

je crois aussi plus faciles, ont été ouvertes, et c'est l'œuvre de ceux qui veulent servir la science et leur pays de discerner ce que les éléments peuvent recevoir de l'immense élaboration qui s'est accomplie depuis Gauss jusqu'à Riemann."

There is in the present tract a clear exposition of the elementary applications of Trilinear and Triangular Coordinates, and just a passing glance at Polar reciprocals.

In such a work we do not look for anything original, but for clearness and correctness. These ends, we think, have been attained, and we wish Dr. Wright health and leisure to enable him to carry out his design.

Grundriss der chemischen Technologie. Von Dr. Jul. Post. (Berlin: Robert Oppenheim, 1877.)

DR. POST, who is known to chemists as an able Privat Docent at the University of Göttingen, has, like many other teachers, felt the great necessity of a manual of chemical technology, suited to the requirements of students who desire a general training in that branch of applied chemistry. A considerable number of excellent treatises, as, for example, those of Knapp, Wagner, Bolley, Kerl, and Stohmann, already exist in German, and some of them have been translated into English, but no one of them is exactly adapted to the class-room. Their excellence consists in their completeness as works of reference; indeed as such they may be said to be invaluable to the chemical manufacturer; but the mode of their arrangement renders them of comparatively little value as aids to systematic study. Dr. Post has succeeded in producing a work which, within the compass of some of our smaller chemical manuals presents a complete outline of the present position of chemical technology. His book thus serves as a fitting introduction to the larger and more special treatises above mentioned.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Colour-Sense in Birds

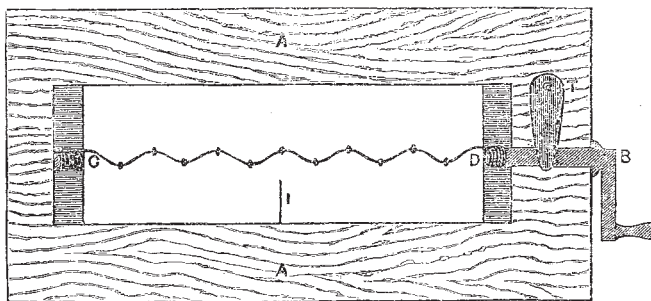
I HAVE been lately watching, with great delight, two goldfinches building their nest. They placed it nearly at the end of an outside branch of a young sycamore tree, so that there was nothing but sky above it, and the gravel path below. The window from which I observed them, being never opened, and well covered with flowers in pots and a blind, seems to have caused them no alarm, although not more than two yards distant from them; and their object appears to have been to make their nest invisible from below. To this end they chose their building materials with such skill and such colour-matching power that if one had not seen the nest built it would be quite impossible to discover it; to match the tree they took its long flexible blossoms, and to match the sky the equally long and flexible stalks and flowers of the garden forget-me-not, of which a bed was close at hand in full bloom. I watched them carefully, and, as far as I could see, they used no other materials than these flowers, though I saw one of them attempting to get the dirty-white cotton tie off a budded rose-tree. At all events the nest was mainly built of them. The blue of the forget-me-not has of course faded, but the general effect from below is that of a scarcely visible grey-green thickening of one of the bunches of sycamore leaves. They seemed to enjoy flinging their flower-wreaths about. And that leads to the question whether birds—who are in many ways like children—do not often out of mere playfulness and love of colour, pull to pieces yellow crocuses and other bright flowers. While my pen is in my hand I may mention, with reference to Dr. Muirhead's communication on the subject of noise causing a sensation of colour, that I have frequently observed whilst tuning a harp,

that the sudden breaking of a string will cause a curious taste and sensation in the mouth, like that produced by a piece of silver and one of zinc placed above and beneath the tongue, when they are made to meet.

A Simple Wave-Motion Apparatus

It has been suggested to me that I should publish a description of a simple and portable wave-motion apparatus, devised by me a year or two ago, which has given satisfactory results to others as well as to myself. I therefore send the description.

In the figure A A represents an ordinary wooden lantern slide, with a rectangular aperture, which may vary in size according to the size of the lantern condensers, the sketch being half size for 4-inch condensers. A small winch, B, is fitted into the slide at one end of the aperture, and held in its place by the tongue, T. The spindle, B D, is milled or otherwise roughened near the end, D. A brass stud similar in shape to the milled end of the spindle, but smooth and slightly smaller, is fixed in the opposite side of the aperture at C. A helix of 25-gauge hard brass wire is wound on a spit of the same size as the smooth stud, taking care to wind the coils close together; about fifteen turns of the helix are cut off, and the middle five turns drawn out till they form a perfect wave similar to the figure when held up to the light. The length of the helix should then be the same as C D. One end of the helix is pushed tight on the milled end, D, and the other end is slipped loosely over the stud, C, so as to work



on it like a swivel, to keep the end of the helix true when the winch is turned. A little bead of wax is melted on each crest and hollow of the wave to represent particles, and the essential parts of the apparatus are complete. On placing it in front of the lantern, and focussing, a distinct and striking image of a moving wave with its vibrating particles is produced by turning the winch.

If the helix is not perfectly straight the image of the wave will rise up and down more or less as a whole; the helix should then be straightened or "set" with the fingers till true. When once set thin glass plates may be placed on each side to protect it from injury. An index, I, of wire, may be fixed so as to give a means of proving that the particles only move up and down.

A modification I have tried by using a dark wire with bright silver beads, on a velvet back-ground in the optic telescope, is more difficult to make and use. I therefore prefer the apparatus as sketched above.

Of course the amount of finish depends on the taste of the user, &c. A pasteboard frame instead of mahogany, a wire bent twice at right angles instead of a finished brass winch, and tied to the frame by two bits of wire instead of let in, &c., may be used, thus reducing the cost to a few halfpence.

In use it will recommend itself.

W. JESSE LOVETT

Birmingham

Atmospheric Currents

A CONTROVERSY was recently waged in your columns as to the course which is pursued by the hot water-laden air of the equatorial regions in its journey to the poles. Both combatants seem to adopt what I may call the sheet-theory, which regards the winds as moving in sheets or strata, and gliding over and under each other at the polar and equatorial sides of the calms of Cancer and Capricorn, a process which would inevitably result either in both opposing winds being torn to tatters, or in their commixture and neutralisation. Surely the truth is that like all other moving fluids, the air will seek equilibrium in the direction of least resistance, and will carve out for itself wide channels in accordance with local conditions from the poles to the equator,