a brief classification of the subjects included under the general term of anthropology, Dr. Haddon said his reason for touching on the subject at all was to suggest a general survey in the hope that fellow-students may carefully consider the lines upon which future research may be undertaken with profit, as there are times and occasions when one branch of inquiry is more immediately desirable than another. A few remarks were made on certain aspects of anthropological research, and various lines for future investigation were indicated.

A claim was made that the ethnological material now being collected from all over the earth is an indispensable contribution to the science of history. It is a truism that history repeats itself, and historians were invited to consult the modern instances that are accumulating, as they will find many suggestions that will serve to throw light upon past events, which otherwise might remain obscure. It is hardly an exaggeration to say that new life has been given to classical studies by the introduction into the universities of original archæological investigations, comparative archæology, ethnology and folklore. Allusion was made to the recent signs of an interest in ethnological inquiry by various Governments of the British Empire. "Is it too much to hope," it was asked, "that at last it is being recognised that a full knowledge of local conditions and a sympathetic treatment of native prejudices would materially lighten the burden of government by preventing many misunderstandings, and by securing greater efficiency would make for economy? . . . We have not yet exhausted other methods of advancing anthropology, we have scarcely yet endeavoured to educate the masses or to interest individuals who have time or money at their disposal. Few people have any idea of the great wealth of human interest there is buried in the data in the journals of our societies, or locked up in the cases and drawers of our museums. It is this practically unexploited wealth of interest and information that we should endeavour to disseminate. The apathy of the public to our science probably is largely due to its students. . . . I have indicated some of the lines upon which our Cinderella science is advancing, but before I finally vacate the honourable position to which you have called me, I must return once again to its most pressing need.

"Students at home spend laborious hours in reading, transcribing or collating the records of travellers, and in endeavouring to make them yield their secrets. The safety of the student usually depends upon the bulk of his material, but when one considers the sources of his information, one is sometimes appalled at the dangers he runs. The data that are available have been collected in varied circumstances by men of every degree of fitness and reliability. There are but two remedies for this state of affairs—trained observers and fresh investigations in the field. Fortunately, we are now in a position to say that means do exist for the training of field-anthropologists. Those who have had practical experience in Oceania, or who followed the literature of that region, will fully acknowledge the urgent need there is for immediate field-work. But the same pressing necessity is manifest in every quarter. Nor is it a call that we can neglect with impunity and postpone until a more convenient season. Each year sees a decrease in the lore we might have garnered, and this diminution of opportunity is taking place with accelerating speed. Oh! if we could only agree to postpone all work which can wait, and spend the whole of our energies in a comprehensive and organised campaign to save for posterity that information which we alone can collect."

ELECTRICITY AND MATTER.[1]

THE subject I have chosen is an enormous one, but it is one of exceptional interest at the present time. It is one of general interest as well as of scientific interest to students of physics. The fundamental properties of matter are now coming to be understood in a way in which they have never been understood before. What are these fundamental properties? One is cohesion, another is gravitation, and another is inertia. Concerning gravitation, we remain pretty much in the dark. It is an empirical fact that a body has weight, that two lumps of matter attract one another, with an extremely small force when we are dealing with ordinary pieces of matter, but extremely large when we are dealing with astronomical masses, such as planets or suns; but the cause of that gravitative attraction is not known, and at present appears to have little chance of becoming known. Cohesion ten years ago was in the same predicament, but cohesion now seems to be on the eve of yielding up its secret. The most striking fundamental property of matter, however, that we are beginning to understand in some degree, is that of inertia. Inertia is a popular term, but it is not always clearly understood what is meant by it. Let me explain the meaning. It may be defined as the power of overshooting the mark, or the power of moving against force. It is by inertia that a rifle bullet travels after it has left the gun. In the barrel it is urged by force; in the air the bullet goes on against an opposing force of friction because of its inertia—often in that case called the momentum. It is by reason of inertia that water runs uphill; we are sometimes told that water will not flow uphill, but that is a mistake. Heat will not flow uphill—heat will only flow from hot to cold; you cannot give it impetus and let it rush up of its own momentum, for heat has no momentum; it is not a substance, it only goes when it is pushed, and the instant you remove the force it stops. That is the case with heat, but that is not the case with any form of matter—it is not the case with anything possessing inertia. The water from a fountain rises because of the initial velocity imparted to it; for the same reason a cricket ball rises when it is thrown up; the propelling force has ceased, but the motion continues. It is the same with tides; for three hours the water is running uphill, for three hours it is running downhill. The head of the inflowing water is for three hours higher than the water behind it—the first three hours of the flow impart to the water its momentum, and the last three hours destroy that momentum gradually. The swinging pendulum is another illustration. [Having illustrated this point by a liquid in a horseshoe tube, showing the return to the position of equilibrium after a series of oscillations, the lecturer continued.] Oscillations like that are known to occur in electricity when a Leyden jar is discharged; the electricity does not go simply from the more highly charged to the less highly charged and there stop, but it goes beyond, it overshoots the mark and charges up that which was negative to positive, and then backwards and forwards, very like the oscillations in the tube. Hence it would appear as if electricity had a property resembling inertia. When I lectured here a quarter of a century ago I should have said that electricity had a property *resembling* inertia—I should have called it a mechanical analogue—an apparent inertia, simulating by inductive electromotive force the real inertia of matter. I should now go further than that, and should say that electricity has real inertia, just as real as matter: I should even go still further, and should say that in all probability there is no inertia but electric inertia; that the inertia of matter itself is to be explained electrically. In other words, what we are now arriving at gradually is *an electric theory of matter*. We are endeavouring to explain the properties of matter in terms and by means of what we know concerning electricity.

Although it may sound paradoxical to people who have not studied physics, we know more about electricity than we do about matter. Its properties have been more clearly investigated and more clearly understood than the inertia of matter, which is not understood at all. We only know its behaviour:—If a body is subject to a positive force it gradually increases its speed; if it is subject to an obstructive force it does not move in the direction of that force necessarily at once, but its motion begins to decrease, gradually stopping, and ultimately reverses its direction, if the force is continuous and if it is an active force. Many obstructive forces are only able to oppose motion like friction. In the text-books a bad example of a body obeying the first law of motion is given in the throwing of a stone upon ice, or some smooth surface. That is a bad example, because a single obstructive force acts all the time. The best example to give of the first law of motion is a case

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[1] A lecture delivered at Bedford College for Women, on February 5, by Sir Oliver Lodge, F.R.S. Reported from shorthand notes.

where there is a pair of balanced forces, where a propelling force acts all the time, just sufficient to overcome friction; *e.g.* a barge pulled by a horse, or a train drawn by a locomotive. When such a thing starts, the force is greater than the resistance, and the speed accelerates; when it stops, the resistance is greater than the propelling force; but when it is going on at a steady speed, *i.e.* for the major part of its journey, the force and the resistance precisely balance. The resultant force acting upon it is nothing. It is obeying the first law of motion. The barge moves, or the ship moves, or the train moves, simply and solely because of its own inertia. All the energy of an engine goes to generate heat and to overcome resistance. There is no propulsion in that; when it is going at a steady pace the positive and negative forces balance; the body is subject to zero force and obeys the first law of motion.

Now this property, a property analogous to inertia, belongs also to electricity; it was called self-induction, and its laws have been made out for a long time, a law known as Lenz's law, which says that any change in a current is such as to oppose the motion. If you have a current of certain strength any cause which increases that strength calls out an antagonistic force. The force called out is always antagonistic to any change in the current. When a current is weakened, self-induction tends to make it persist in retaining its old strength. It is a property precisely analogous to inertia, and I now wish to suggest or maintain that it is a property which actually is inertia. It depends on a property which was first brought out mathematically by considering the case of acceleration of a charged body.

In a sphere charged with electricity, as long as it is at rest, we have the phenomena of electrostatics; directly it is in motion we get the phenomena of current electricity. A charged sphere in motion is a current, and we have to realise that there is no other current but that; a current is surrounded by magnetic lines of force; and when a sphere or other body charged with electricity is put into movement, a set of concentric circles of magnetic force surrounds its path, giving rise to a magnetic field. That magnetic field may seem extremely weak, but it is the measure of the current; and whether weak or not, it is now believed to be the only kind of magnetic field which exists. We are coming to realise that there are three things—a charged body, a charged body in motion, and a charged body in accelerated motion; the first gives us electrostatics, the second gives us magnetism, and the third gives us two things, first the evidence of inertia, and secondly radiation. Inertia and radiation are not the same thing, but both are manifest throughout the accelerated period. Inertia no doubt exists all the time; and instead of radiation I will use the more general term of "light"—light being the best known form of radiation. I will put inertia in a class by itself, because, although it is only manifested when there is radiation, it exists all the time. It does not depend on the speed, it is constant, and may be taken to exist equally well when a body is at rest. I want you to realise that just as there is no other electric field but that due to a charged body, so there is no other current or magnetism except that due to a charged body in motion, and there is no other radiation except that due to an accelerated charge; further, that one kind of inertia is the inertia of the charge on a body, and that *probably*, but not yet certainly, there is no other inertia except electric inertia.

With the time at our disposal it is impossible to give you all the steps leading to this conclusion, I can only give you a summary of the results. The idea of electric inertia as a reality and as due to a moving charge took shape and form in a magnificent paper by Prof. J. J. Thomson, of Cambridge, which appeared in the *Philosophical Magazine* in 1881, one of the most striking productions in the recent history of mathematical physics. It was a paper on the properties of a moving charged sphere, and it showed that a charged body possesses inertia because it is charged. It is important to remember that a body when it possesses a charge has, in addition to its ordinary mass, a supplementary mass, as it were, proportionate to the square of the charge, and inversely as the radius of the sphere on which it exists; or, as we may also put it, it is proportional to the quantity and to the potential. No great importance was attached to the statement at the time because of the difficulty of detecting any increase of inertia due to the electric charge in the case of a sphere of appreciable size. The extra inertia would be excessively small and impossible to detect if the sphere is of any perceptible size. Even if the sphere is reduced in size until it is a mere atom, and charged as highly as the atom can be charged, still the inertia due to the charge would only be an insignificant amount of the whole—not more than one hundred thousandth part of the whole. That is to say, if you had one atom of matter charged with the maximum quantity which it can possess, and which you know in electrolysis or in chemistry, and if the inertia of the atom itself was one hundred thousand units, then when the charge was added it would be one hundred thousand and one; no important difference and not experimentally to be detected.

It depends, however, entirely how small the body is; the smaller the radius the bigger the inertia, due to the charge, will be. For a long time nobody thought of anything smaller than the atom, that was thought to be the limit, hence electric inertia seemed to be no more than a matter of mathematical curiosity. But about the year 1870 Sir William Crookes called attention to the phenomena that went on in vacuum tubes, and considered that the kathode rays were matter in a "fourth state," neither solid, liquid, nor gaseous. Sir William Crookes was not believed, and was rather jeered at for speaking of matter in a fourth state. However, the subject was investigated by a great number of different people in this country and in Germany; and the result of these researches, in which Prof. Schuster and many others, and notably Prof. J. J. Thomson, engaged, has been to show that Sir William Crookes was perfectly right; that the matter in the vacuum tube flying in these kathode rays is not solid, nor liquid, nor gaseous, does not consist of atoms as had been thought propelled by the kathodes and flying through the tube and causing phosphorescence where they strike, or X-rays, as the case may be, but that they consist of something much smaller than the atom, fragments of matter, ultra-atomic corpuscles, minute things, very much smaller, very much lighter than atoms—things which appear to be the foundation stones of which atoms are composed. Thomson measured the mass of these particles and found that they were of less mass than the atom of hydrogen; whereas the atom of hydrogen had been the lightest body hitherto known. These small corpuscles were about the one-thousandth of an atom of hydrogen in mass, and he further made this important observation, that whether hydrogen or oxygen or carbonic acid or any other gas was in the tube, the particles into which these substances seemed to be broken up by electric action were identical and independent of the nature of the gas in the tube. That is to say, the things shot out by the kathode did not depend upon what gas was in the tube; they seemed to be fragments of the atoms of the gas, but they were the same fragments in each case. This at once suggested the hypothesis, not yet by any means completely verified, that all atoms of matter may be composed of these same corpuscles, or electrons as Dr. Johnstone Stoney had called them. Dr. Stoney had a habit of being in the van and of naming things before they had been discovered; thus they were called electrons long before they were known to exist separately—only the name belonged to the charge of an ion in electrolysis—a charge associated with matter; but in a vacuum tube these same charges are detached from the atom and fly free, a thing previously unheard of. In liquid conduction the charge and the atom travel together, they are inseparably associated; at an electrode or solid conductor the electron or charge is handed on to the metal and goes along the wires by some other means, but while they are travelling they are definitely united or attached to atoms all the time, although passed from hand to hand; in a gas it is not so, for it is just as if charges had been knocked off, charges of electricity dissociated from the matter, disembodied charges or electric ghosts flying through the tube at a tremendous speed. It was not only possible to measure the mass of the particles, it was also possible to measure their speed, and their speed was found to be something comparable to that of light, about one-thirtieth or sometimes even one-tenth of the velocity of light. Anything moving with that prodigious speed of several thousand miles per second must have a great amount of energy, and when stopped by a target naturally considerable results are produced.

Now for radiation of any kind there must be acceleration. The greater the acceleration the stronger the radiation. If you want violent radiation take a quickly moving charged body, and stop it dead; which is just what you do in the production of X-rays, and what is done to some extent by minerals exposed to the kathode rays. These corpuscles have extremely small mass, and so their inertia is extremely small, but a body, no matter how small, moving with the speed of light, must have terrible energy; thus, by way of illustration, the energy of a gramme of matter (15 grains) travelling at the speed of light would be sufficient to lift the British Navy to the top of Ben Nevis. After the speed of these corpuscles that of bullets is rest in comparison. [Having shown by experiment a vacuum tube containing electrons in motion, the lecturer proceeded.] To show that these are charged particles in motion, it is only necessary to show that they have the properties of a current, that is, that they are amenable to magnetism—such as that of an ordinary steel magnet—and what you see going on in the tube is the nearest approach you have to seeing electricity. In that tube electricity is as isolated and as separated as we can ever hope to have it.

All electrical phenomena seem to depend upon these electrons. In the case of gaseous conduction what we observe is the flying of the particles—the bullet method or electric particles in free flight. When we deal with liquid conduction it is the slow travelling charges moving, but retarded or loaded with the atom of matter, having to convey the atom of matter with it; hence they travel very slowly, the atoms jostle and have to work their way through the rest of the material, and instead of going something like 1000 miles a second they go more like an inch an hour; it depends upon what gradient of potential is applied. That I call the bird-seed method, meaning that the charge is carried as a bird carries a seed the bird and seed travelling together until they arrive at an electrode, when the electron is dropped. In the case of solid conductors or metals the atoms cannot move along as they do in the liquid, they can only vibrate a little, are fixed, rigid, crystallised into their places. So when the electrons travel it must be because they are handed on from one to the next; each receives one and passes it on, not necessarily the same one; and this may be called the fire-bucket method.

A word more about radiation. If conduction is explicable in this way, how is radiation to be explained? Until quite recently radiation has been a puzzle. Atoms of matter vibrate; radiation is waves in the ether. Hence it used to be thought, and it did not seem puzzling at that time, that vibrating atoms of matter could generate waves in the ether just as a bell can generate waves in the air. The method by which light is generated was not clearly understood, but it was thought to be something analogous to the production of sound by a tuning fork or bell. But certain experiments made by me at Liverpool showed that matter and ether are disconnected from one another—that matter alone cannot generate these waves. It becomes necessary to assume that it is not matter which is vibrating so much as the charge on the matter—that radiation is caused not by the atom itself, but by the electron which it carries. It is during the accelerative period that radiation occurs. If the atom simply carries a charge along there is no radiation. There is nothing visible in the kathode rays as long as they are travelling with uniform speed and direction; it is when they are accelerated, started or stopped, or curved, that radiation occurs. The electron instead of simply vibrating might be revolving round the atom like a satellite; that would be centripetal acceleration, which is just as effective as longitudinal acceleration.

But if radiation is due to an orbital motion of an electric charge, it ought to be amenable to a magnetic field; every motion of an electron constitutes an electric current, and electric currents are amenable to a magnet. A source of light put between the poles of a magnet ought to show some difference. Faraday tried many experiments in this direction and failed, because the appliances available in his day would not show it. Nowadays, with a Rowland grating, the spectrum is much better defined, and a few years ago Zeeman, of Amsterdam, was able to see the difference when light is magnetised.

It often falls to men of genius to predict a great deal more than their generation can realise. A theory had been given by sundry people, including Fitzgerald, Larmor, Lorentz, and others. Perhaps the theory has been given more completely by Lorentz than by anyone else. It was an interesting case of prophetic prediction. They predicted that the effect observed by Zeeman would follow if light were due to revolving electrons. Time only permits me to indicate the explanation. It comes near to astronomy, and, indeed, it had been worked out six years before by Dr. Johnstone Stoney on astronomical principles. He had fully worked out the perturbations, but had not suggested that they would be caused by a magnet. But Larmor and the others did. They perceived that on applying to an orbit or circular current a strong magnetic field, that orbit will tend to be deflected; the effect of a magnetic field in general is a deflecting force. But as the circulating electron has inertia, the application of a deflecting force will not make it simply obey the force that is applied, but will make it move sideways, like any planetary orbit or a spinning top. A precessional motion is set up. Anything spinning that has inertia does not obey the force but moves at right angles. Thus the revolving electron will not, when the force is applied immediately, set itself normal to the field, but will go round the magnetic lines in a precessional motion; and that precessional motion will analyse the original lines of the spectrum into three. [Here the lecturer gave an illustrative experiment, and proceeding, pointed out that when the polarisation of the lines is examined, the vibrations are precisely as predicted.] It was further found that by the amount of separation of these lines a calculation could be made of what the magnitude of the electric charge was in relation to the inertia of the revolving portions of matter. It was thus found that the radiating particles have just the same inertia and just the same charge as the particles in the kathode rays. All the known phenomena connected with conduction and radiation are allied to these very small particles—the same inertia, the same electric charge, and the same kind of velocities, the mass being something like the thousandth part of a hydrogen atom.

Passing over chemical affinity and cohesion, the lecturer proceeded to discuss other phenomena which are due to these small particles. These particles, in order to give rise to visible radiation, revolve with terrific velocity. The number of vibrations which constitute visible light is from 400 to 800 million million times per second; and although it is no great distance round an atom, yet these particles have to go at very high speed; hence, naturally, some of them occasionally fly off. This will occur from various causes; they will fly off under the action of ultra-violet light, and so give rise to leakage of negative electricity. But there are certain substances which will emit these particles without any stimulus, and the first discovered was uranium. Although there may be aluminium or other screen between a piece of uranium and a photographic plate, something will penetrate through to the photographic plate. This constituted the discovery, by Becquerel, of the radio-activity of substances. In the researches of Dr. Russell various substances were found to possess this quality of giving out something on their own account. But the subject has gone ahead very far and fast. The most important developments have been made by Monsieur and Madame Curie in France, discovering polonium and radium, which latter has the properties possessed by uranium in a most extraordinary degree. The rays given off by these substances are of extraordinary interest; they have marvellous penetrating powers and are very intense, more intense than the X-rays given by a Röntgen tube. Radium rays will not only penetrate a foot of aluminium or wood, but they will penetrate three-eighths of an inch of lead, and then be as strong as are the rays from uranium. The full mechanism of the giving off of this great amount of radiation has still to be further investigated. It is a kind of electric evaporation, an emission of particles; this seems clear. There are three kinds of radiation, (1) particles which are readily stopped by obstacles, absorbable rays:

(2) the particles which penetrate obstacles with singularly penetrating power; and (3) the ordinary X-rays. X-rays are waves in the ether, not light, something of that nature; the penetrating rays are electrons which are shot off. But the most interesting are the first rays, those which are easily stopped; for these turn out to be atoms of matter shot off with a speed comparable to that of light. It is the first time that matter has ever been known to have such a speed as that. Rutherford, now of Montreal, has measured for the first time the speed of these readily stopped absorbable particles, and also their mass. He shows that they are atoms of matter, and that they are moving with one-tenth of the velocity of light.

All hot bodies and all negatively charged bodies are now believed to be giving off these particles; radio-activity is becoming quite a common feature. Recently fallen rain drops are radio-active, leaves of plants and most things in sunshine are radio-active; the difficulty will be to find something which is not radio-active in some degree, and the commonest kind of radio-activity appears to be the detachment of an electron. Loose charges seem to fly off, apparently by centrifugal force or the jostling of the atoms.

The *size* of electrons is known, on the hypothesis that the atom of matter is composed of them, *i.e.* on the hypothesis that the inertia of matter is electrical, or that it is electrically composed of the inertia of these charges. Evidence of this is accumulating, and there is reason to believe, not only on philosophical grounds, but in accordance with direct physical experiment, that electric inertia is the only inertia that exists. The size of an electron can then easily be determined. Regard the radius as unknown, the charge as known, the mass as known; then the size is at once calculable. The size of these electrons is about one hundred thousandth part of the diameter of an atom, otherwise they would not have sufficient inertia. They are the smallest bodies known. There was a time when the atom felt small; it is not big, it is true, but it is getting to feel quite a large thing beside the electron. To illustrate the difference between an atom and an electron, imagine an electron to be the size of a full-stop as here printed, and an atom a church 160 feet long, 80 feet broad and 40 feet high—in an atom of hydrogen there are nearly 1000 electrons—imagine those thousand full-stops thrown into that church, and some idea will be obtained of the relative sizes of the electron and the atom. The electrons *occupy* the atom very effectively; they are energetic and pushful, though not big. They occupy the atom in the sense that soldiers occupy a country, that is, they will not let anybody else in. The electrons, by the force they exert, will not let anything else in, they make the atom impenetrable; they also give the atom its other properties and enable it to act chemically. That chemical affinity is electrical force has been known for a long time; it was suspected by Sir Humphrey Davy. I believe if the atom has no extra or odd electron it has no chemical force; the atom may have molecular force, which is cohesion, and this point might be explained at greater length; for in my ideas cohesion is turning out to be electrical too, though not in the sense of attraction between ordinary positive and negative electricity.

The relation of the electron to the atom is a matter of the most intense interest. But it is not to be supposed that the electron is stationary in the atom. The electrons are revolving round one another at tremendous speed, so that the atom is a region of intense activity. The electrons are not in the least crowded, although there are a thousand in the hydrogen atom, twenty or thirty thousand in the sodium atom and one hundred thousand in the mercury atom; for consider how far apart are they in proportion to their size. Just as far apart as planets in the solar system are in proportion to their size. The distance of the earth from the sun is to the size of the earth very much as the distance of electrons from each other is to their size in a mercury or platinum atom. The fact is, we come to an atomic astronomy, and the atom is becoming like a solar system, or like nebulæ or Saturn's rings or something of that kind, composed of a number of small particles in a violent state of revolving motion and occupying very little of the whole space with their actual substance. They are so small that collisions are infrequent; so it is in the solar system and heavens generally, collisions do occur, but seldom, because of the excessively small sizes compared with the distances at which they are spaced out.

Taking any family belonging to a sun, *i.e.* a solar system, it forms something like the same kind of collection as the electrons form in an atom. So when we get in an atom a sort of solar system we begin to question whether there is anything in absolute size at all. It is a question I cannot answer. It has been suggested that solar systems may be atoms of a still larger universe. These are questions that are too hard. But there appears to be no end to the infinity of the universe, and all that we can say is that the probability is that it is infinite in an infinite number of ways.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The subject for the Adams prize essay of 1905 is "Wave Motion of Finite Amplitude and Unchanging Type, in Deep Water." The prize is open to the competition of all who have at any time graduated in the University. The value of the prize is about 225*l*. Further particulars are given in the *University Reporter* for March 10.

The new Lucasian professor will next term lecture on "The Theory of Gases and the Molecular Statistics of Energy."

Dr. Anningson and Prof. Woodhead will represent the University at the congress of the Royal Institute of Public Health to be held in Liverpool next July.

IT is reported through Reuter's Agency that a sum of more than 200,000*l*. has been given to Barnard College, New York, to be used for the purchase of the land adjoining the buildings. The name of the donor is not given.

A JUBILEE of the University of Heidelberg will be held next August in commemoration of the revival of the University in 1803 by Charles Frederick of Baden. Though the *fêtes* will be on a more modest scale than those which marked the celebration in 1886, an extensive programme is being arranged for the occasion.

THE London School of Tropical Medicine announces that the Craggs research prize of 50*l*. will be awarded in October to a past or present student of the school who, during the current year, has made the most valuable contribution to tropical medicine. Full information may be obtained from the medical tutor at the school, Royal Albert Docks, London.

THE senate of the Madras University has passed a resolution, it is reported in the *Pioneer Mail*, disapproving of the recommendations of the Indian Universities Commission that the system of examinations by compartments should be abandoned. The Vice-Chancellor of the Bombay University at the recent annual convocation advocated the establishment of a science school, and urged the raising of a fund of twenty lakhs of rupees for the purpose. Part of this money, he said, must come from the public and part ought to be provided from the funds for higher education in the Presidency. He thought the Government might be trusted to provide the remainder.

THE will of Dr. H. E. Schunck, F.R.S., who died on January 13, shows that he bequeathed to Owens College in trust for the foundation of a "Dr. Schunck's Endowment for Promoting Chemical Research," the contents of his laboratory and the apparatus, appliances and instruments, to be administered by the principal and professors of chemistry in Owens College and by two other trustees, to be nominated by the council, and by his son, Mr. C. A. Schunck, if he shall be willing to serve. The endowment is for the purpose, not only of research in chemical science, but also of geological, physiological and other sciences, and reports are to be annually presented to the council of the college.

IN the House of Commons on Monday Mr. Brodrick stated that many of the recommendations of the Military Education Committee are to be accepted. The new Director-General of Military Education and Training is to have an advisory board as suggested by the Committee. This body is to consist of the heads of Woolwich, Sandhurst, the Staff College, and the Ordnance College, of two representatives