Values of $a' = \sqrt{(p^2+q^2)}$. Mean p = mean q = 0. S.d. of p = s.d. of q = 10. 500 pairs taken.

	Experiment	Theory
Mean a'	12·5	12·53 ± 0·20
Standard deviation of a' ...	6·5	6·55 ± 0·14
Per cent. exceeding 25 ...	4·0	4·39 ± 0·62

the agreement being very close in all three values.

Manchester. H. E. SOPER.

Antarctic Fossil Plants.

IT should have been stated that Prof. Seward's memoir (reviewed in NATURE for August 26) is the first dealing with the *geological* results of Capt. Scott's Expedition. Two numbers of the Zoological series had previously appeared—No. 1 of vol. i. on June 27, and No. 1 of vol. ii. on July 25, 1914.

D. H. S.

HENRY GWYN JEFFREYS MOSELEY.

SCIENTIFIC men of this country have viewed with mingled feelings of pride and apprehension the enlistment in the new armies of so many of our most promising young men of science—with pride for their ready and ungrudging response to their country's call, and with apprehension of irreparable losses to science. These forebodings have been only too promptly realised by the death in action at the Dardanelles, on August 10, of Henry Gwyn Jeffreys Moseley, 2nd Lieut. in the Royal Engineers, at the age of twenty-seven. A son of the distinguished zoologist, the late Prof. H. N. Moseley, of Oxford, he was educated at Eton, entering as a scholar, and passed to Trinity College, Oxford, where he gained a Millard Scholarship. He obtained a First Class in Mathematical Moderations, and Honours in Natural Science.

Moseley early showed marked originality and an enthusiatic interest in science. A year before his graduation he had decided to undertake original work in physics, and visited Manchester to discuss the matter with me. After graduation, he was appointed lecturer and demonstrator in the physics department of the University of Manchester, and immediately devoted all his spare time to investigation. After two years he resigned his lectureship in order to devote his energies entirely to research, and was awarded the John Harling Fellowship. During the past year he went to Oxford to live with his mother, and to continue his experiments in the laboratory of Prof. Townsend. He went out to Australia with the British Association, took an active part in the discussion on the "Structure of the Atom" at Melbourne, and gave an interesting account of his recent work on the X-ray spectra of the rare earths, in Sydney. On the outbreak of war he put aside all thought of continuing the investigations in which he was so vitally interested, and returned at once to England to offer his services to his country, and was granted a Commission in the Royal Engineers. He was later made signalling officer to the 38th Brigade of the First Army, and left for the Dardanelles on June 13. He took part in the severe fighting at the new landing on August 6 and 8, and was instantaneously killed on the 10th by a bullet through the head in the act of telephoning an order to his division at a moment when the Turks were attacking on the flank only 200 yards away.

Moseley was one of those rare examples of a man who was a born investigator. He rapidly acquired the technique of experiment and soon gained a remarkably wide and accurate knowledge of modern physics. His undoubted originality and marked capacity as an investigator were very soon ungrudgingly recognised by his co-workers in the laboratory, while his cheerfulness and willingness to help in all possible ways endeared him to all his colleagues. His first research, published in the Proceedings of the Royal Society, consisted in the determination of the average number of beta particles emitted during the transformation of an atom of radium B and radium C—a difficult and important piece of work. It then occurred to him to determine the potential to which radium could be charged in a high vacuum by the escape of its own beta particles. He was able to achieve such a high stage of exhaustion—and this before the advent of the molecular pump—that a small quantity of radioactive matter retained itself at a potential of more than 100,000 volts for several weeks. He devised an ingenious method for detecting the possible presence of very short-lived radioactive substances, and in conjunction with Fajans utilised the method to determine the period of transformation of a newly-discovered product in actinium, which was found to be half transformed in 1/500 of a second.

Moseley's interest was greatly aroused by the discovery of Laue of the diffraction of X-rays in their passage through crystals, and in conjunction with Mr. Charles Darwin he immediately started an investigation to examine the quantity and quality of the X-radiation scattered from crystals at different angles. Prof. Bragg, who was working simultaneously at Leeds on the same problem, observed the presence of definite maxima in the scattered radiation corresponding to definite lines in the X-ray spectrum. This result was confirmed and extended by Moseley and Darwin, and they mapped out accurately for the first time the spectrum of the characteristic X-radiation from an X-ray tube with a platinum antikathode. These pioneer investigations in Leeds and Manchester were of fundamental importance, for they laid the foundation of the new science of X-ray spectroscopy, which is now in the process of rapid development.

Moseley next decided to examine the X-ray spectra of a large number of different elements with the definite object of testing whether the spectrum was connected in a simple way with the atomic number of the element when arranged in increasing order of atomic weight. Suggestions had been previously made that the charge on the nucleus of an atom, which defines its chemical and physical properties, was possibly equal to the atomic number. For this purpose he developed the photographic method for accurate measure-

ments of the spectra. In his first paper he examined the spectra of a group of elements of atomic weight between calcium and zinc. He showed that a similar spectrum consisting of two strong lines was emitted by each of these elements, and proved that the frequency of the corresponding lines in the spectra was proportional to the square of a whole number which varied by unity in passing from one element to the next. This number, which was closely connected with the atomic number of the element, was considered to represent the nucleus charge. He next proceeded to make a systematic study of a great majority of the solid elements, and showed that a similar result held for them all. Since the frequency of a given line in the spectrum varied by definite jumps in passing from one element to the next, he was able to draw the deduction that there could only exist three unknown elements from aluminium to gold, and he was able to predict the atomic number and spectra of these missing elements. This new and powerful method of attack was of especial importance in connection with the much debated question of the number of the rare earth elements.

The fundamental importance of these discoveries was immediately recognised. Prof. Urbain came from Paris to Oxford in order to utilise Moseley's new method to decide the nature of the elements present in the numerous preparations he had made of the rare earths. The results of the investigation of the rare earths have not been published, but it is to be hoped that sufficient data will be available later.

Moseley's fame securely rests on this fine series of investigations, and his remarkable record of four brief years' investigation led those who knew him best to prophesy for him a brilliant scientific career. There can be no doubt that his proof that the properties of an element are defined by its atomic number is a discovery of great and far-reaching importance, both on the theoretical and the experimental side, and is likely to stand out as one of the great landmarks in the growth of our knowledge of the constitution of atoms.

It is a national tragedy that our military organisation at the start was so inelastic as to be unable, with few exceptions, to utilise the offers of services of our scientific men except as combatants in the firing line. Our regret for the untimely end of Moseley is all the more poignant that we cannot but recognise that his services would have been far more useful to his country in one of the numerous fields of scientific inquiry rendered necessary by the war than by exposure to the chances of a Turkish bullet.

E. RUTHERFORD.

THE BRITISH ASSOCIATION AT MANCHESTER.

WRITING on the eve of the British Association week, it may be said that the prospects of a good number of members and associates are much brighter now than they were a few weeks ago. The experiment of shortening the meeting and of cutting out of the programme the long-distance excursions was one that threatened to reduce the numbers considerably, but we can be assured now that a very large proportion of those who attend the meeting of the British Association are primarily attracted by the scientific programme.

The interest taken in the meeting by the citizens of Manchester and the surrounding district has very noticeably increased during the past week, and a large number of students and teachers are enrolling themselves as associates on the half-fee terms that were offered by the Council for this meeting.

The discussions that will probably attract the largest attendances from among the local members are those on industrial harmony in Section F and on military education in Section L. Mr. Balls's lecture on the application of science to the cotton industry in Section K will also attract a good audience of local people.

In addition to the afternoon sectional excursions already announced, the agriculturists have arranged visits to the Agricultural Institution of the Cheshire County Council at Holmes Chapel and to another large farm in the district.

The arrangements made by the local executive committee for the reception of the Association have now been completed, and it will be found that ample accommodation has been provided for the comfort and convenience of the visitors. In time of war there are some subjects that cannot be discussed advisedly in open section, particularly in the sections of the physical sciences; but it may be anticipated that some important work will be done in the private discussions of smaller groups of scientific men in the smoking and conversation rooms. The university and the high school for girls will between them provide facilities for such informal discussions on a larger scale, probably, than in any previous meeting of the Association.

INAUGURAL ADDRESS BY PROF. ARTHUR SCHUSTER, D.Sc., Sc.D., LL.D., DR.-ÈS-SC., F.R.S., PRESIDENT.

The Common Aims of Science and Humanity.

UNDER the influence of the diversity of pursuits imposed upon us by the conditions of modern life, different groups of the community—men of business, men of science, philosophers, or artists—have acquired detached and sometimes opposing interests. Each group, impressed by the importance of its own domain in the life of the nation, and focussing its vision on small differences and temporary rivalries, was in danger of losing the sense of mutual dependence. But in the shadow of a great catastrophe it has been brought home to us that the clash of interests is superficial, and the slender thread of union which remained has grown into a solid bond. What is the fibre from which the bond is twined? Patriotism may express its outward manifestation, but its staple is the mental relationship which remains continuous and dominant even in normal times, when each of us may peacefully go to earn his living and enjoy the course of his intellectual life.

Outwardly the community is divided into heterogeneous elements with mental attitudes cast in different moulds, and proceeding along separate roads