

phenomena (1) by a consideration of the composition and properties of atmospheric air; or (2) in consequence of remarking the results of the analysis of certain pairs or series of chemical compounds, the composition of which illustrates the law of multiples.

The authors contend for the former view, and adduce the contents of the lecture note-book dated 1810; but these notes of lecture 17 contain evidence of confusion in the statements made by Dalton himself. In these notes he says (p. 14 of the book), "In order to reconcile or rather adapt this chemical theory of the atmosphere to the Newtonian doctrine of repulsive atoms or particulars, I set to work to combine my atoms upon paper," &c. (P. 15), "In 1801, I hit upon an hypothesis." This hypothesis relates to the mutual repulsion of gaseous particles. (P. 16), "Upon reconsidering this subject it occurred to me that I had never contemplated the effect of difference of size. . . . This idea occurred to me in 1805." (P. 17), "The different sizes of the particles being once established, 'a train of investigation was laid for determining the number and weight of all chemical and elementary principles which enter into any sort of combination one with another.'"

So that the atomic theory as applied to chemical combination took shape in Dalton's mind according to this version of the story in 1805. Yet according to another of the note-books, quoted p. 26, he was using symbols to express the atoms of elementary bodies in 1803. The authors notice this conflict of statement, but get rid of it by assuming 1805 to be a clerical error for 1803.

Thomson was probably wrong in attributing the origin of the atomic theory to the study of marsh gas and olefiant gas. But in his exposition of the Daltonian doctrine, prepared only a short time after his interview with Dalton, he illustrates the use of the atomic doctrine by reference to the oxides of nitrogen. This was in his third edition, published 1807. In his sixth edition he introduces the oxides of carbon as well as the oxides of nitrogen. Thomson, therefore, from the time of his interview with Dalton retained the impression that the genesis of the theory was intimately connected with the facts known to Dalton as to chemical combination in multiple proportions, though he was evidently not clear as to the particular case first considered. That it was the oxides of nitrogen which first attracted Dalton's attention is, however, probable from the fact that he refers to them in the following noteworthy passage which occurs in his paper on the atmosphere read at Manchester, November 12, 1802: "These facts clearly point out the theory of the process: the elements of oxygen may combine with a certain portion of nitrous gas, or with twice that portion, but with no intermediate quantity." The authors have succeeded in discrediting the story about marsh gas, but it still remains doubtful whether Dalton's recollections in 1810 of what occurred six or seven years before are more trustworthy than the impressions of Thomson received much earlier, when it is a question as to the order in which various considerations came before his mind in the long course of meditation which led to the adoption of his theory.

YOUR REVIEWER.

An Advance in Röntgen Photography.

SINCE my last communication I have been pursuing the study of the photography of the soft tissues in the living adult subject, and making attempts to see shadows of them on the fluorescent screen. In a previous communication I was able to state that I had accomplished these in the region of the neck, the tongue, hyoid bone, larynx, &c. Proceeding downwards, I have now photographed and seen shadows of the cardiac area. In the photograph the diaphragm is clearly indicated below; the pyriform shape of the cardiac area is well made out, the base downwards, apex upwards, and the right and left borders show the relationship to the spine and ribs. JOHN MACINTYRE.

179 Bath Street, Glasgow, May 9.

PROJECTS FOR ANTARCTIC EXPLORATION.

ON January 28, 1841, Captain James Clark Ross and his comrades on her Majesty's ships *Erebus* and *Terror*, saw for the first time the giant volcanoes, rising in latitude $78^{\circ} 30' S.$, which bear the names of the only vessels that ever sighted them.

Fifty-five years later we remain in possession of no

more information regarding these regions than was brought home by the discoverer. This is a circumstance absolutely unique in the modern history of geography. During these fifty-five years the map of Africa has developed from a *carte blanche* into a well-ordered delineation of mountains, lakes and rivers, even towns and villages the names of which are household words. In the far North the limits of the unknown have been and are still being strenuously pushed back. It is only in the far South that the explorer's march has been stayed, and during the last ten or fifteen years the importance of securing a farther advance in this direction has been given expression to, with increasing frequency and emphasis, by the scientific men of all countries. The latest and most weighty statement on the subject was the resolution of the Sixth International Geographical Congress, drafted in London by the leading geographers of Europe, to this effect:

"That the Congress record its opinion that the exploration of the Antarctic regions is the greatest piece of geographical exploration still to be undertaken. That, in view of the additions to knowledge in almost every branch of science which would result from such a scientific exploration, the Congress recommends that the scientific societies throughout the world should urge, in whatever way seems to them most effective, that this work should be undertaken before the close of the century."

It is clear to all scientific men that, although the recent experimental trips of Scottish and Norwegian whalers to the Antarctic regions have led to some distinct advances in our knowledge, and have rightly occupied a good deal of attention, they leave the question of serious exploration untouched. In the absence of a real expedition, we must continue to eagerly utilise every scrap of information which may be obtained by any means; but such trifles are only of provisional value. The drowning man may, for want of other floats, catch at straws, but the least critical spectator of this proverbial tendency would not argue that a life-belt was therefore unnecessary.

Antarctic exploration, if newspaper reports are to be trusted, has been commenced by the American Dr. Cook, who accompanied Lieutenant Peary on one of his journeys in Greenland, and has now got together a small scientific party on board two little sailing vessels of only 100 tons, with which he hopes to penetrate to the coast of Graham's Land and winter there. Weddell, in 1823, succeeded in reaching $74^{\circ} 15' S.$, in that neighbourhood, one of his vessels being only 65 tons, so that small size does not necessarily mean failure. If Dr. Cook has experienced ice-navigators with him, he will probably be able to effect a landing and collect some useful information. His equipment, however, is, we fear, inadequate to the task he has undertaken, and much must not be expected from it.

A more serious effort is announced as almost ready. It is to be commenced in September this year, under a flag which we believe has not hitherto appeared in polar regions, that of Belgium. The proposed expedition is being arranged by Lieut. A. de Gerlache, of the Berlin Navy, under the auspices of the Royal Belgian Geographical Society, and the expenses, which are estimated at £10,000, are to be met by public subscription. It is said that a large proportion of the money has been promised, the Brussels municipality have voted a grant; but until the whole of the cost is guaranteed, it would be rash to look upon this or any other expedition as a settled affair. A strong scientific staff is intended to accompany the vessel, which will probably try to get south along the east coast of Graham's Land.

In Germany the enthusiasm for Antarctic exploration has been gradually rising, and a strong Committee was appointed at the Eleventh German Geographical Congress, held last year at Bremen, to organise an expedition.