

the larynx is closed in the inspiratory phase, and parts of the transversalis and rectus abdominis are attached directly or indirectly to the pulmonary roots.

Thus parts of the muscles of the amphibian trunk become inspiratory in action, for they contract during the inspiratory phase and tend by their contraction to enlarge the pulmonary space. If, then, the larynx were to be opened in this phase, air would be drawn within the lungs (regulated in its rate of inflow by the laryngeal, tracheal and bronchial musculature), and a thoracic type of respiration would be thus evolved. Thus the minor movements which occur in amphibians when the lungs are filled with air are evidently the precursors of the normal respiratory movements of reptiles, birds and mammals.

One other point in connection with the respiration of the frog may be mentioned; it has not received the attention it deserves. The air which the frog breathes is a mixture of the air just expired with a fresh supply drawn within its mouth. Further, I believe it never empties its lungs completely in expiration. Thus the air within the lungs is always a highly impure air. That is also the case with the air within the pulmonary alveoli of mammals, birds and reptiles. The explanation I offer is that when air breathing vertebrates were evolved from water breathing forms, the oxygen of the atmosphere had to be diluted to a proportion more nearly corresponding with the amount held in water, to which the system of branchial breathing forms were adapted.

A. KEITH.

London Hospital Medical College, E.

Degradation of Elements.

A STATEMENT reported as having been made by Sir William Ramsay, that radium breaks down into helium, has been received with a chorus of wonder as something absolutely new. May I point out that in NATURE, October 10, 1889, p. 584, you have something very similar, in an account of some observations on gases in sealed tubes, communicated by the late Prof. Piazz-Smyth to the British Association in 1889.

The whole of the paper is astounding, stating as it does that many substances break down into hydrogen, but perhaps the most remarkable part is:—"Again, an iodine tube which had a comparatively large quantity of solid iodine granules introduced into, and sealed up in, its interior eleven years ago, and showed then a splendid spectrum of 148 measured iodine lines, extending discontinuously from red to violet, and had nothing else save these very faint, puny images of the three principal lines of hydrogen—this tube, in 1889, has not a single iodine line now left; but its spectrum, which is now brighter than ever, is composed of nothing but hydrogen lines, so that the once solid iodine granules would seem to be partly changed into hydrogen, and partly deposited on the inside of the tube as a yellow haze, besides leaving a trifle of loose dust."

When in 1894 I saw this quoted in Preston's "Theory of Heat," I thought it momentous, and wondered why it had not been followed up and more made.

Some to whom I have mentioned it consider that it comes in the same category as the alleged complete metalepsis of manganese acetate communicated by Wöhler to Liebig's *Annalen*, vol. xxxiii. p. 308.

S. H. WOOLHOUSE.

Parmiter's School, Victoria Park, N.E., March 14.

I THINK it was generally believed that Prof. Piazz-Smyth's results were due to the iodine being absorbed by, and the hydrogen being evolved from, the electrodes. There are many other recorded transformations, among them Dr. Samuel Brown's conversion of carbon into boron (or *vice versa*, I forget which). The difference between the more recent work and the earlier consists in the fact that the transformation of radium emanation into helium is accompanied by a great energy change, while we do not know that the former supposed transformations are.

Although in all probability the result would be negative, the re-investigation of the old recorded cases is not to be discouraged.

WILLIAM RAMSAY.

University College, London.

NO. 1796, VOL. 69]

Remarkable Destruction of Birds in Cardigan Bay.

THE following incident, which has excited much interest here, seems to me to be of more than local interest, and to be worthy of record in the columns of NATURE.

On Friday, March 18, many of my pupils in the Pwllheli County School, on returning from dinner at 2 p.m., informed me that "hundreds and thousands" of birds—starlings, thrushes, blackbirds, woodcock and snipe—had just been cast upon the shore at high tide.

Further, that, during the small hours of the morning, large numbers had fallen "dead beat" upon the deck of a vessel entering the harbour, and also that some had fallen, in a helpless and dying condition, among, and even upon the backs of, workmen employed at the granite quarries on the Gimblet Rock. At first I was naturally somewhat sceptical, but on inquiry in several quarters I found that my informants had correctly stated the case, and that large numbers of birds—all land-birds, be it noted—had been found all along the coast from a point some distance east of the town so far as Aberdaron, several miles to the west. The theories put forward to account for the occurrence were many and varied. Some held that electricity was to be held accountable—either the ordinary atmospheric sort or that uncanny variety manipulated by Mr. Marconi. Others suggested, in all seriousness, a special miraculous intervention of Providence, on the ground that the frost this year had not killed a sufficient number of the feathered tribe!

On the following day I visited the shore with the view of finding some clue to the mystery. I found enough to lead me to believe the following to be the simplest explanation. The warm weather and copious rains of the last few days must have melted large masses of snow on Snowdon and neighbouring ranges. This may have caused in some of the valleys opening out into Cardigan Bay a flood of sufficient magnitude to carry away bushes and trees on the banks of the swollen mountain torrents. Assuming this to have occurred during the night—moonless, starless and possibly foggy—it is conceivable that birds roosting in the branches would cling to them and be carried out to sea. At dawn, finding themselves literally and metaphorically "at sea," the birds would fly hither and thither, and finally sink exhausted. A strong easterly breeze then prevalent would account for the rest. There was, in my opinion, abundant evidence of a flood. In addition to the birds (thrushes, starlings and blackbirds, according to my personal observations) lying about three feet, vertically, above the ordinary high-water mark—the Friday mid-day tide being a spring tide—I found many twigs and a few good-sized branches of alder and willow, besides a branch of a pruned apple tree. Several onions and some cabbages were lying at the same level as the birds, together with a square wicker basket with rope handles. The latter probably indicate a flooded garden, which may enable us later to localise the flood.

The main difficulty to my mind lies in the failure of the birds to leave their drifting perch before getting out to sea. Perhaps some readers of NATURE better acquainted with bird life than myself may be able to throw light on this remarkable occurrence.

C. W. HERBERT GREAVES.

The County School, Pwllheli, N. Wales, March 21.

Distribution of the Nightingale.

THE fact that the distribution of the nightingale is restricted to the drier parts of these islands is well known, but the causes of this are obscure. If an excessive amount of rain be one of them, it is probable that last summer would have had the effect of reducing the number of young birds, and consequently of the immigrants of this spring. I should therefore be much obliged to any of your readers who live in a nightingale country if they will inform me towards May 1 whether they observe any difference in the number of these birds.

I may mention that the nuthatch, a bird which, though not altogether migratory, has a similar range (I have never met with it in North Wales, where I lived many years), has disappeared from here entirely this winter, though it was abundant in former winters.

ALFRED O. WALKER.

Ulcombe, Maidstone, March 19.