

a comparatively few feathers exactly like those of the male in full breeding plumage, the majority resembling, rather, those of the male in summer plumage.

In each of these cases, then, removal of the ovary has been followed by a greater or less assumption of male characters.

Further light on the subject may be expected in due course from the birds on which ovariectomy has been performed this season, several already having feathers like those of a normal male.

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NOTE ON A METHOD OF MIMICKING AMOEBOID
MOTION AND PROTOPLASMIC STREAMING
IN THE SAME MODEL¹

THE following method of mimicking amoeboid motion and protoplasmic streaming has been employed by me for class-demonstrations during the past five years. As it is extremely simple and yields results which are very striking and instructive, it appears advisable to communicate it to a wider public.

It is well known that if particles of camphor be dropped upon the surface of clean water they display energetic movements which are attributed to large and unequally distributed alterations in the superficial tension of the air-water surface at points of contact with the camphor.² It occurred to me, therefore, that if camphor could be incorporated into a fluid immiscible with water, drops of the mixture placed upon water might be expected to display surface deformations resembling those occurring in the formation of pseudopodia. This anticipation proved correct.

I prepare a ten-per-cent. solution of camphor-gum in benzol and then, since drops of this water-white liquid are difficult to observe upon the surface of water, I color it deeply by the addition of Sudan III or Scharlach R.

¹From the Rudolph Spreckels Physiological Laboratory of the University of California.

²Van der Mensbrugghe, cited after Rayleigh, *Proc. Roy. Soc. London*, 47, 1890, p. 64.

If a drop of this mixture be placed upon the surface of water, violent and extremely rapid deformations of surface are observed. Lengthy and irregular "pseudopodia" are rapidly thrown out and withdrawn. The whole drop exhibits a veritable ecstasy of motion which shortly ceases when a fine incrustation of precipitated camphor has spread over the water.

By successive additions of some viscous liquid such as olive oil to the mixture the motions of the drops can be rendered slower and slower and more readily followed in detail by the eye. When at length a mixture is formed of equal volumes of olive oil and the camphor-benzol solution the formation of "pseudopodia" is no longer observed; instead, we observe a prolonged and energetic streaming movement within the drop which mimics in the closest manner imaginable the phenomenon of protoplasmic streaming.

In this way the modifying influence of viscosity upon the reaction of fluid masses to local changes in superficial tension can be shown in any desired gradation; it appears probable that a superficial semi-solid pellicle must restrain the movement of the fluid in much the same way as internal friction. Hence, the phenomena of protoplasmic streaming and amoeboid motion are readily traced to the same origin.

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THE DUNDEE MEETING OF THE BRITISH
ASSOCIATION FOR THE ADVANCE-
MENT OF SCIENCE¹

THE meeting of the British Association at Dundee which has just come to an end will be remembered as one of the pleasantest and most successful in the annals of the association. It was thought to be impossible to surpass the number of members and associates who attended the last Dundee meeting, just 45 years ago; indeed, it was not expected that so high a figure would be reached. But the number this year—2,504—is considerably in excess of the total in 1867, and the support accorded to the association by every one in Dundee, from Lord Provost Urquhart to the humblest citizen, has been most gratifying.

¹From the *London Times*.

Public and private hospitality have been lavished on the visitors, and nothing that could contribute to their comfort and pleasure has been left undone. The organization has been admirable, and the very heavy work entailed on the honorable local secretaries, Professor D'Arcy Thompson, C.B., Dr. A. H. Millar, and the Town Clerk, Mr. W. H. Blyth Martin, has been carried out without a hitch. The history of these meetings proves that their success depends in a very large measure on the local secretaries, and a generous meed of praise is due to those in Dundee for their untiring efforts on this occasion.

The people of Dundee, moreover, realized the fact, not always present to the minds of the citizens of places visited by the association, that they are most heartily welcome at its meetings, and the way in which they flocked to the reception rooms to take out their tickets rejoiced the hearts of the president and his supporters. If further evidence is needed of the warmth of Dundee's welcome it is to be found in the munificent donation of £10,000 made by Dr. Caird, a distinguished citizen, to the funds of the association. This noble gift, unfettered by conditions, was handed in the form of a check to the president, Professor Schäfer, at the conclusion of his opening address. Of this address, which dealt with the problem of the origin of life, it is unnecessary to speak in detail, since it has been reported fully in *The Times*, and has attracted widespread attention. The origin of life also formed the subject of a discussion between the Zoology and Botany Sections. This was one of the principal features of the meeting, and attracted an audience so large as to necessitate the hiring of a special hall for its accommodation. The social program, arranged and carried out with complete success, comprised a civic reception, a splendid ball, and garden parties, flower shows, and excursions far too numerous for individual mention. The admirable evening discourses by Professor W. H. Bragg, F.R.S., on "Radiations Old and New," and by Professor A. Keith, on "The Antiquity of Man," were attended by crowded audiences; and there were besides three lectures for working men, one by Professor Fowler on the Sun, another by Professor Gonner on Prices and Wages, and the third by Professor B. Moore on Science and National Health, all of which were practical, informing and well attended. A brief summary of the work in the various sections is given below, though it must be understood that it is not possible to cover so wide a field exhaustively.

SECTION A—MATHEMATICAL AND PHYSICAL SCIENCE

Interest in this section centered chiefly in the discussion on wireless telegraphy, when Sections A and G (Engineering) joined forces. From many points of view this discussion was one of the most important features of the Dundee meeting. Contrary to the usual custom, practical achievements were almost disregarded and there was a total absence of those sensational announcements which have tended to become characteristic of public discussions on wireless telegraphy. So far as a section of the public is concerned this may have been unfortunate, but it was welcomed by many of the engineers and physicists present. The points discussed were: the "bending" of the waves to follow the contour of the earth, and the so-called "day-light effect," which makes it possible to transmit signals for a very much greater distance by night than by day, using the same power. Several distinguished physicists and electricians took part in the discussion, among them being Lord Rayleigh, Professor Fleming, Professor S. P. Thompson, Dr. W. H. Eccles and Professor Howe.

Much time was devoted to papers on general physics and mathematics. An interesting discussion took place on the atomic heat of solids, in which Section B also joined. The opening remarks were made by Dr. F. A. Lindemann. On more than one occasion when the section divided into two parts, that part which dealt with general physics fell completely into the hands of the radio-activity enthusiasts, and some excellent papers and discussions resulted. For example, Professor J. C. M'Lennan succeeded in convincing the majority of his audience that the earth's radiation is practically constant and does not suffer any diurnal or other variation. It was interesting to observe also that some attention is being paid to such matters as the velocity and direction of the wind above ground level, and the temperature of the upper atmosphere, for these things must of necessity have considerable bearing on aviation problems.

SECTION B—CHEMISTRY

The proceedings of this section have been spoken of as highly technical in character, but the problems which chemists are now engaged in studying are of a far more fundamental character and far more closely related to the affairs of life than those of most other sections. Theirs is the task of unravelling some of the mysteries on which the president of the association dwelt at length in the opening address, and by some it is held that it will rest with the chemists eventually

to say what living matter is and what may have been the origin of life. Two of the sittings were largely devoted to work of this kind. On Friday, when the chemists and botanists combined forces, the papers read mostly had reference to important problems in plant chemistry. On Monday Professor Irvine, of St. Andrews, gave an account of researches on which he has long been engaged, which are throwing much light on the nature of the sugars—a class of substances which play an all-important part in plant life and as animal foods. Again the final sitting was devoted to papers dealing with the mechanism of chemical change, a problem which is fundamental for the understanding of the processes both of organic and of inorganic nature. Other communications dealt with topics of physical interest.

SECTION C—GEOLOGY

The address of the president, Dr. B. W. Peach, was a welcome résumé of the paleontological evidence with regard to the fauna of the Cambrian rocks of the British Isles as compared with that of North America. The interesting problems of the Highlands gave rise to several valuable papers and addresses. Dr. Robert Campbell described the discovery of fossils in the jasper and green schists of the Highland Border near Stonehaven. This is of great interest, as it proves that the beds are not pre-Cambrian, but of Upper Cambrian or Ordovician age. Dr. Jehu supplemented this by an account of fossils recently found in the Boundary Fault series, near Aberfoyle, by which these beds are identified as of Upper Cambrian age.

Dr. Campbell also described an important discovery of the Downtonian (Silurian) Age of certain beds between Craigeven Bay and Stonehaven Harbor, which was formerly classed as Old Red. *Dictyocaris* is abundant, and *Ceratiocaris* is also found. These fossils have never been found elsewhere in rocks younger than the Silurian. Interesting results of the examination of pebbles from the Millstone Grit of Yorkshire were given by Mr. Albert Gilligan, of Leeds University. Large numbers of these pebbles have been collected and sliced, and give evidence of derivation from Scottish or Norwegian sources. Mr. Gilligan has been impressed by the many points of similarity existing between the Millstone Grit and the Torridon Sandstone, and is disposed to think that areas of similar rock types were laid under contribution for each. Dr. J. D. Falconer described the detached hills of South Africa, which possess caps

of weathered rock which he attributes to the effect of periods of elevation and erosion following upon periods of decomposition at base-level.

SECTION D—ZOOLOGY

The meeting of this section was undoubtedly one of the most successful ever held. This was due to various contributory causes—to the number and interest of the communications, to the large attendance of British and foreign zoologists present, and in no small degree to the fact that one of the two indefatigable local secretaries is a zoologist of distinction. Two inter-sectional debates were held, one with the Section of Physiology and the other with the botanists. The subject of the former was upon the nutrition of marine organisms. Professor Pütter, of Bonn, was present and opened the discussion with an account of his own work, which he claims furnishes proof of the ability of marine organisms to obtain nourishment from organic solutions present in sea-water. The discussion was animated and well sustained, though it must be admitted Professor Pütter's views found but few adherents. The discussion on the Origin of Life was opened by Professor Minchin. The largeness of the audience was no doubt in great part due to the fact that Professor Schäfer in his opening address had dealt with the same subject. The debate was interesting, and the discussion of such a subject is valuable in the way of "stocktaking," but a final solution is still far remote.

A new departure at this year's meeting was an exhibition of zoological specimens and methods. This was extremely interesting and attracted much attention, especially the demonstration by Professor Leduc of his well-known diffusion figures. It is to be hoped that such an exhibition will become an annual feature and that in future time will be allowed for people to examine it more carefully; an afternoon session should be entirely given up for demonstrations. As a result of the advocacy by the president of the section, Dr. Chalmers Mitchell, of the preservation of wild animals other than those of sporting or economic value, the sectional committee forwarded a resolution to the council of the association drawing attention to the urgency of the matter.

Of the morphological papers perhaps that of Professor Julin on the luminous cells of certain tunicates was the most appreciated. Accounts were given of the work being done at Aberdeen University upon the migration of birds and an inquiry into the food of birds, the latter subject.

being one of great economic importance. These experiments need to be extended over a period of years before any certain conclusions can be drawn.

SECTION E—GEOGRAPHY

Sir Charles Watson's presidential address dealt with two themes—the history of Sudanese geography since Sir S. Baker was the president of the section at the last meeting in Dundee 45 years ago, and the new international map of the world on the uniform scale of 1/1,000,000. His criticisms on the coloring of the map were supported by the section later when Captain E. O. Henrici, R.E., exhibited the sheets as far as they had been published. It was agreed that an uncolored edition ought to be published as well as the "layer" edition now appearing.

The African branch of the president's address was carried further by the papers of Dr. Felix Oswald (from the Victoria Nyanza to the Kisii highlands), Mr. G. W. Grabham (the country north of Lake Albert), and Mr. P. Amaury Talbot (South Nigeria). A valuable paper was contributed by Mr. E. A. Reeves on recent improvements in surveying instruments, and Sir H. G. Fordham illustrated his paper on the Road Books of the United Kingdom by a varied collection of maps and itineraries. Great interest was taken in the Antarctic discussion initiated by Sir Clements Markham, who sketched the history of Antarctic discovery and the outstanding problems. Other speakers felt that in the praise of Captain Scott something less than justice was done to other explorers, and especially to the expeditions which started from Dundee.

Dr. W. S. Bruce in his paper on the Antarctic continent, after reviewing the earlier discoveries, noted that Amundsen had confirmed Shackleton's discovery of the Antarctic plateau, and traced the Victoria land range to the southeast, as well as finally obliterating the suggestion that the Ross Barrier extends across Antarctica, dividing it into two land masses. The biological evidence confirms the evidence of soundings in favor of a former land connection between Africa and Antarctica. Professor Charles Chilton, of New Zealand, took up the biological point, and showed that the inference extended to South America and Australia. Dr. R. N. Rudmose Brown spoke of the structure of the continent, pointing out that the theory of a great strait completely lacked confirmation. Dr. Marshall described the work of Shackleton's expedition, and Dr. Hodgson, of the *Discovery*, defended

the use of dogs against the criticisms of Sir Clements Markham. At the very end of the meeting Sir W. Willcocks gave a trenchant and delightfully entertaining lecture on Canadian agriculture and irrigation.

SECTION F—ECONOMIC SCIENCE AND STATISTICS

This was one of the most popular of the sections. All the papers discussed dealt with practical economic issues of the day, and at each meeting the hall was crowded. Sir Henry Cunynghame, of the Home Office, who presided, said at one of the meetings that he was more interested in the establishing of prosperous and contented communities throughout the land than in the discovery of the remains of creatures which existed millions of years ago, and that saying well expresses the spirit of the section.

In his presidential address Sir Henry Cunynghame also pleaded for a thoughtful and rationalist treatment of economic studies. He did not condemn sympathy, for they were all men and could not but be touched by the sufferings of humanity, but they must be practical in their endeavors to find solutions for social evils. An outstanding paper in the section on the first day of the meeting was that of Mr. Herbert Samuel, M.P., the Postmaster-General, who discussed the tendency to find in a federal system of government the varying and sometimes conflicting interests of the different and widely separated communities of the British Empire. There was also a notable discussion on the results of war by Mr. Norman Angell and Archdeacon Cunningham.

Friday was devoted to a discussion of labor problems. The readers of the four papers treated different aspects of the subject. Professor S. J. Chapman presented the general case for and against arbitration and conciliation in the settlement of labor disputes. Sir Francis Webster gave the manufacturers' point of view, noting the causes affecting prices and wages in the last 40 years. Mr. Ramsay MacDonald, M.P., made a reasonable plea for a minimum wage, varying according to locality and industry, giving labor its due share in the profits, but not unfair to the employers. Mr. C. R. Fay considered the limits within which industrial co-partnership might reasonably claim to be a remedy for industrial strife, and described in detail the schemes in operation at Lever Brothers (limited), Port Sunlight, and those in the English gas companies, where the late Sir George Livesey was the pioneer. A letter relating to conciliation

was also read from Sir Charles Macara. Monday's program was more varied. Mr. Allan McNeill discussed the possibility of utilizing national savings for the purchase of agricultural holdings through the machinery of land banks. Miss Annie Ashley instituted a comparison between British and German insurance legislation. Dr. David Heron, in a short address illustrated by lantern slides, gave startling evidence of the failure of inebriates' homes to reform habitual drunkards. Professor Geddes pleaded for the cooperation of the sciences in the town-planning movement and for the preparation of regional and civic surveys for that purpose.

From one point of view the work of the section on its last day was the most interesting of all. The first half of the morning was given to Scottish problems. Mr. James Cunningham, President of the Dundee Chamber of Commerce, gave facts and statistics which are probably not elsewhere procurable, relating to the origin and growth of the jute trade in Dundee and Germany. Mr. Alex. Newlands opened up a fascinating problem—the possibility of developing the water power of the Highlands for industrial purposes. In an impartial paper Mr. J. H. Jones analyzed the effects of dumping on the steel and tin-plate industries, and Mr. A. A. Mitchell closed a most successful meeting with an examination of the question—"Do Trade Unions Raise Wages?"

SECTION G—ENGINEERING

Perhaps the first place among the topics set down for discussion in this section, which was presided over by Mr. Archibald Barr, may be assigned to wireless telegraphy, which has already been referred to under the heading of the section of Mathematics and Physics. A second subject discussed referred to the attempts now being made by workers in different countries to produce a commercial gas turbine. The application of the reciprocating internal combustion engine to the purposes of marine propulsion is regarded as a retrograde step in view of the demonstrated advantages of rotary machinery for such service, and, in spite of the serious difficulties which have to be overcome, it is felt that the efforts being made to construct a commercial gas turbine is a movement along the right lines. A certain measure of success has, indeed, already been achieved, and with so many minds attacking the subject in different ways it is probable that success will be attained at no very distant date. The discussion which was opened

by Mr. Dugald Clerk showed what has been done and what has still to be accomplished.

The research on the gas engine itself which is being carried out by the Gaseous Explosions Committee of the British Association is to be continued. The report presented to the present meeting made it clear that useful work is being done by this committee in the settlement of disputed points and in throwing light upon certain questions which have hitherto baffled designers of gas engines. A set of interesting papers on marine problems and developments in marine propulsion opened up a discussion on several matters of current interest. Questions relating to the provision of lifeboats on liners and the special means whereby quick launching may be ensured were the subjects of a paper by Mr. Axel Welin. Another paper showed the real dangers in navigation arising from the suction effect between passing vessels, concerning which there has been a serious conflict of opinion. The case for electrical methods of ship propulsion, which is being closely watched by the British Admiralty, was discussed from the expert standpoint for the benefit of the lay mind.

SECTION H—ANTHROPOLOGY

In the proceedings of Section H (Anthropology) much interest attached to Professor Anthony's exhibit of the cast of the La Quina brain—one of the first examples of a brain of paleolithic man of Neanderthal type to be described and one of the finest yet discovered—as well as to Professor Keith's communication on the Gibraltar brain, which afforded strong corroborative evidence in support of the theories of the evolution of mammalian and especially the human brain elaborated in the president's address. Dr. Duckworth's description of the jaw of paleolithic antiquity found in Kent's Cavern, Torquay, in 1867, but not previously described, which was presented to the section by Professor Boyd Dawkins, was another interesting and important contribution to the study of the antiquity of man—a subject much in evidence at this meeting. Professor Elliot Smith's views on the origin of megalithic monuments, which he associates closely with the beginnings of the use of copper in Egypt, whence he holds the adoption of this form of burial monument spread over the remainder of the world, gave rise to a discussion in which these views were strongly criticized and a number of profoundly interesting questions were raised. The discussion on the ethnological aspects of Scottish folklore, if it did not succeed in elucidating any particular problems

of Scottish ethnology, at any rate brought out the fact that many primitive customs still survive in different parts of the country and will undoubtedly serve to stimulate interest in a subject in which the serious workers are regrettably few. Papers dealing with Egyptian archeology and the ethnology of the Sudan were unusually numerous.

Professor Elliot Smith in his two papers, one dealing with the earliest attempts at mummification in Egypt, and a second dealing with the physical character of the Egyptians of the second and third dynasties, has traced to a higher antiquity than had previously been done the use of this method for preserving the body of the dead, and in the second case has demonstrated the existence of an alien population in Egypt at an earlier date than his previous researches had revealed. Dr. Wood-Jones's paper on the Ancient and Modern Nubas showed that there is evidence of this same process of infiltration of an alien element in Nubia in early Christian times. Mr. Robert Mond's colored illustrations of the Theban tombs excavated by Mr. Gardner were greatly appreciated, both on the ground of their beauty and of their scientific value as accurate records. The papers of Professor Petrie on early dynastic discoveries, and by Mr. Quibell on tombs of the second and third dynasties, both contained important contributions to the study of Egyptian antiquities. To archeologists a melancholy interest attached to Mr. Ogilvie's paper on the Temple of Philæ. The colored slides shown to illustrate the paper were reproductions of recent sketches, and probably will be the last records to be made of the temple, which will be finally submerged in November.

SECTION I—PHYSIOLOGY

Mr. Leonard Hill presided over this section and devoted his address to the important question of ventilation in its relation to health. Some interesting information was given by Professor J. S. Macdonald, who, as a result of calorimetric observations on man, concluded that 25 per cent. of the energy transformed during work is converted into mechanical movement. His experiments were conducted in the large calorimeter at Sheffield University. Dr. A. D. Waller gave an account of the original physiological work done by Patrick Blair about 200 years ago in correctly describing the nerves of the trunk of an elephant which died near Dundee. He dissected the carcass of the animal until, owing to its decomposition, he was compelled to desist. Its bones were subsequently ground to powder and used to fertilize the fields.

This section devoted a morning to a discussion on the relation between mind and body—a subject which proved extremely attractive. Another discussion was held in conjunction with the Zoology Section. This had relation to the physiology of marine organisms. Dr. Edridge Green criticized the report of the departmental committee on sight tests. He condemned the wool test as not being efficient in detecting color blindness; and also criticized the form of lantern recommended by the committee, and the method of flicker photometry. Professor Gotch and Professor Sherrington agreed that the wool test was quite inefficient and should not be retained; but they defended the lantern and the form of photometer recommended by the committee.

SECTION K—BOTANY

Two of the most interesting papers in the Botanical Section were read by Dr. C. H. Ostenfeld, of Copenhagen, and by Professor F. E. Weiss, of Manchester. These dealt with the question of hybridism in plants. Dr. Ostenfeld confined his remarks to the genus of hawkweeds (*Hieracium*), one of the most difficult genera with which systematic botanists have to deal, on account of its remarkable polymorphy. As Dr. Ostenfeld showed, some species of *Hieracium* reproduce themselves without fertilization, whilst other species require this; and in a third set of species both modes of reproduction obtain. Crossing species of one of these sets with another, hybrids were obtained; and these first crosses differed remarkably among themselves, thus differing from the first crosses of other genera, which are remarkably uniform. The offspring of the first crosses, however, were quite uniform, thus differing from later crosses of other genera, which are remarkably polymorphous. Dr. Ostenfeld concluded that in this genus of plants new forms have arisen and are arising at the present time (1) by hereditary variation of already existing species, (2) by hybridization and (3) by a combination of these methods. From those forms which reproduce themselves without fertilization very few new forms arise at all; but there are indications even here that new forms arise occasionally by mutation. Dr. Ostenfeld's paper may be regarded as the first step towards a real synthesis of the extremely numerous "species" of the genus *Hieracium*.

Professor Weiss's paper dealt with artificially produced hybrids of two common British species of avens, *Geum rivale* and *G. urbanum*. The first cross agrees with plants named *Geum intermedium*.

Some of the later crosses agree with other hybrid forms described by systematic botanists. It is remarkable that two such well-marked species as the water avens (*G. rivale*) and the wood avens (*G. urbanum*) should produce so many fertile hybrid forms that a very complete series of forms can be obtained connecting the one species with the other. In the discussion which followed it was suggested that the same phenomenon which is happening in *Geum* is happening in the allied blackberries (*Rubus*), a genus as polymorphic as *Hieracium*, except that in *Rubus* there are several (perhaps six or sixty) true species, most of which are hybridizing with one another, and that many of the so-called "species" of *Rubus* are merely hybrid forms corresponding to those artificially produced hybrid forms of *Geum* made by Professor Weiss.

Several papers on ecological botany were read, of which one of the most important was that by Miss Rayner on the Ecology of the Common Heather (*Calluna vulgaris*). The semi-popular address, which was well attended, was delivered by Mr. I. H. Burkill (the newly appointed director of the Botanical Gardens of Singapore) on "The Botanical Results of the Abor Expedition."

The section was well attended, especially by the younger members, and several interesting excursions were made. The visit to Dundee will long be remembered by the members of the section as among the most generally useful and interesting of any meetings of recent years.

SECTION L—EDUCATION

The Education Section marked in various ways an advance upon the time when it was a mere battleground for those who favored this or that method of teaching particular subjects of the school curriculum. The origin of the section was due, in fact, to men who were in the main concerned with the teaching of science. They were not interested in the deeper problems of education; probably, in fact, they would deny that it had any problems other than those which were concerned with how much of the science master the schools ought to tolerate. Obviously, however, if the section was to justify its independent existence, it must take its own line and call to its councils those who make education in the scientific sense of the term their chief concern.

The appointment of Professor Adams as president was in fact a recognition on the part of the council of this claim to independence, and Professor Adams's address on the possibility of an

objective standard in education will take rank as a very sane and moderate statement of the present position of the subject as a science. Less directly addressed to the popular mind than is usual, it will be read with marked attention and pleasure by the new school of educational research which is slowly making its way, stimulated perhaps by the influence of the new school of psychology. If it contained no new or startling discovery, the presidential address pegged out the claims, so to speak, upon which education may hope ultimately to take full rank among the sciences.

Closely allied to the presidential pronouncement was the discussion on the psychological processes involved in reading and writing. A report from a research committee presented the latest statement of the results of psychological inquiry, and some admirable papers were read, leading to the general view that much ingenuity is at present misspent in setting up positive hindrances to the rapid acquisition of the art of getting at the meaning of the printed page.

Less technical in its appeal was the discussion on vocational training. Miss Faithfull's was in effect the only dissentient voice in the general call for a curriculum more closely directed to the actual situation of school pupils. There was some little uncertainty about the meaning of the word vocational. Obviously, if a lad is to spend his life in one of the 95 independent operations which enter into the making of a pair of boots, school time would be wasted if its activities were thus confined. The problem of how to give point and meaning to school "lessons" has yet to be solved. It is at least a step forward when the desired end is clearly laid down.

There were interesting discussions on school leaving certificates and the present position of mathematical teaching. Two distinguished physicists, Professor Sylvanus Thompson and Principal E. H. Griffiths, lamented the loss of Euclidean geometry, though there was a general agreement about the value of the work which men like Dr. T. P. Nunn are doing for the humanizing of mathematical studies.

Not the least important of the actual accomplishments of the section was the report on school-books and eyesight. The committee has laid down standards of type, etc., which must profoundly affect the production of school-books and the hygiene of school life. It is much to be hoped that the council of the association will give wide publicity to that report.