

technical essay deals with the latent image in photography, while skating is the subject of a very successful popular lecture at a high level. A selectionist interpretation is given of the brightly-coloured Alpine varieties of certain flowers, for pollinating insects are scarce and readily benumbed, and survival rewards variants in the direction of brighter blossoms. To this is appended a theory of the way in which "a unified course of economical expenditure" is impressed upon the organism, and gives to "the developmental progress of the individual its prophetic character." But the theory is stated very elliptically, and does not seem to us to be very clear.

In his concluding essay, which rather takes our breath away, Prof. Joly argues that the present gravitational properties of matter cannot be supposed to have acted for all past duration, and proceeds to speculate concerning the pre-material



FIG. 2.—The Ampezzo Thal. Dolomite Alps. From "The Birth-Time of the World."

state of the universe, when kinetic entities, not yet materialised, exhibited a dreary succession of unprogressive, fruitless motions.

It gave us a pleasant thrill to renew acquaintance after a quarter of a century with a remarkable essay entitled, "The Abundance of Life"—certainly one of the most instructive contributions that have been made to the contrast between animate and inanimate material systems. The contrast is stated in physical terms: "The transfer of energy into any inanimate material system is attended by effects retardative to the transfer and conducive to dissipation. The transfer of energy into any animate material system is attended by effects conducive to the transfer, and retardative of dissipation. The organism is a configuration of matter which absorbs energy acceleratively, without limit, when unconstrained." The attitude of the organism towards energy external to it

"results in its evasion of the retardative and dissipatory effects which prevail in lifeless dynamic systems of all kinds." But what is it in the organism that enables it to take the attitude thus so admirably defined?

(3) A re-publication of Mr. Hudson's "Birds and Man" is very welcome, for no such wise and beautiful book should be allowed to get out of print. He tells us of "birds at their best," that is, in their native haunts all-unsuspecting, and of the enrichment which their beauty brings to the open mind; of the reality of sympathy between living creatures, for instance, between wagtail and cow, robin and man; of the pleasingness of all natural sounds heard in their proper surroundings; of the secondary æsthetic element which the voices of some birds have, inasmuch as they approach the expressive tones of the human voice; and of the secret of the charm of flowers, which seems to us to exaggerate, almost *ad absurdum*, the associative factor in æsthetic emotion. His chapters on ravens, owls, and geese are charming and illuminating appreciations; his protests against the "cursed collector" and his patrons, and against stuffed birds as household decorations are still too dismally relevant—though we think that there has been a wholesome change in public opinion to which Mr. Hudson's insight and infectious enthusiasm have effectively contributed. We confess, too, that we have more hope for the conservation of the beautiful along this line than by the severe legislation which the author suggests. At the end the book brings us very picturesquely to Selborne and to an imaginary conversation with Gilbert White, which is high art and sound sense too. The frontispiece of this delightful book is a very fine coloured picture of the furze wren or Dartford warbler.

JOHN DALTON AS A SCIENCE LECTURER.¹

AS is well known, John Dalton began his academic career at the age of twelve, by a public announcement, affixed to the door of his father's cottage, that he was prepared to impart the elements of a liberal education to the youth of Eaglesfield, of both sexes, on reasonable terms. In actual attainment he was probably not greatly in advance of his scholars—some of whom were lads of sixteen or seventeen, who offered to fight their mentor when disciplinary duty was to be done. In moral power and mental vigour he was more than a match, we may be sure, for even the most pugnacious of his pupils. These qualities doubtless secured for him the ascendancy proper to his position as the principal.

During this short apprenticeship to the profession of a pedagogue, Dalton sowed the seeds of his future greatness. A couple of years' experience of self-taught teaching, when wholly dependent upon his own powers of self-reliance, acquisitiveness, and industry, must, at such a period

¹ "John Dalton's Lectures and Lecture Illustrations." Parts i. and ii. by Prof. W. W. Haldane Gee. Part iii., by Dr. Hubert F. Coward and Dr. Arthur Harden. (Manchester: Literary and Philosophical Society, 1915.) Price 1s. 6d.

of his mental development, have greatly tended to form and strengthen his intellectual character. The fact is, Dalton was a born teacher, and, luckily for the world, he realised his true vocation. He then joined his elder brother Jonathan in carrying on Mr. Bewley's school at Kendal, and for twelve years he instructed the youth of both sexes in English, Latin, Greek, and French; writing, arithmetic, merchants' accounts, and the mathematics. It is interesting to trace, from the school syllabus issued by the brothers, how John was gradually drawn to the study of science, first to the oldest of all the sciences, astronomy, and then to the various branches of physics, or natural philosophy, as it was then termed. The late Prof. Huxley used to say to his colleagues, "If you want to get up a subject, offer to lecture upon it," and Dalton would seem, in practice, to have acted upon this principle. The school syllabus was gradually enlarged until, as Sir Henry Roscoe says, it "forcibly reminds us of that of a technical school of the present day."

When twenty-seven years of age, John Dalton accepted the position of tutor in mathematics and natural philosophy at the Manchester Academy, and for upwards of fifty years Manchester continued to be his home until his death at the age of seventy-eight.

For some years prior to his removal to Manchester Dalton had offered to give public lectures, and the Manchester Literary and Philosophical Society possesses copies of the prospectus he issued for courses on natural philosophy to be held at Kendal—"Admittance 6d. each lecture, or 5s. the whole." After his removal to Manchester he again arranged for a course at Kendal "as far as the apparatus there would admit"—"about six lectures on chemistry and six on the other branches would be my plan." Tickets for the course to admit a gentleman and lady, or two ladies, 10s. 6d.; single lectures, 1s. 6d.

Dalton was now fully embarked on the career of a public lecturer on science, and until he was close upon seventy years of age there were few years in which he was not called upon to give courses. At the instigation of Davy he was early invited to London—Albemarle Street sharing with Athens a passion for the newest thing—to receive from the youthful *protégé* of Rumford, himself some twelve years Dalton's junior, instruction in declamation, and in the art and mystery of holding the attention of a Royal Institution audience.

In the publication before us Dalton's later career as a science lecturer is succinctly set forth. He repeated his London lectures in Manchester. "In a populous town like this, where the arts and manufactures are so intimately connected with various branches of science, it may be presumed that public encouragement will not be wanting to a person qualified to exhibit and illustrate the truths of experimental philosophy upon a liberal and extensive scale." Nor was it. John wrote to Jonathan that "a more respectable audience has seldom been had on a similar occasion." In 1807 he was invited to Edinburgh, and subsequently to Glasgow, where, as he says, "he was honoured

with the attention of gentlemen, universally acknowledged to be of the first respectability for their scientific attainments, most of whom were pleased to express their desire to see the publication of the doctrine." The "doctrine" thus indicated took the shape of that epoch-making work, "A New System of Chemical Philosophy," part i. of which appeared in the following year.

Although the greater number of Dalton's public lectures were given in Manchester, at the rooms of the Literary and Philosophical Society, of which he became the honoured president, or at Thomas Turner's Medical School in Pine Street, or at the Royal Manchester Institution, or at the Mechanics' Institution, where he gave his last lecture, in 1835, on the Atomic Theory, he was readily induced, until age and physical infirmity began to tell upon him, to visit the neighbouring towns, and Leeds and Birmingham were in turn favoured with his presence. All that can be ascertained respecting these various courses, and especially of the diagrams and illustrations used by Dalton in connection with them, most of which seem to have been prepared by himself, is set forth in the interesting account before us. The diagrams, 150 in number, are the property of the Manchester Literary and Philosophical Society, and Prof. Haldane Gee, and Drs. Coward and Harden have done a signal service to the history of one of the most remarkable epochs in science in giving a description of the more important of them, and of the circumstances under which they were first employed by their illustrious author.

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PROF. RAPHAEL MELDOLA, F.R.S.

SCIENCE and the world are alike the poorer by the sudden death of Prof. Meldola on Tuesday, November 16. Naturalist, chemist, physicist, and man of affairs, it is no easy matter to estimate, thus near to that sad event, the value of his work and influence. But we may recall the facts that at the time of his death he had been for thirty years professor of chemistry at the Technical College, Finsbury, a part of the City and Guilds of London Institute, that he was also a vice-president of the Royal Society, a member of the Advisory Council appointed by the Privy Council to promote scientific research in relation to trade and industry, and chairman of the Advisory Council of the Board of British Dyes (Ltd.), a commercial organisation fostered by Government to assist in the manufacture of dyestuffs in the United Kingdom.

Raphael Meldola was the only son of the late Samuel Meldola, and was born in Islington July 19, 1849. They came of an ancient Sephardic family, the Sephardis being Spanish and Portuguese Jews, the more aristocratic section of the race. The genealogy of the Meldolas can be traced through sixteen generations without a break, back to Isaiah Meldola (b. 1282, d. 1340), of Toledo. Under Spanish names the family flourished long in Toledo, and produced many men of