weights and measures is that it is adopted all over the civilised world by physicists and chemists; and it may be stated with confidence, that the present international character of these sciences is largely due to this.

It is interesting also to notice, that the metric system is being gradually introduced into other branches of science. Anthropometric measurements made by the Committees of the British Association in this country and in Canada are invariably given in metres, and a comparison with measurements made in other countries can be at once made.

The period of twenty-five years under review has indeed witnessed great advances, both in scientific knowledge and practical application. This progress has led to powerful yet peaceful competition between the leading nations. Both from among our cousins of the United States, and from our nearer neighbours of Europe, have we, at this meeting, the pleasure of welcoming most respected representatives. But their presence, and the knowledge of the great discoveries made, and colossal works carried out, by them and their brother scientific men and engineers, must make us of Great Britain face with increased earnestness the problem of maintaining our national position, at any rate, in the forefront of all that tends towards the "utilisation of the great sources of power in nature for the use and convenience of man." Those English engineers who have been brought in contact with engineering thought and action in America and abroad have been impressed with the thoroughness of much of the work, the great power of organisation, and the careful reliance upon scientific principles constantly kept in view, and upon chemical and mechanical experiments, carried out often upon a much more elaborate scale than in this country. This is not the place from which to discuss the questions of bounties and tariffs, which have rendered possible powerful competition for the supply of machinery and railway plant from the continent to our own colonies; but there is certainly need for advance all along the line of mechanical science and practice, if we are to hold our own—need especially to study the mechanical requirements of the world, ever widening and advancing, and to be ready to meet them, by inventive faculty first, but also by rigid adherence to sound principles of construction, to the use of materials and workmanship of the highest class, to simplicity of design and detail, and to careful adaptation of our productions to the special circumstances of the various markets.

It is impossible to forecast in what direction the great advances since 1871 will be equalled and exceeded in the coming quarter of a century. Progress there will and must be, probably in increased ratio; and some, at the end of that period, may be able to look back upon our gathering here in Liverpool in 1896 as dealing with subjects then long since left behind in the race towards perfection.

The mechanical engineer may fairly hope for still greater results in the perfection of machinery, the reduction of friction, the economical use of fuel, the substitution of oil for coal as fuel in many cases, and the mechanical treatment of many processes still dependent upon the human hand.

The electrical engineer (hampered as he has been in this country by unwise and retrograde legislation) may surely look forward to a wonderful expansion in the use of that mysterious force, which he has already learned so wonderfully to control, especially in the direction of traction.

The civil engineer has still great channels to bridge or tunnel, vast communities to supply with water and illuminating power, and (most probably with the assistance of the electrician) far higher speeds of locomotion to attain. He has before him vast and ever-increasing problems for the sanitary benefit of the world, and it will be for him to deal from time to time with the amazing internal traffic of great cities. China lies before him, Japan welcomes all advance, and Africa is great with opportunities for the coming engineers.

Let us see to it, then, that our rising engineers are carefully educated and prepared for these responsibilities of the future, and that our scientific brethren may be ever ready to open up for them by their researches fresh vistas of possibilities, fresh discoveries of those wonderful powers and facts of nature which man to all time will never exhaust.

The Mechanical Section of the British Association has done good work in this direction in the past, and we may look forward with confidence to our younger brethren to maintain these traditions in the future.

THE IRON AND STEEL INSTITUTE.

THE Iron and Steel Institute, probably the most cosmopolitan of all our technical societies, has always been noted for taking its members far afield during the annual autumn excursions. The United States—from far north to the extreme south—Austria, Hungary, Germany, France, and Belgium have been among the countries visited, and now Spain may be included in the list. A very novel and somewhat ambitious programme had been arranged by the Executive for the 1896 meeting. It has long been thought desirable that members of the Institute should pay a formal visit to the great source of supply for the steel-workers' raw material situated in Northern Spain. It is from the Bilbao district that the greater part of the iron ore used by British steel-makers is obtained. What the modern steel trade of this country would have been had not the wonderful deposits of non-phosphoric ore of the Peninsula existed it is difficult to realise, but we may be sure that the industry would not have flourished in the way it has. We have, it is true, a limited and partial supply of hæmatite ore in this country; but it would not nearly have sufficed to satisfy the demands of the trade. The acid process of steel-making requires ores free from phosphorus, and though the basic process has been introduced with a view to eliminating phosphorus during the course of manufacture, it cannot be said to have rendered us independent of purer ores.

Nature seems to have designed the hills of Northern Spain especially for the use of the steel-maker. Happily for England, the communication between our country and Spain is of a very direct nature, and across the element which is peculiarly our own, the open sea. Next to having these pure rich ores within our own borders, they could hardly be placed more advantageously than they now are. Spain has not been in the past ambitious to institute a steel-making industry. She has been content to sell the valuable raw material to countries with a more advanced manufacturing organisation. A new spirit, however, has arisen of late, and the somewhat sorely-pressed steel-maker of to-day finds the prospect of another rival springing up at the seat of supply. That, however, is more of the future than the present, for the steel works of Spain now in operation are of comparatively small extent.

The iron mines of Northern Spain are not mines at all in the proper acceptation of the term, for they are open workings, in fact vast diggings or quarries. The mountains themselves are just heaps of iron ore, covered naturally with but a thin layer of earth. This is removed, and it only remains to break up the ore and load it into fitting receptacles, when it is conveyed down to the water's edge by its own gravity. It is difficult to conceive anything more favourable for the purposes of transport. Self-propulsion to the ship's hold, and then the cheapest of all artificial methods of carriage to the home port. Fortunately for us, in the struggle for the word's steel market, our coast-line is more accessible from Spain than that of our great rival, Germany. The Pyrenees offer a barrier to land carriage even if the French railways would frame rates that would allow competition with those wonderfully economical cargo boats, which are one of the greatest triumphs of our engineering industry. There are, however, compensations for our great competitor even in this. A patient and ingenious people, such as the Germans, finding they are blocked in one direction will try other measures. In the manufacture of acid steel Germany laboured under a disadvantage, for the reasons stated, but this led her steel-makers to put forth great efforts to perfect the basic process, by which they could utilise their own supply of native ore, too phosphoric for the manufacture of acid steel. Their labours have been crowned with almost unexampled success, for the development of the basic steel industry in Germany is one of the most creditable achievements in the history of industrial progress. It is true that the best steel is produced from non-phosphoric ores, but the German makers can manufacture excellent steel castings at a low price, and though these may not be equal to the best acid steel, they are commercially successful. After all steel-making is a trade, not simply a competition like prize-winning at an exhibition.

We have been led somewhat astray from our immediate subject by the economic problem suggested by the Bilbao trip of the Iron and Steel Institute, and will now return to our text. The Council, knowing the insufficiency of hotel accommodation for so large a number of persons

as was expected to take part in the expedition, made arrangements to charter a steamer which should not only convey the party from England to Spain and back, but should serve as a floating hotel during the whole time. It may be said that in no other way would the expedition have been possible. The large Orient liner, *Ormuz*, was therefore engaged for the purpose. This vessel left Tilbury on Saturday the 29th ult., and arrived off the mouth of the river Nervion about midday on the Monday following. Of the run down Channel and across the Bay of Biscay it is unnecessary to say much; some enjoyed it, some did not.

On the arrival of the ship the Reception Committee came off in three steamers and welcomed their guests to Spain. This was the first expression of that kindness and hospitality of which the members of the Institute received so many proofs throughout the visit. The Reception Committee, having re-embarked members, were transferred to small steamers and taken for a trip up the Nervion to inspect the extensive engineering works that have converted this once small and unimportant stream into a commodious port. Although the depth of water over the bar is not sufficient to admit the largest type of ocean liners, such as the *Ormuz*, yet it is enough for the class of ore-carrying ships now engaged in the trade. Last year one vessel, drawing 22 feet 10 inches of water, and carrying 5380 tons of ore, sailed from the port. Bilbao itself lies some distance inland, twelve miles or so up the river Nervion, but the loading stations of the port are nearer the sea. At the present time two breakwaters have been commenced. By means of these a considerable part of the Concha, or Bay of Bilbao, will be enclosed, and thus form a safe anchorage for the largest ships. At the mouth of the Nervion is situated the town of Portugalete. Here the two banks of the river are connected by a somewhat novel form of bridge, or, as it might perhaps be better described, by an aërial ferry. It is necessary at this point to give sufficient height for the masts of ships to pass under, and this would necessitate, where ordinary conditions followed, either a swing bridge or a structure which would be at a height involving steep and long gradients for its approach. Both these plans would have been expensive and inconvenient. The scheme adopted was to erect a high gantry supported by towers on either bank. Suspended from this gantry by wire ropes is a large cage, capable of carrying 30 tons live load. There is a trolley which travels on a roller path on the gantry, and to which the wire ropes holding the cage are attached. A 25 horse-power engine is used for traversing the trolley, which of course carries the cage with it from side to side, and thus transports the passengers across the river. The cage is entered at the ground level, and travels at a safe height above the water. The span is 531 feet, and the roller path is 147 feet above high-water spring-tides. The cost of the structure was no more than £20,000.

On the following day, Tuesday, September 1, members were conveyed ashore from the *Ormuz* in steam tenders, and were then taken to Bilbao by train. Sittings for the reading and discussion of papers had been arranged for this and the next (Wednesday) morning. The following is a list of the papers read:—

(1) "On the Spanish Iron Industry," by Don Pablo de Alzola (Bilbao).

(2) "On the Estimation of Sulphur in Iron Ores," by R. W. Atkinson and A. J. Atkinson (Cardiff).

(3) "On a New Water-cooled Hot-blast Valve," by William Colquhoun (Liverpool).

(4) "On the Present Position of the Iron Ore Industries of Biscay and Santander," by William Gill (Bilbao).

(5) "On the Manganese Ore Deposits of Northern Spain," by Jeremiah Head.

(6) "On Sand on Pig-Iron and its Avoidance," by H. D. Hibbard (Highbridge, New Jersey, U.S.A.).

(7) "On the Missing Carbon in Steel," by T. W. Hogg (Newburn Steel Works).

(8) "A Note on the Presence of Fixed Nitrogen in Steel," by F. W. Harbord and T. Twynam.

(9) "Further Notes on the Walrand Process," by G. J. Snelus, F.R.S., Vice-President.

(10) "On the Roasting of Iron Ores with a View to their Magnetic Concentration," by Prof. H. Wedding, Bessemer Gold Medallist (Berlin).

The first paper taken, that of Don Pablo de Alzola, gave an account (necessarily brief) of the condition of the iron and steel industry of Spain, referring by way of preface to the ore deposits of the country. There are two important districts, Biscay (of which Bilbao is the centre) and that of Asturias. In the latter district there are coalfields, but the ores are less rich than in Biscay. The total Spanish output of iron ore in last year was 5,514,399 tons. One-tenth of this was smelted in Spain. It will be interesting here to repeat a passage from the elder Pliny, which Don Pablo quotes: "In the part of the Cantabrian coast which is washed by the ocean, there rises a high and steep mountain which, marvellous to relate, is composed entirely of iron." It will be therefore seen that the iron ore of Northern Spain was known in the first century of the Christian era; and there are, we learn from the paper, records of ore being shipped from the Bilbao River as far back as the tenth century. The Spanish ore was, however, earlier worked on the spot, and the fame of Spanish iron of the Middle Ages was world-renowned, as every metallurgical student knows. The industry has continued from the fifteenth century down to our own time; the well-organised, if limited number, of iron and steel works at present existing thus being the modern representatives of a very ancient industry.

In the latter part of his paper, Don Pablo enters upon the politico-economic aspect of the Spanish iron trade. He assumes that the deposits of rich non-phosphoric ores of the district are becoming exhausted by the vast exports now taking place, and regrets that foreigners should be allowed to carry off the natural wealth of the country, and that foreign capital should not be directed to the permanent good of the nation, rather than conferring fugitive and ephemeral prosperity upon a district; in other words, the author asks for protection for native industry. Here are the facts upon which he bases his demand:—

"From two tons of ore valued at 18 pesetas (30 pesetas equal one pound sterling roughly) there is obtained one ton of pig iron, the price of which is 64 pesetas. If this is converted into rails, it sells at 140 pesetas. Rolled into steel plates, it increases in price to 210 pesetas; forged into axles, &c., it increases to 700 pesetas; and if it is converted into engines and boilers, it increases to 1200 pesetas per ton, and to 1500 in locomotives and marine engines."

Whether Spain can be converted into a vast factory for the manufacture of steel rails, plates, axles, engines, boilers, and locomotives "by stimulating in Biscay the manufacture of steel, and by imposing some restrictions on the export of ores," is a subject upon which we need not here enter, as, fortunately, the matter was not discussed at the meeting after the reading of the paper.

Mr. Gill's contribution was next taken. It was really a volume rather than a paper, and taken in conjunction with a former contribution he made to the *Transactions* of the Institute in 1882, may be looked upon as a standard work of reference upon the iron industry of Northern Spain. Mr. Gill is the chief engineer and manager of the Oconera Iron Ore Company, the largest establishment of its kind in the world. He was also one of the secretaries of the Reception Committee, and in that capacity earned the gratitude of every member of the expedition by the unceasing care he bestowed upon their welfare. It would be a hopeless task to attempt to give even a brief abstract of this paper; we can only say that it embraces all that could be fairly considered to come within the scope of its title, and we must refer our readers to the original in the pages of the *Transactions* of the Institute.

There was practically no discussion on these two papers, but in answer to a question Mr. Gill stated that an export tax of twenty cents per ton was levied on Bilbao ore, whilst that of the more southern districts was but ten cents per ton.

The paper by Mr. Snelus was next read by the author. The Walrand-Legenisel process had been already described in a former contribution by the same author to the *Transactions* of the Institute, and the object of the present paper was to report progress. It appears that nine firms have taken the process up, and another is thinking about it. The paper should be of considerable value to the proprietors of the process; but that, of course, is by the way.

Dr. Wedding's contribution was, within its limits of space, an exhaustive monograph worthy of a recently created gold-medallist. It begins with a period "long before iron ores were smelted for pig," and carries the subject down to the present day. The problem of the roasting of ores for the purpose of magnetic concentration is of a distinctly controversial nature in its scientific aspect, and doubtless more might have been said than was said during the discussion had not members been under

the influence of unrest, which so often prevails at autumn meetings. Probably the subject will come up again. In the meantime, those interested would do well to study Dr. Wedding's suggestive paper as a means of preparation for future controversy. The following quotation will serve to give a key to the line of reasoning followed :—

"As a rule the roasting is a preliminary to the reduction process. It is only exceptionally or incidentally that it has to effect the purpose of simultaneously eliminating elements, such as sulphur or arsenic, that could detrimentally influence the iron produced. It is only in very recent times that roasting processes have also been employed in order to render iron ores magnetic, so that they can subsequently, by magnetic concentration, be freed from gangue, that is, from constituents not containing iron, and be enriched in iron.

"On considering the composition of the ferruginous constituents of the ores practically employed in the metallurgy of iron, there will be found, as a rule, in the ores supplied by nature, oxides, hydrates, and carbonates of iron: magnetic oxide in magnetite ores; ferric oxide in red hæmatite ores; ferric hydrate in brown hæmatite ores; ferrous carbonate in spathic iron ores, clay iron ores, and carboniferous iron ores. If sulphur compounds occur, which have to be used as iron ores, as, for example, iron bisulphide in iron pyrites, they must always be first converted into ferric oxide (purple ore) before the material can be further utilised in ironworks practice. Again, from the hydrates water must be expelled, and from the carbonates carbon dioxide, before the iron of these ores can be reduced.

"The heats of combination of all iron ores show that a reduction to iron cannot occur as long as sulphur, water, and carbon dioxide are still present. It might consequently be assumed that the only object of roasting was the expulsion of sulphur, water, and carbon dioxide, with a view to the reduction of the iron, were it not that the practical facts were in contradiction to this, in that they show that as a matter of fact even more iron ores that contain neither sulphur, water, nor carbon dioxide, but that consist only of magnetic oxide or ferric oxide, can with advantage be subjected to roasting. The object of this is either to facilitate the subsequent reduction by the formation of the most easily reducible oxygen compounds, or to facilitate the reduction by loosening the texture of the iron ores."

At the conclusion of the reading of his paper, the author pointed out the great use of the thermo-junction pyrometer in work of this nature. He had himself improved the working of this instrument by a shield of asbestos.

Mr. Head's paper was read in abstract, and gave rise to practically no discussion. It was an interesting record of certain professional investigations made by the author into the prospects of mines in the neighbourhood of Santander and Covadonga. Analyses of the ores, cost of working, and other data of a practical nature are given in the paper.

The remaining paper taken at this sitting was that of Messrs. Harbord and Twynam. It was a short but suggestive contribution on what may be called a by-subject, although one not without its practical bearing. The authors agree that nitrogen undoubtedly exists in two conditions in steel. They think it may occur mechanically occluded in the metal, whilst as fixed nitrogen, in combination with some other element, it is undoubtedly present. As the result of investigation, however, they have failed to trace any connection between the amount of nitrogen and the good or bad quality of the steel. Their results appear to confirm the generally accepted opinion that nitrogen, in the proportion in which it is found in commercial steel, has no detrimental effect. Details of tests and analyses are given.

At the second sitting four papers were read in brief abstract before an extremely thin audience, all, excepting a conscientious few, having gone on an excursion of a frankly frivolous nature, there not being even an incipient ore quarry as an excusive for a lunch. Mr. Hibbard's paper was first read. In it the author dwelt, somewhat emphatically, upon the evils of sand sticking to pig; and then proceeded to describe an apparatus he had devised for getting over the difficulty, although whether he had translated his theories into practice did not transpire. So far as could be gathered from the description and illustrations, the ordinary pig bed is superseded by a vast circular table on which are mounted eight radial rows of iron moulds. Sows connect the pigs in the usual way. The moulds are capable of turning, and the pigs are dumped while still red hot, falling into waggons fitted with projections which serve to break them up. (It may be suggested that an objection to this is that the pigs may bleed.) The author states that in one year (1895) purchasers of pig in the United States received 213,750 tons of sand in lieu of iron, and though some allowance is made on this account, the actual loss to purchasers—and corresponding gain to the iron maker—was considerably over a million dollars. These are surprising facts, but the subsequent statement the author makes is even more startling. He says that "the chemist of a great iron-producing firm was commissioned to find a sand which would stick in the largest possible proportion to pig iron"! In the brief discussion an opinion seemed to prevail that the invention was not likely to receive very immediate application in this country.

Mr. Hogg's note on "the missing carbon" was another contribution on a by-subject of the steel-maker. The question has been discussed before, and is likely to come up again, as Prof. Roberts-Austen has promised a communication on the subject, which can hardly fail to be of scientific interest, although, so far, the problem does not appear to have a practical bearing from the steel-maker's point of view. Bearing on this, however, the following passage, with which the author concludes his paper, may be quoted as a warning, from one who can speak with authority, against a reaction that appears to have set in with undesirable force :—

"The various questions of a purely physical nature concerned with the phenomena of hardening are now increasing so rapidly that, for the time being, the chemical side is receiving a somewhat disproportionate share of attention. Probably this may be on account of the generally limited nature of the kind of chemical examination which has to be resorted to. Bearing in mind that the few facts of a purely chemical nature which are known to be intimately related to the physical results are based upon the effects of retarded or accelerated solution, the writer feels confident that, although the labour may at first sight appear to be great in proportion to the results obtained, in time some simple chemical discovery will do much towards rendering the hardening of steel easier to understand."

The valve described in Mr. Colquhoun's paper was illustrated by diagrams, without which it would be impossible to make the details clear. The cooling of valves by water is, of course, by no means a new idea, though possibly the author's arrangement may include points of superiority over anything that has gone before. This was the last paper taken, Messrs. Atkinson's contribution not being read.

The sitting was brought to a conclusion by votes of thanks to the Spanish gentlemen who had done so much hard work to make the meeting a success, and to the President (Sir David Dale), who had occupied the chair throughout.

Mr. E. P. Martin, of Dowlais, will be the next President.

During the meeting excursions were made to ironworks and mines. These we must deal with very briefly.

The Altos Hornos Iron and Steel Works were the first visited. They are situated on the river Nervion, five miles from Bilbao. The following figures relating to their output give an idea of the scope of the works. When in regular work, the product is about 100,000 tons of pig iron yearly. Of this 12,000 tons will be made into puddled iron; 15,000 tons into steel of various sections; 6000 tons into plates; 45,000 tons into rails and bars; 6000 tons into castings; 3000 tons into bridges, roofs and boilers; and 1000 tons into machinery.

The Vizcaya Company's Works, also visited, are likewise on the Nervion. The following is given as the annual production: 200,000 tons of iron ore, 100,000 tons of coke, 100,000 tons of pig iron, 25,000 tons of open hearth and converter (Robert) steel, 6000 tons of puddled iron, and 25,000 tons of rolled iron and steel.

The above are the two principal works, and they are well laid out and equipped. Other iron and steel works are of a smaller character. It may be interesting to state that the production of pig iron during 1894 was in the United Kingdom 7,546,000 tons. In Spain it was 260,000 tons during the same year.

The great excursion of the meeting was, however, that arranged for Thursday, September 3, when the whole day was devoted to a visit to the great Oconera Mines. The weather was extremely favourable, and members had an opportunity of seeing the manner in which iron stone is quarried on these mountains, and at the same time enjoying an exquisite view of the Bay of Biscay—as blue that day as the Mediterranean—and the bold, rocky coast-line backed by the Pyrenees. As we have

stated, there is little to say about the mining operations, so-called. All is in the open. The hill-side is broken out by blasting, the ore is sorted by hand, and is then carried down to the ships in buckets on an aërial railway of wire rope, or by trucks running on inclines. In the level parts near the river locomotives are used, but the great motive power is supplied by the gravity of the material itself.

After leaving the anchorage off the Bilbao River, the *Ormuz* proceeded to Santander, where excursions were made ashore. From thence she went to San Sebastian, where members were landed, and explored the neighbourhood. Finally, the ship was anchored off St. Jean de Luz, from whence Biarritz and Bayonne were visited, and finally the *Ormuz* reached Tilbury once more on Saturday morning, September 12, after having had a most successful fortnight's voyage.

NOTES.

LETTERS have been received from Prof. Sollas, by the Chairman and Secretary of the Coral Reef Boring Committee of the Royal Society, which show that, so far as the main object of the expedition is concerned, the effort has been an almost complete failure. When the party had landed on Funafuti from the *Penguin*, they selected the most promising site, as it appeared, for a bore-hole. The apparatus was landed and set up, and a bore-hole carried down to a depth of about 65 feet, when further progress became impossible, for material like a quicksand was struck which choked the bore-hole. Very little solid coral rock was pierced. To pass over the steps then taken, it may be enough at present to say that another attempt was ultimately made nearer to the edge of the island, where there appeared some hope of finding more solid coral rock. This boring was carried down to 72 feet, and then similar difficulties prevented further progress. The material struck was a kind of quicksand containing "boulders" of coral. As fast as the sand was got out, fresh material poured in, and the water pumped down the tube, with a view of cleaning it, actually flowed out into the surrounding bed, while the coral boulders made it impossible to drive the tubes through the quicksand. So far as the reef was pierced it appeared to be not solid coral, but more like a "vast coarse sponge of coral with wide interstices, either empty or sand-filled." It is very unfortunate that the efforts of the Royal Society, and the liberal aid of the Admiralty and of friends and authorities in Sydney, should be so ill-rewarded; still, though the expedition has failed in its main object, it has met with great success in all the others. Large collections have been made: Messrs. Gardiner and Hedley have thoroughly investigated the fauna and flora, both land and marine, of the atoll. Dr. Collingwood has obtained information of ethnical interest, and Captain Field a series of soundings, both within and without the atoll, which Prof. Sollas states are more complete than have yet been obtained, and must greatly modify our views as to the nature of coral reefs. Of all these matters it would be premature to speak, till Prof. Sollas has returned and been able to give fuller particulars, and Captain Field has reported to the Admiralty.

THE International Congress of Meteorology is meeting this year at Paris, under the presidency of M. Mascart. Several committees or sections have been appointed. One of them has discussed the expediency of an international system of observations to be carried on jointly with the national system. Another has considered the desirability of more frequent international signals, so as to give warnings of storms. The difficulty of delaying the regular traffic was urged as an obstacle, and the section, while desiring a system of circular telegrams at a fixed hour between the national central offices, pronounced in favour of the reception of local reports at each central office in time for international exchanges by 1 o'clock a.m., Greenwich time. Among the proposals made at the Congress is one for the establishment of a station on the coast of Finland, which would issue reports on the break-up of the ice, the movements of icebergs, marine currents, and the prospects of fisheries.

THE Home Secretary has appointed Mr. Thomas Pickering Pick to be the Inspector of Anatomy for the Provinces, in place of Mr. John Birkett, resigned.

THE sixty-eighth annual meeting of the Association of German Men of Science and Medical Men is at present taking place at Frankfort-on-Main. Among the addresses to be delivered during the gathering are:—"Biology and the Science of Health," by Prof. Buchner, of Munich; "The Practical Aims of Military Hygiene," by Dr. Below, of Berlin; and "New Questions in Pathological Anatomy," by Prof. Wiegert, of Frankfort-on-Main. Among the discussions is one on "The Results of Recent Investigations on the Brain," to which Prof. Flechsig, of Leipzig, will contribute a paper on "The Localisation of Mental Processes"; Prof. Edinger, of Frankfort, one on "The Development of the Brain Paths in Animals"; and Prof. von Bergmann, of Berlin, one on "Tumours of the Brain."

WE are sorry to learn, from the *Ceylon Observer*, that Dr. Trimen, the Director of the Ceylon Botanical Gardens, is somewhat seriously ill.

THE death is announced, from Paris, at the age of seventy-seven, of M. Hippolyte Fizeau. M. Fizeau was a member of the Academy of Sciences, and an authority on the velocity of rays of light and of electrical currents.

WE regret to have to record the death, at the age of forty-five, of Dr. G. Brown Goode. He died at Washington, September 6. Dr. Goode was a Member of the National Academy of Sciences, and one of the original Fellows of the American Association for the Advancement of Science at the time of incorporation of the latter in 1874, and had, as our readers will remember, just been elected Vice-President of the Section of Zoology at the Buffalo meeting.

THE death of Dr. Goode, and the absence of Prof. Langley from the United States, prevented the fiftieth annual meeting of the trustees of the Smithsonian Institution (which was to have been held on September 7) from taking place. This was the first time in the existence of the Institution that the annual meeting had failed to be held.

NEWS has been received of the massacre, on August 10, by natives of Guadalcanar of the Solomon Islands, of a portion of a party, detached from the Austrian war vessel *Albatross*, for purposes of scientific research. It is reported that Baron Foullon, a geologist, a midshipman and two sailors were killed, and six others wounded, four seriously. Efforts made by the British Resident to recover the dead bodies were unsuccessful.

A REUTER telegram from St. Petersburg, dated September 17, states that a telegram from Vladivostok announces that the expedition for the exploration of Kamtchatka, under MM. Bogdanovitch and Lemiakin, has made a thorough survey of the district between Chumikan and Ayan, discovering some rich gold-fields of considerable extent. Gold of remarkably good quality has been discovered in fourteen places in volcanic strata on the banks of the river Aikashra.

THE correspondent of the *Standard* at Rejkjavik, writing on September 11, gives an account of the recent earthquakes in Iceland. The first shock occurred on the evening of August 26, and it was followed by another, somewhat less severe, the next morning. These shocks were felt over the whole south-west of the island, but were most violent in Rangarvalla Syssel, which