

(b) In the case of Light, not much can be said as yet: but with regard to radiation and absorption of radiant heat, Tyndall has shown that the complex molecules of organic vapours are the best radiators, and that uncombined atoms can hardly be said to radiate or absorb at all. So we see that the simple, "metallic" vapours radiate but ill, whilst the more complex atoms do not reflect, but rather absorb light and heat rays. Indeed, we may suppose, that as in the case of complex vapours, the more highly evolved atoms, requiring a greater supply of force, turn these rays that fall on them to account; whilst the metals dispense with them by reflecting them.

(c) The chief relations of electricity have already been alluded to. The chemical affinity between elements increases as they differ in electric polarity; and the more highly evolved, the more chlorous or electro-negative are they.

Lastly, late researches have shown that the elements nitrogen and sulphur at a high temperature, give more complex spectra. This fact, if it be a fact, has thrown some doubt on their claim to be regarded as absolute elements.

In explaining the phenomenon, we should probably consider the sulphur particle to be composed of several groupings of the ultimate element, which, driven apart by the action of heat, are made to vibrate separately with various velocities. Thus the allotropic form of oxygen, ozone, has been represented by a simple formula  $\begin{matrix} O \\ \diagup \quad \diagdown \\ O \end{matrix}$ , being made up, as it is supposed, of two groupings of the element oxygen, that being the ultimate atom.

The above statements seem to me to agree in showing, that if the hypothesis of evolution is tenable at all, it can be extended to explain all or nearly all the relations between the elements at present existing on this globe.

C. T. BLANSHARD

Queen's College, Oxford

#### Ancient Balances

*Apropos* of Mr. Chisholm's interesting account of ancient weighing instruments, in your last number, I venture to call his attention to the representation of an equal-armed balance in an Egyptian papyrus of the nineteenth dynasty, about 1350 B.C. It is to be found in the celebrated "Ritual of the Dead," a hieroglyphical papyrus of Hunnefer, of the reign of Seti I. In the "Judgment Scene" the heart of the deceased is represented as being weighed in a balance in the Hall of Perfect Justice, and in the presence of Osiris. The balance is of the ordinary equal-beam construction, the final adjustment being attained by a sliding weight on one side of the beam, exactly like the "rider" on our exact balances. The papyrus may be seen in the British Museum.

G. F. RODWELL

#### Brilliant Meteors

ON Saturday evening (Oct. 18), about half-past 8 o'clock, I observed, from Boltsburn, Durham, a meteor of considerable brilliancy in the north-western part of the sky; it shot downward from an elevation of about 40°, and left a streak of very red light on its path. The streak continued visible for nine or ten seconds.

JOHN CURRY

Boltsburn, Oct. 20

LAST evening, October 26, when returning home I observed a brilliant meteor stream across the sky. It may be worth while to record it.

Not having my watch, I can only guess the time as about 8.20 P.M. The first appearance was like a flash of lightning intensely white, arresting attention at once. When observed it streamed from  $\xi$  Persei above Capella (in altitude) and disappeared in Lynx. For two-thirds of its course its light was very bright, and it left a brilliant train of sparks, but for the remaining third it merely showed its own single expiring light.

Later in the evening when observing with the telescope in Cepheus, two shooting stars crossed the field at different times, apparently from the same radiant.

T. T. S.

Thrupton Rectory, Hereford

#### SIR HENRY HOLLAND

ALTHOUGH the late Sir Henry Holland, whose name has been familiar to the world during the greater part of the present century, cannot be regarded as a ma-

eminent in scientific research, still, as a Fellow of the Royal Society of nearly sixty years' standing, as President of the Royal Institution, as one who was ever ready to contribute towards the advancement of scientific research, and as the friend of all the most eminent men of science of his time, which was a long one, we deem him worthy of more than a passing notice.

As much as for anything else, Sir Henry was known as an indefatigable traveller; his fondness for travelling, indeed, having led to the illness which was the immediate cause of his death on October 27 last, his 86th birthday. He had very early in his career deliberately determined to set aside two months each year for the purpose of indulging his favourite recreation. This year, immediately after his return from a visit to Russia, he set off for Naples in September last, staying a short time at Rome and Paris on his way home. He arrived in London on October 25, suffering from a slight cold, which was sufficient, notwithstanding the wonderful robustness of his constitution, to cut him off in two days. He began his travelling career by a visit to Iceland in 1810, since which he has explored almost every corner of Europe, and been eight times in America. In his "Recollections of Past Life," published in 1872, he speaks thus of his travels:—

"The Danube I have followed with scarcely an interruption, from its assumed sources at Donau-Eschingen to the Black Sea—the Rhine, now become so familiar to common travel, from the infant stream in the Alps to the 'bifidos tractus et juncta paludibus ora' which Claudius with singular local accuracy describes as the end of Stilicho's river journey. The St. Lawrence I have pursued uninterruptedly for nearly 2,000 miles of its lake and river course. The waters of the Upper Mississippi I have recently navigated for some hundred miles below the Falls of St. Anthony. The Ohio, Susquehanna, Potomac, and Connecticut rivers I have followed far towards their sources; and the Ottawa, grand in its scenery of waterfalls, lakes, forests, and mountain gorges, for 300 miles above Montreal. There has been pleasure to me also in touching upon some single point of a river, and watching the flow of waters which come from unknown springs or find their issue in some remote ocean or sea. I have felt this on the Nile at its time of highest inundation, in crossing the Volga when scarcely wider than the Thames at Oxford, and still more when near the sources of the streams that feed the Euphrates, south of Trebizond."

It was mainly on account of the reputation which even then he had achieved as a traveller, that he was elected a Fellow of the Royal Society in 1815.

Sir Henry was elected President of the Royal Institution in 1865, and took the very warmest interest in its success, and in the promotion of scientific research, being seldom or never absent from his post, doing much to popularise science among the upper classes, among whom, as our readers know, he was always a welcome guest. For fifteen years Sir Henry contributed 40% annually to a fund specially set apart for the promotion of research, and was always ready to take by the hand promising young students who were diffident of their own abilities. Sir Henry himself never knew what it was to struggle, no man ever slid more easily into the highest professional and social position, and no man was ever probably less spoiled by his success. He counted from the very first among his patients, many of whom became his intimate friends, the highest in social and political rank both at home and abroad, and the most eminent in literature, science, and art, knew nearly everyone whose name during the last sixty years has been before the public, and was respected and loved by all with whom he came in contact. Sir Henry had naturally good abilities, great tact and knowledge of the world, a mind stored with knowledge gained from books, from travel, and from his intercourse with men, which, combined with his genial

bearing, rendered his society wonderfully delightful. As a physician, he was possessed of high skill.

Of Sir Henry's contributions to literature, his "Medical Notes and Reflections" (1839) and his "Chapters on Mental Physiology" (1852) are well known to the medical profession. He contributed a considerable number of articles to the *Edinburgh*, and other reviews, which, in 1862, were published as "Scientific Essays." In 1815, he published his celebrated "Travels in the Ionian Isles and Greece," of which a second edition appeared in 1819; a work abounding in classical, antiquarian, and statistical information, interspersed with interesting details respecting manners and customs, scenery and natural history. In 1816 he contributed to the "Philosophical Transactions" a memoir on the manufacture of sulphate of magnesia at Monte della Guardia, near Genoa, and afterwards papers to various other scientific journals. Last year he published his well-known "Recollections of Past Life," a volume which must long keep Sir Henry Holland's name alive. His memory will be cherished by all who knew him as something ever pleasant to recall.

The Royal Institution has thus, within a year, lost its Secretary and its President, not to mention the resignation of its Professor of Chemistry, who has not yet been replaced. Whoever is elected to fill the Presidential office will, we doubt not, keep up the traditions of the place, and do what in him lies to carry out the original design of the founders and donors of the Institution, never losing sight of the fact that above everything it is meant to be one of the few temples of original scientific research in the country. Its laboratories have recently been rebuilt, and we hope they will ever continue to be taken ample advantage of for purposes of study and research, not only by the earnest successors of the great men who have rendered them famous, but also by competent members, for whom they were originally equally intended by the enlightened and science-loving men to whom the conception of the Institution was originally due.

We conclude this notice by giving a few of the dates, in addition to those already given, which mark Sir Henry Holland's career. He was born at Knutsford, Cheshire, Oct. 27, 1787, and was educated at Newcastle-on-Tyne, and at the school of Dr. Estlin, near Bristol, where he became head boy. In 1804 and 1805 he attended Glasgow University, and in 1806 he entered the Medical School at Edinburgh, where he became acquainted with many of the notable men that then frequented "the grey metropolis of the north"—Sir Walter Scott, Brougham, Sydney Smith, Horner, Jeffery, Dugald Stewart, Sir William Hamilton. In 1816, after spending some time in travel, he established himself in London, and at once achieved high professional success. He became Physician in Ordinary to the late Prince Consort in 1840, and to the Queen in 1852; and next year was created baronet. Sir Henry was twice married, his second wife, who died in 1866, having been the daughter of his old friend Sydney Smith.

#### THE AMERICAN MUSEUM OF NATURAL HISTORY IN CENTRAL PARK NEW YORK \*

FOR many years a large number of the generous and public-spirited citizens of New York had long felt the need of a museum and library of natural history that should be on a scale commensurate with the wealth and importance of their metropolitan city, and would encourage and develop the study of natural history, advance the general knowledge of kindred subjects, and to this end furnish popular amusement and instruction. In 1868 a remarkable opportunity presented itself of securing a rare collection that would form an admirable nucleus for such a

comprehensive museum. The most extensive dealer in specimens in the world, Edouard Verreaux, of Paris, suddenly died, leaving in the hands of his widow a collection, which, at the rates he was accustomed to sell specimens, would have brought over 500,000 francs, 100,000 dols. in gold. . . . Dying suddenly, he left the rich gatherings of an industrious lifetime seriously embarrassed with debt. This opportunity it was decided to try to improve, and a subscription of nearly 50,000 dols. was at once made up as a beginning, and since that time about 100,000 dols. have been contributed in money, though the present property of the institution, including the large donations of specimens which have been steadily coming in, could not be replaced, nor could other as interesting and valuable specimens for less than 250,000. A rare and nearly complete collection of American birds, and many fine birds of paradise and pheasants were first purchased by Mr. D. G. Elliott. While negotiations were about to be opened for the Verreaux collection, a second museum unexpectedly became available. Prince Maximilian of Neuwied on the Rhine above Bonn (not the Emperor Maximilian of Austria and Mexico) died, and the young son inheriting the estate had no scientific taste, and offered the results of his father's life-work for sale. The elder Prince, who formed the collection, passed 1815, 1816, and 1817 exploring Brazil from Rio up to Bahia, and of course a large proportion of the great collections he secured had never at that early date been seen by scientific men in Europe before, and were therefore types of new species.

This collection the American Museum purchased entire. An agreement was soon after made with Mme. Verreaux by which all the choice specimens in her cabinet not contained in the Elliott and Maximilian purchases were selected for the museum, and all these specimens have been safely received from Europe, and are now on public exhibition in Central Park. Large donations of shells, corals, and minerals have been received, and one collection of 20,000 insects. The liberal subscriptions first made induced the principal subscribers to consent to act as trustees for the fund and property acquired by it, and by a special Act of the Legislature they were created a body corporate—they and their successors to have entire and unrestricted control for ever over all the museum property. They have limited their number to twenty-five, and the survivors fill every vacancy, thus securing a fixed policy and stable character to the institution. An arrangement has been made between the trustees and the Department of Public Parks in New York by which the city may furnish lands and buildings, while the collections are to be bought and cared for by moneys contributed by the trustees themselves and the generous public. In pursuance of this plan, by which the authorities of the city and private citizens might cooperate toward the common end of establishing a large museum, 500,000 dols. were appropriated by the city to commence a suitable thoroughly fire-proof edifice, and the Department of Parks was authorised to set apart so much of the public lands under their control as they might deem proper and necessary for the proposed structure and its future extensions.

The great object of the museum is twofold. First, to interest and instruct the masses which already throng its halls, and occasionally number over 10,000 in a single day; and, secondly, and especially to render all the assistance possible to specialists. These wants are shown to be amply met by the large, palatial saloons for the public, and over the whole building a high Mansard story, containing spacious and well-lighted rooms with every modern convenience, where naturalists from every part of the country may pursue their favourite studies for any length of time, and be secure from all possible interruptions. The building will undoubtedly be ready for occupation in the spring of 1875.

\* A Paper read by Albert L. Bickmore, Ph. D., Superintendent, at the Meeting of the American Association.