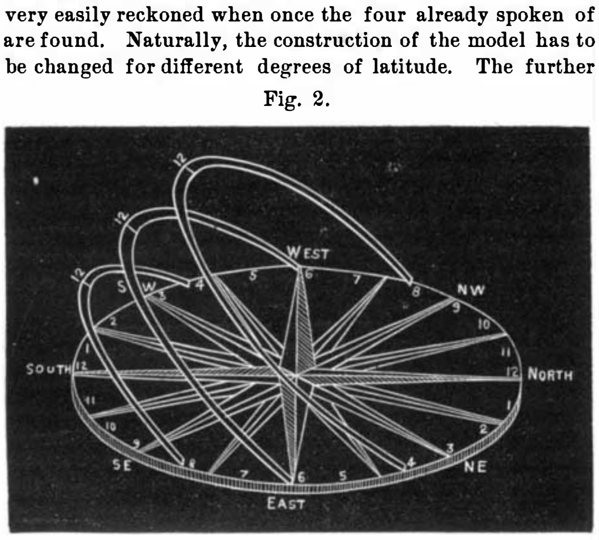


divisions with the numbers of the hours, from one to twelve A. M., and from one to twelve P. M. Then draw upon it the dial face of a compass, so that the south may coincide with twelve, noon. Then cut three narrow circles of the same circumference as the dial, and divide and mark their outer edges with the hours in the same manner as before. Cut one of the circles off at eight A. M. and four P. M., the second at six A. M. and six P. M., and the third at four A. M. and eight P M., and fasten the ends of all three arcs to the corresponding hours upon the dial, so that they are inclined towards the south at an angle of 42° to the dial. Fig. 2 is a perspective view of the finished model.

The parts of the circles cut off represent the sun's orbit as it appears to us in Vienna, Munich, and all other places which lie 48° north—the first on the 21st December (the shortest day), the second on the 21st March and 23d September (when the days and nights are equal), and the third on the 21st June (the longest day). In order to find out the sun's position at a given hour on any of these days, one has only to let fall a perpendicular from the particular hour and arc to the face of the dial, and read off the name of the point of the compass on which the line falls.

The sun's position for all the other days of the year is very easily reckoned when once the four already spoken of are found. Naturally, the construction of the model has to be changed for different degrees of latitude. The further

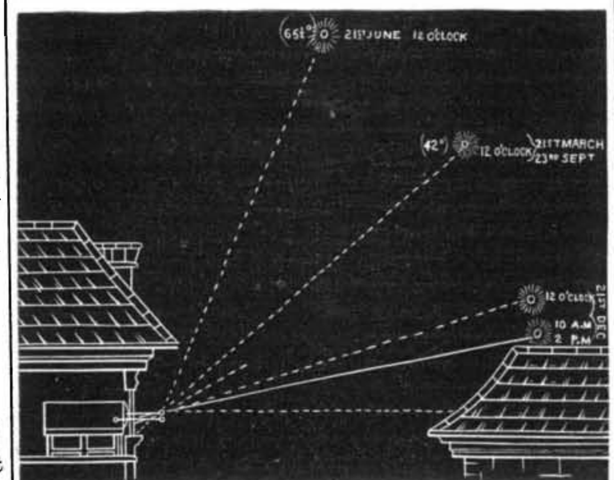
Fig. 2.



north the longer the longest day will be, the shorter the shortest day, and so on. Also the angle which the segments of circles must make with the dial will be altered, this angle always expressing the difference between the number of the degree of latitude and 90. For example: For St. Petersburg, on the sixtieth degree of latitude, the angle would be 30°: For Naples, Madrid, and Constantinople (41° N. lat.), it would be 49°.

Many a photographer must have wondered how it is that the same building should be touched by the sun's rays on one side in winter at a given hour of the day; and at the selfsame hour in summer, it should be touched on the opposite side. To such a one the foregoing statement would be useful, if he wishes to decide upon a time and site for building, by means of a compass, a helioscope, or Wehl's "Guide to Building," since a beautiful shadow really contributes to

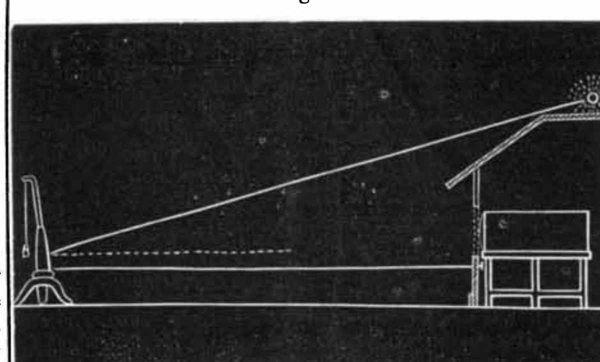
Fig. 3.



the perfection of the picture. Indeed, by means of this model, one can always study the shadows as they would be produced by the sun's rays falling on a building favorably and definitely situated, both geographically and with reference to the points of the compass. For this purpose the model must be pretty large. Take it into a dark room and set up, upon the dial, the model of a building with prominent pillars, ornaments, projections, etc., taking care that the model of the building about to be observed is placed exactly on the center of the dial and in the desired direction of the compass. The light of a candle held to one of the arcs will show the direction in which the shadows will fall on the building on that day of the year for which the arc is specially constructed. The foregoing would also prove useful to any one looking out for a site for a studio or an enlarging apparatus, especially the latter, since the angle formed by the arc of the 21st December and a line raised from the center of the dial is that by which the mirror will receive unobstructed light and be struck by the sun's rays on the shortest day. At Vienna, on December 21, at noon, this angle falls as low as 18½°, and at ten A. M. and two P. M. yet 5° lower, so that the sky would only be unobstructed for 13½°; and about Christmas the illuminating power of the lens is diminished below the point of utility. (See Fig. 3.)

It may be remarked here that for the latitude of Vienna an enlarging apparatus, erected on Wothly's system, with the mirror in the north as shown in the diagram, Fig. 4, is much to be preferred to that on Monckhoven's system, with

Fig. 4.



the mirror on the south; because, while in winter Monckhoven's mirror only gives sunlight to a small part of the lens, by Wothly's system the whole of it can be illuminated at every season of the year, as the mirror must be placed about eight times the diameter of the lens distant from it, thus allowing the whole of its plane to receive the sun's rays even in the shortest days. Another advantage of Wothly's system consists in this, that no direct rays of the sun fall on the combination lens. With Monckhoven's mirror this is unavoidable.

In conclusion, we will only make one more remark. A single glance at our model shows that the sun's ascent from ten to twelve, and its descent from twelve to two o'clock, is very slight, while before ten it rises rapidly, and after two it falls as quickly to the horizon. This is, then, the reason why the light from ten to two possesses about equal power, while it increases rapidly up to ten, and from two decreases again with the same rapidity.—*Photographische Correspondenz.*

The Duration of Life.

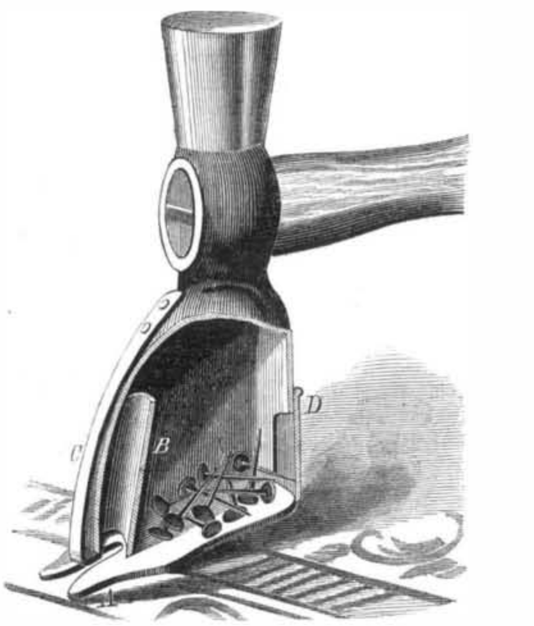
The following facts on the duration of life appear in the *Deutsche Versicherungs Zeitung*: "In ancient Rome, during the period between the years 200 and 300 A. D., the average duration of life among the upper classes was 30 years. In the present century, among the same classes of people, it amounts to 50 years. In the sixteenth century the mean duration of life in Geneva was 21·21 years, between 1814 and 1833 it was 40·68 years, and at the present time as many people live to 70 years of age as 300 years ago lived to the age of 43.

A New Kind of Poisonous Dress Goods.

Professor Gintl says that in some English and Alsatian print works the expensive albumen is partially replaced by glycerin-arsenic and acetate of alumina. Some of the dress goods in the market contain 3 or 4 grains of arsenic in a yard of the stuff. Muslins and cambrics with little white spots, circles, stars, or flowers, on a violet ground, and those printed with brownish yellow or reddish brown patterns, have been found to contain arsenic; and these are colors which have never before been considered with any suspicion, and would be purchased by the uninitiated without any foreboding of the danger that would attend the wearing of such dresses. The danger is no slight one: for aside from the large quantity of arsenic in it, the compound is not an in soluble one. If the goods are soaked in water, there is dissolved out a sufficient amount of arsenical salt to give a distinct reaction. This latter peculiarity is explained by the supposition that the goods, being comparatively cheap, are not washed or rinsed after printing, but sent directly to be finished.

A NEW TACK HAMMER.

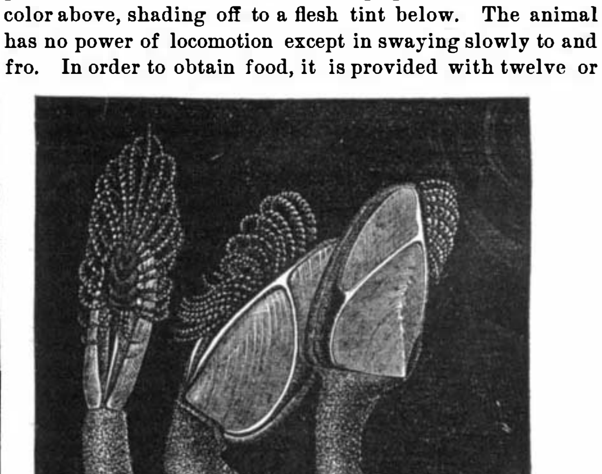
Any one who has ever drawn a tack from the floor, with the usual claw found on tack hammers, has doubtless seen the tack yielding to a sudden jerk, spring out of the board, and disappear into some hidden fold of the carpet, there to remain until it finds its way into somebody's foot or fingers. Mr. George H. Ryer, of this city, has devised a way of preventing that difficulty, by forming a receptacle in the rear of the hammer head, as shown in the annexed engraving. The base of this chamber is a steel plate having at its front end



forked projections, A, the slit between which extends back into the plate. Just in rear of the slit is a curved piece, B, and at the opening between plate and receptacles is a spring, C. The head of the tack enters the slit as represented, and easily passes the spring. A downward movement of the handle then draws the tack, which, falling on the piece, B, when the hammer is tilted back, slides into the receptacle. When the latter is full its contents are emptied out, on opening the slide at D.

THE ANATIFA.

The anatifas are among the most curious inhabitants of the ocean world. They are a kind of barnacle, attaching themselves to drift wood, rocks, and vessels, and supporting life upon minute animalculæ gathered from the sea water. The structure of the creature consists of a calcareous miter-shaped shell, composed of five pieces, two on each side and the fifth on the dorsal edge. The shell rests upon a thick pedicle, which is tubular, flexible, opaque, and of a brown color above, shading off to a flesh tint below. The animal has no power of locomotion except in swaying slowly to and fro. In order to obtain food, it is provided with twelve or



more arms on each side, which are closely contracted when in repose; but when sweeping the adjacent water for animalculæ, are widely extended. The two sexes are associated in the same individual. The young, on emerging from the egg, swim about with ease, being provided with large movable fins and a huge eye in front. These organs disappear in the adult, as it gradually becomes fixed by its pedicle.

Ancient naturalists held the queer fancy that these creatures were legged eggs, deposited by some bird like a duck, and up to the present time fishermen have a similar superstition, probably due to the feathery appearance of the arms when spread out.