

reaction to environmental conditions. In the extreme case the genetic machinery may, so to speak, be put out of action; genotypic potentiality no longer becomes actual. We say that the character is not inherited. We meet with such an example in *Ranunculus aquatilis*. According to Mer (Bull. Soc. Bot. de France, i., 27, 1880), the terrestrial form of this plant has no hairs on the ends of the leaf-segments, but in the aquatic individual the segments end in needle-shaped hairs—that is to say, hairs of a definite form are produced in a definite region. Again, Massart (Bull. Jard. Bot. Bruxelles, i., 2, 1902) finds that in *Polygonum amphibium* the shoot produces characteristic multicellular hairs when exposed to the air, but if submerged it ceases to form them on the new growth. Every individual, however bred, behaves in the same manner, and must therefore have the same genetic constitution. In an atmospheric environment genotypic expression is achieved; in water it becomes physiologically impossible. A limitation to genotypic expression may in like manner be brought about by the internal environment, for the relation of the soma to the germ elements may be looked upon in this light. Thus in the case of a long-pollened and round-pollened sweet pea, Bateson and Punnett (Report to the Evolution Committee, Roy. Soc., ii., 1905) found that the  $F_1$  pollen-grains are all long, yet half of them carry the factor for roundness. If we take the chromosome view, and if it be presumed that the factor for roundness is not segregated until the reduction division, the cytoplasm of the pollen mother-cells may be supposed to act as a foreign medium owing to a mixture of qualities having been impressed upon

it through the presence of the two opposite allelomorphs before the moment of segregation. We should, consequently, infer that the round-pollen shape is produced only when the round-factor-bearing chromosome is surrounded by the cytoplasm of an individual which does not contain the long factor. If, further, we regard the result in this case as indicative of the normal interrelation of nucleus and cytoplasm in the hereditary process, we shall be led to the view that, whatever the earlier condition of mutual equilibrium or interchange between these two essential cell constituents may be, an ultimate stage is reached in which the rôle of determining agent must be assigned to the nucleus.

In conclusion, I would appeal for more organised co-operation in the experimental study of genetics. It is a not uncommon attitude to look upon the subject of genetics as a science apart. But the complex nature of the problems confronting us requires that the attacking force should be a composite one, representing all arms. Only the outworks of the fortress can fall to the vanguard of breeders. Their part done, they wait ready to hand over to the cytologists, with whom it lies to consolidate the position and render our foothold secure. This accomplished, the way is cleared for the main assault. To push this home we urgently need reinforcements. It is to the physiologists and to the chemists that we look to crown the victory. By their co-operation alone can we hope to win inside the citadel and fathom the meaning of those activities which take shape daily before our eyes as we stand without and observe, but the secret of which is withheld from our gaze.

### The Air Conference, 1920.

THIS Conference, consisting of representatives of aviation in all its many branches, lasted three days, and was organised by the Air Ministry in order to bring together persons interested in the subject in conditions under which urgent problems could be freely discussed with the knowledge that resolutions of the conference arrived at after such discussion would be welcomed by the Ministry as assisting the Secretary for Air in his endeavour to promote in every way the national interests depending on aeronautics.

At the luncheon at which he presided on the first day of the conference, Mr. Churchill, Secretary of State for War and Air, made this abundantly clear. The future of military aviation, he pointed out, depended on the widespread development of civil aviation. "We," he continued—"I am speaking for the Government—intend to help civil aviation by every means in our power. You know our resources are limited, but I hope the day is coming when it will be possible for us to increase to some extent the resources which are available for the development of civil aviation. I do not think three years should be too much to reconstruct the Air Service, so that fathers of every grade in our national life shall be glad to send their sons into it with the feeling that they are giving them a good start in life, with the possibility of a fine career."

In the main (he added), civil aviation must fly by itself, and the function of the Government would be to facilitate its action—to liberate, stimulate, and encourage its action. The Air Estimates had shortly to be considered. He excluded no solution which would be likely to help us through the two or three difficult years ahead of us. No one could have the slightest doubt about the ultimate future. To suppose that the world, having got into the air, was ever going to get out of it, was as absurd as to suppose that the

world, having taken to steamships, was going back to schooners and sailing ships. They were gathered there to drive away pessimism and to assert their view that a great and bright future was opening for British aviation.

The conference was held, by the courtesy of the Lord Mayor, in the council chamber of the Guildhall on October 12, 13, and 14, and the room was well filled during all the sessions. The Lord Mayor himself welcomed the members, and in a few well-chosen words expressed his sense of the importance of the occasion. He then gave place to Lord Montagu of Beaulieu, whose interest in aviation is known to all. On the second day Lord Weir of Eastwood, President of the Air Council during a most critical part of the war, presided; while on the third day the chairmen were, in the morning, Lord Beatty and, in the afternoon, Lord Londonderry, Under-Secretary of State for Air, who had been detained in Ireland and was unable, in consequence, to be present at the opening sessions.

The business details were admirably arranged. A paper was read by some recognised authority on the subject under discussion, one or two invited speakers followed, and then the discussion was open to all who cared to contribute.

The conference was fortunate in that three out of the six papers were read by the members of the Air Council responsible for the subjects considered, while other members of the Council took part in the discussion. The audience thus learnt at first hand official views on these matters.

The conference was widely representative; invitations had been sent not only to airmen, to designers and builders of aircraft of all kinds, and to the representatives of aeronautical organisations, but also to the Air Attachés of foreign Powers, to members of



learned societies, to representatives of various Government Departments, and to the secretaries of the Transport Workers' Federation and of the United Vehicle Workers.

Turning now to the details of the meeting, the first day was devoted to civil aviation and air services and to the operation of civil aircraft in relation to the constructor.

Major-Gen. Sir Frederick H. Sykes, Controller-General of Civil Aviation, was the author of the first paper. He dealt in detail with the growth and present position of air-mail goods and passenger services (a) in the United Kingdom, (b) between London and the Continent, (c) in foreign countries, and (d) in the British Dominions and Colonies. Under (b) he gave a most valuable series of statistical tables, showing the amount and type of the general traffic, the number of arrivals in and departures from the United Kingdom, the number of letters carried, customs returns, and the number of accidents. Details as to the last were very striking; the dangers of air traffic are quite small, and it was stated during one of the discussions that all the accidents for some time, so far as could be known, had originated in the failure of the engine or of one of the engine accessories.

A large map brought clearly before the eyes of all the routes actual and projected, and information was given with regard to the proposed services from Paris to Prague, Warsaw, and the Balkan States, and from London to Copenhagen, Hamburg, and Scandinavia. The importance of Egypt to the Imperial routes to Africa and the East was very clearly shown. This point was stressed later by Sir Hugh Trenchard in his paper.

The second part of Sir F. Sykes's paper dealt with the factors contributing to successful air services, and the author concluded a most valuable contribution with suggestions for the future development of those services. Referring to the recommendations of Lord Weir's Advisory Committee on Civil Aviation, he said that the more experience he obtained and the more he considered the case in regard to the scheme of subsidies which Lord Weir's Committee recommended, the more clear he was that those recommendations were sound. He appreciated the argument in favour of allowing industry to stand on its own feet, but he was strongly of opinion that civil aviation must not be allowed to die for lack of direct assistance, the need for which would only be temporary, that was to say, during the period—three to five years—during which old material was being used up, and while new and really suitable types were being evolved. Without this small stimulus it would be very difficult for transport concerns to show enterprise and vigour, even if they could live during the next year or two.

The conference was greatly indebted to Mr. White Smith, the able and energetic chairman of the Society of British Aircraft Constructors, for his paper in the afternoon. After discussing the present lack of financial success in operating air services and its main causes, and emphasising the need for improved trustworthiness, while pointing out the high standard already attained, Mr. Smith proceeded to give a series of most important statistics as to the costs of operating commercial air services, showing the capital expenditure involved in the use of various types of aircraft, the operating costs, and the necessity of improved design as shown by the operating costs.

The tables which accompanied the paper will, no doubt, be published in full, and, while they may need correction in some details—Mr. Handley Page in the course of the discussion did criticise some of the figures relating to one of his machines—they form a most valuable mine of information and must prove of

immense service. The economic advantage of the large high-powered machine is very clearly brought out.

The second day was devoted to research. Between the morning and afternoon sessions on that day a most interesting visit was paid to the Croydon Aerodrome to see the arrangements for the departure and arrival of aircraft to and from the Continent and to learn something of the working of an air-port. A large number of the most modern types of machine were on view, and many members had their first flight.

Lord Weir was in the chair, as was specially fitting, for during his tenure of office as President of the Air Council he appointed a Committee on Education and Research, and thus led up to the scheme connected with the Zaharoff professorship which is now being developed at the Imperial College.

Air Vice-Marshal E. L. Ellington's paper gave a full account of the present position of aircraft research and contemplated developments—questions which, as Director-General of Supply and Research, he was specially qualified to discuss. He dealt in the case of aircraft heavier than air with trustworthiness, controllability, performance, safety and comfort, and cheapness. Particulars were also given as to airships and kite-balloons.

Capt. Barnwell, in the afternoon, dealt very fully with the technical aspects of Service and civil aviation. In the course of the discussion reference was made to the important work carried out during the war by the scientific staffs of the Royal Aircraft Establishment and the National Physical Laboratory, and the fear was expressed lest the reductions which had taken place at Farnborough were on such a scale as to impair the efficiency of the research work. It was also pointed out by several speakers that, in addition to a research staff in the scientific establishment, it is essential that builders of aircraft should be in a position to retain the services of a staff of skilled designers, whose work is necessary before the results of research can be made use of in improved machines.

During the afternoon session two resolutions were moved and carried *nem. con.* The first, moved by Major-Gen. Sir R. Ruck, was to the effect "That the Air Conference of 1920 desires to record its emphatic opinion that the rapid development of civil aerial transport is vital to the interests of the Empire, not only as a means of developing its communications, but also as an essential element in its defence, and the conference endorses the recommendations of Lord Weir's Advisory Committee on Civil Aviation and urges their adoption by the Government"; while the second, moved by Prof. Bairstow, urged that sufficient means for researches, both in the Government establishments and elsewhere, should be provided, and that steps should be taken to enable constructors to retain the services of a number of skilled designers.

On the first day a resolution had been carried urging that certain mails should be conveyed by air.

The work of the third day was no less interesting and important. In the morning Air-Marshal Sir H. M. Trenchard, Chief of the Air Staff, spoke on the aspects of Service aviation, the problem of war in the air. He discussed at some length the prospects of young officers in the Force, pointing out that all cannot be taken on permanently, and suggesting that in some cases four years in the Force might take the place of the university. In conclusion, he said that the power of aircraft to cover great distances at high speed, their instant readiness for action, their independence of physical communications, their indifference to obstacles, and the inability of an enemy unprovided with an Air Service to counter their attack,



combined to encourage their use more often than the occasion warranted. The power to go to war at will was apt, in fact, to result in a thoughtless application of that power.

In the afternoon session Sir Trevor Dawson dealt with the future of airships. He thought there would be no difficulty in producing ships to travel at eighty miles an hour, thus giving an average speed, allowing for the wind, of sixty miles, and expressed the view that there would be no difficulty in running a regular trans-oceanic service once the trustworthiness and saving of time had been demonstrated. In his opinion, the time to the Cape might thus be reduced from eighteen days to five, and that to India from sixteen days to four or five.

Sir James Stevenson, Civil Member of the Air Council, stated towards the end of the discussion on behalf of the Ministry, and he thought he might say on behalf of the Government, that if a commercial syndicate would offer to take their airships and develop them as a national undertaking, it would be

an easy matter to get the Government to agree to give them not only airships, but also aerodromes and the other assets.

A further resolution was passed asking the Government to reconsider the report of the Civil Aerial Transport Committee and the recommendations it contained with the view of adopting such as might now apply.

The conference, which was remarkable in many ways, closed with the usual votes of thanks, and in replying, Lord Londonderry, chairman at the concluding session, expressed the appreciation of the members for the help afforded by the Press.

There is no doubt that aviation, particularly civil aviation, will benefit from the discussions which have taken place, and still more from the fuller consideration which can be given to the papers when published in full. The hope was expressed by many that the conference may become an annual event, and thus afford a regular opportunity for the ventilation of questions of great public interest. R. T. G.

### Annual Report of the Meteorological Committee.<sup>1</sup>

THE Report of the Meteorological Committee for the year ending on March 31 last marks the end of a definite stage in the development of the British State Meteorological Service. During the year under review four notable developments occurred: (1) The Office became attached to the Air Ministry instead of being in direct connection with the Treasury; (2) the work of the British Rainfall Organization was incorporated with that of the Office; (3) the co-ordination of the Services of the Navy, Army, and Air Force, which developed during the war, was begun; and (4) inter-Dominion and international co-operation in meteorology, which had largely been in abeyance during the war save for military purposes, began to take a more definite shape. One might add as a fifth important occurrence that the period of service of Sir Napier Shaw as Director of the Office came to an end at the close of the year, though he consented to remain in office until the appointment of his successor was carried through.

An appendix to the report gives the recommendations of the Sub-Committee of the Research Committee of the Cabinet which was appointed to lay down principles on which the State Meteorological Services should be reorganised. It is satisfactory that the wisdom of having one State organisation has been realised, and that while the constitution of the Committee provides for adequate representation of public Departments, the Royal Society and the Royal Society of Edinburgh are also represented. The constitution of the Committee provides that the Controller-General of Civil Aviation shall act as its chairman, but on the representation of the Royal Society it was agreed that a vice-chairman should be elected from amongst the representatives of scientific societies. The Director of the Office, who under the old régime was chairman of the Committee, ceases to be a member, but "will act generally as adviser to the Committee on all meteorological and geophysical subjects," and is made responsible for bringing before the Committee "all matters of importance relating to the application, progress, and development of the science of meteorology in which the Meteorological Service might share."

The British Rainfall Organization had a separate existence for sixty years, but it had for some time

been evident that incorporation with the growing State Service was desirable, and indeed necessary. On the retirement of Dr. H. R. Mill from active duty as Director of the Organization, the transfer was carried through. Mr. Carle de S. Salter, who was associated with Dr. Mill, has been appointed superintendent of the rainfall work of the Committee, so that the continuity of the work and of the relations with voluntary observers is assured.

The overlapping of the various Meteorological Services which developed during the war was perhaps more apparent than real, but there cannot be two opinions as to the need for co-ordination under a central authority. The Navy, the Army, and the Air Force each had quite distinct and separate needs which were met by separate establishments, but the only serious overlapping which occurred arose from the creation of separate headquarters in London, provided with a staff for forecasting, and each collecting similar information. This overlapping has now, fortunately, disappeared, and a start has been made with the establishment of local civil distributive stations to take the place of war-time stations for supplying to aircraft, shipping, and the general public information derived from detailed study of the weather in a form suitable for practical use. One interesting development in this connection is the provision of an effective local organisation for Scotland, with headquarters in Edinburgh and a local advisory committee.

The effect of the war in bringing to light the value of meteorological information is well gauged by the increase in the *personnel* of the Office. In 1914 the staff of the Office comprised about 20 professional and 60 clerical and technical assistants, while on March 31, 1920, the establishment was 97 professional staff and 278 clerical and technical staff.

The inter-Dominion and international arrangements are still far from being stabilised, but one of the most important developments was a Conference of Dominion meteorologists, which concluded with the following resolution: "That this conference of representative meteorologists of the British Empire assembled together for the first time agree to continue as an association for the exchange of their views from time to time by correspondence upon scientific matters concerning the achievements, requirements, and organisation of their Services, and hereby elect Sir Napier Shaw their first president, and invite the members to submit rules for the guidance and acceptance of the

<sup>1</sup> Fifteenth Annual Report of the Meteorological Committee to the Lords Commissioners of His Majesty's Treasury for the Year ended March 31, 1920. Pp 82. (Cmd. 948.) (London: H.M. Stationery Office, 1920.) Price 9d. net.