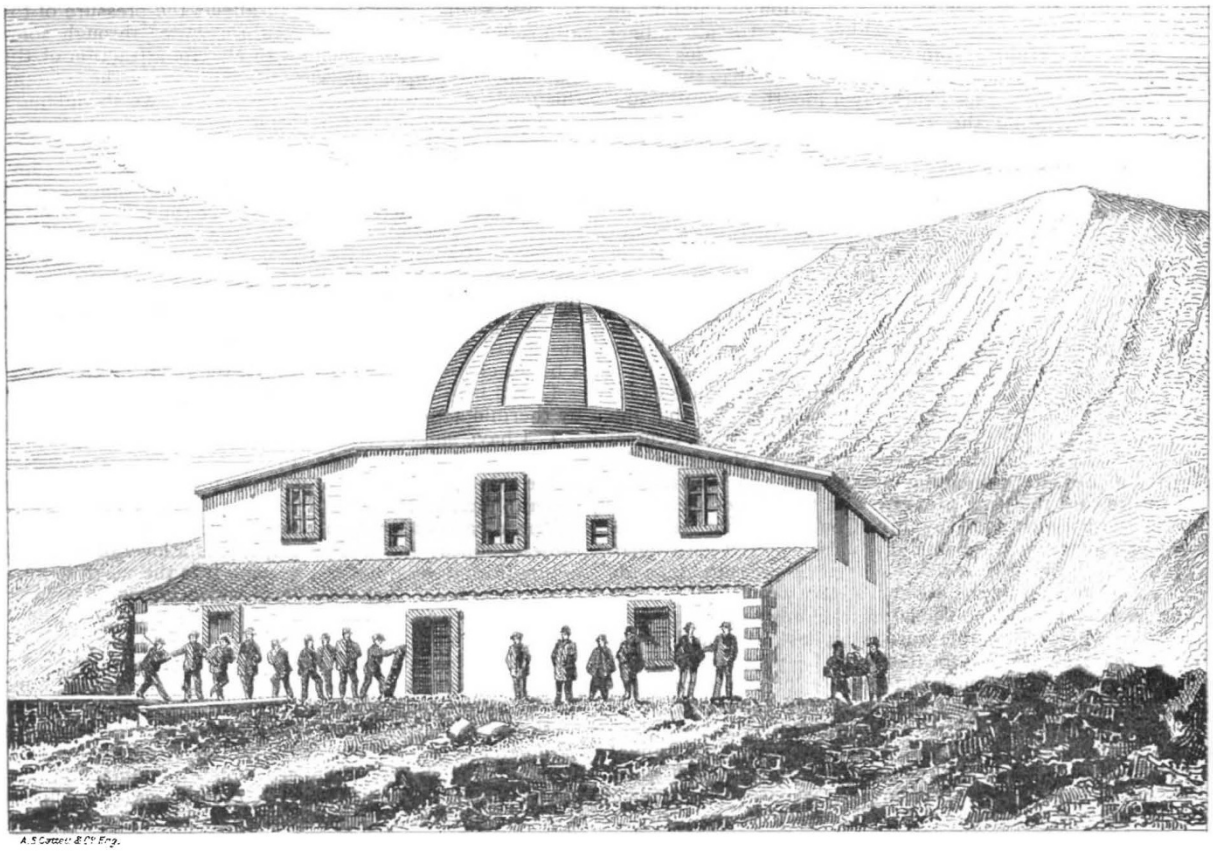
building is yet quite finished and ready for occupation ; a good deal of work has yet to be done to the internal walls, the doors and windows, flooring, &c., besides the scientific equipment of the building. Therefore the announcement by the Alpine Club of Catania that the building would be ready for inauguration at the meeting of the Alpine Congress in Catania next September was premature. The Observatory will not really be ready to be opened till 1882. The difficulties that have had to be contended with can only be comprehended by those



who have visited the place ; all the materials have to be conveyed 3000 metres above the level of the sea, and that during only three months in the year. So that even if not ready till 1882, the work may be said to have been rapidly accomplished. The mounting of the equatorial is finished and the construction of the meteorological apparatus is being proceeded with. The Ministers of Agriculture and Public Instruction are doing their best to provide the Observatory, by 1882, with a director and a staff both of astronomers and meteorologists.

MODE OF MASKING OR CUTTING OFF SHARPLY THE LIGHT FROM REVOLVING APPARATUS ON ANY DESIRED COMPASS-BEARING BY MEANS OF A RECIPROCATING SCREEN

OWING to the optical properties of the lens employed in revolving lights, a formidable element of difficulty comes in the way of effecting a sharp cut-off on a particular bearing; for the direction of the axis of the beam of light which is projected by the lens is being continually changed in the horizontal plane by the revolution of the frame on which it is fixed. So long as the axis of this beam of rays points outside of the line of obscuration the light will not of course encroach on the danger arc, unless to a small extent, when the axis is nearly on the line of cut-off due to the ex-focal rays proceeding from the outer edges of the flame. The light however will begin to be diminished in power from a bearing varying from 12° to 21° outside of the line of cut-off dependent on the size of the lens, the light on the line of cut-off being diminished to the power of one-half. But when the axis crosses that line, then as the rays which come from that part of the apparatus which is still outside of the darkened panes of the lantern is not intercepted by them, the light will begin to be seen within the arc of danger, and as the apparatus goes on revolving the axis will at last point from about 12° to 21° within the danger-arc, according to the breadth of the lens which is employed. Owing to this peculiarity of a revolving light the difficulty of confining the flashes within any required arc of the horizon by means of *fixed* screens is in fact an insurmountable one.

The mode which I have to suggest is as follows :—In front of the revolving apparatus and on the safety side of the danger arc, let a light canvas or metallic screen be constructed for running on rollers on a slightly inclined rail or circular path close to the apparatus. If now a small projecting rod or snug be fixed to the side of each lens it will in revolving be brought against the edge of the screen, and will gradually press the screen before it up the inclined plane at the same rate of motion backwards

as that of the lens forwards. By the time the lens reaches the edge of the danger-arc the screen will have been pushed to the top of the inclined plane, and the full beam of light coming from the now entirely uncovered lens will be pointing in the required line of cut-off which is the border of the danger-arc. But whenever the further revolution of the apparatus causes the snug to pass clear of the edge of the screen so as to free it from pressure, it will immediately run back again to its original position in front of the lens, so as to prevent any light being now sent forwards. If that light were not at once intercepted part of it would, by the movement of the frame, begin to pass across the line of cut-off, so as to be seen within the danger-arc. By this continued reciprocative movement of the screen as lens after lens comes round, the same effect will be successively produced, and the light will always be cut off in the line of obscuration as sharply as in the case of a fixed light, so that the flashes will never be seen within the danger-arc.

In cases where the light has to be cut off on both sides of a danger-arc a similar reciprocating screen is as applicable to the lenses when passing out as when passing into the danger-arc. But in this case the lens, on leaving the danger-arc, will take the screen round with it up an inclined plane until the axis of the lens is parallel to the line of cut-off, when the screen will recoil and the light become visible with full power in the line of cut-off.

A small spherical mask placed inside of the apparatus may be made to produce the same effect by reciprocating between the lenses and the flame. When the danger-arc is of small amplitude the screens, which must always be as broad as the lens, might come in the way of the light passing over the safety-arcs. To obviate this, cloth curtains might be made to wind up on vertical rollers similar in construction to those used for ordinary house-blinds.

THOMAS STEVENSON

CHLOROPHYLL [1]

AN account was given in NATURE, vol. xxi., p. 85, of Prof. Pringsheim's first publication on this subject. He had then found that exposure to intense light for a few minutes causes the chlorophyll-corpuscles contained in the cells of plants to lose their green colour; he also pointed out that this effect is produced not by heat but by light, and only in the presence of oxygen, and further, that the highly refrangible rays of the spectrum are those which are principally concerned in it. He also announced the discovery in the chlorophyll-corpuscles of a substance termed Hypochlorin.

The paper now under consideration gives a full account of all the observations and experiments which he has made up to the present time, and he considers that they tend to confirm the conclusions at which he had previously arrived. It will be well, before entering upon a discussion of the very difficult questions which are raised, briefly to enumerate the principal new facts which he now brings forward.

In the first place, he is able to throw some light upon the intimate structure of chlorophyll-corpuscles by means of a new method for investigating them. This method consists in treating them with a dilute acid (*e.g.* 1 vol. of glacial acetic acid to 2 of water, or 1 vol. of picric acid to 3-6 of water, or 1 vol. of sulphuric acid to 20-40 of water, or 1 vol. of strong hydrochloric acid to 4 of water), or warming them in water, or exposing them to the action of steam. The effect of this treatment is to cause the escape of the chlorophyll from the corpuscle, together with certain fluid or semi-fluid substances which accompany it, in the form of viscid drops, leaving the ground-substance of the corpuscle as a colourless, apparently protoplasmic, hollow sphere, with a much perforated wall.

[1] "Untersuchungen über Lichtwirkung und Chlorophyllfunction in der Pflanze," by Prof. N. Pringsheim (*Jahrbücher für Wiss. Bot.*, Bd. XII., Heft 3: Leipzig, 1881).

These viscid green drops, when produced by the action of warm water or of steam, appear to consist of an oil which holds the chlorophyll and other substances in solution. When they are produced by means of a dilute acid, they appear to contain a substance which is not present when they are extracted by warm water or by steam. Certain dark brown masses make their appearance which are of a tolerably firm consistence and of varying form. These gradually become harder, and assume a crystalloidal appearance, probably, as Prof. Pringsheim suggests, in consequence of a conversion into resin of the oily matter which is present; but it is by no means the whole of the substance which thus solidifies, but only a certain constituent of it. The colour of the mass is doubtless due to the presence of altered chlorophyll, and this may affect even the crystalloids, but they may be obtained colourless. It is to the substance which assumes the crystalloidal form, or rather to some substance pre-existent in the chlorophyll-corpuscle from which these crystalloids are derived by the action of the acid, that Prof. Pringsheim gives the name of Hypochlorin.

He meets the doubts that may arise as to the chemical individuality of this substance, as also the suggestion that it may be a product of the alteration of the chlorophyll, by pointing out that it cannot usually be obtained at any one time from all the corpuscles of a given cell. It is therefore a substance which, as it is present in some and not in others, cannot be derived from chlorophyll which is present in them all, and which probably bears some definite relation to the metabolic processes going on in the corpuscles.

Since no hypochlorin can be obtained from cells which have been warmed in water or acted upon by steam, it appears that this substance is decomposed by heat.

After giving a detailed description of the arrangement of the apparatus used in his observations, Prof. Pringsheim goes on to give an account of the effects produced by exposure to intense light in the different parts of which the cell consists. He again insists that none of the following phenomena can be the results of excessive heating of the object, for he found that cells not containing chlorophyll (*e.g.* colourless zoospores) could bear the exposure for half-an-hour without injury, and further, that the phenomena were produced more readily by blue or green light than by red light which has a much greater heating effect. The principal phenomena observed are as follows:—

1. The colouring-matter.

The chlorophyll-corpuscles lose their colour in a few minutes, but this does not take place when oxygen is not present, nor in red light. There is no trace of chlorophyll left in the corpuscles. Prof. Pringsheim is therefore of opinion that its decolorisation is a phenomenon of oxidation, and that the products are gases. Further, this disappearance of the chlorophyll is not prevented by the absence of carbonic acid gas. The corpuscles which have lost their green colour do not regain it, although the cell in which they are contained, still continues to live; on this account Prof. Pringsheim regards the decomposition of chlorophyll as a pathological and not as a normal process.

Colouring matters, other than chlorophyll, which occur in the cells of plants, are likewise decomposed, but not all of them. Thus, the blue pigment of the Phycochromaceæ, the brown of Fucus, the red of the Florideæ, the orange of the corolla of Calendula, the blue in the cells of the staminal hairs of *Tradescantia virginica*, disappear, but the blue pigment in various flowers is not decomposed by exposure to intense light.

2. The ground-substance of the chlorophyll-corpuscles and their contents.

If a cell of Nitella or of Spirogyra be killed by the action of heat, for instance, the chlorophyll-corpuscles of the one and the spiral band of the other will absorb water