

These papers provoked a spirited discussion. Mr. P. Lyle spoke of a rapid method for estimating the mean and standard deviation of a normal distribution from a table of frequencies. If a table of cumulative frequencies is formed, and the corresponding ratios plotted on specially ruled probability paper, the resulting points will lie approximately on a straight line; the 50 per cent value of this line gives the mean of the distribution, and the reciprocal of its slope is the standard deviation. He said that he had generally found methods of regression analysis to give a more readily understandable representation of results than the calculation of correlation coefficients. From a slightly different point of view, this matter was also raised by Mr. Clayson, who criticized the correlation between rainfall and percentage 'gumming' quoted by Mr. Adam; he said that since 'gumming' was caused by bacterial infection of the trees, no meaning could be given to the rainfall correlation. In reply, Mr. Adam stated that not all 'gumming' could be attributed solely to bacterial causes; he and other speakers also pointed out that the existence of a correlation does not imply a direct causal relationship, but may be due to the two variates being to some extent dependent upon common causes. Mr. Leibmann mentioned the danger of drawing misleading conclusions from spurious correlations.

Dr. J. G. A. Griffiths questioned the practice of using a normal frequency distribution to represent the distribution of a measurement the range of variation of which is not infinite. He was particularly concerned about the probabilities of extreme values, and described the difficulty of using a statement of probability as the basis for legal action concerning the constitution of a food product; the assertion that a sample analysed had only a very small probability of occurrence in random sampling from a product that was up to standard might be countered in court by the claim that a rare chance could occasionally happen. He would prefer to argue on impossibility rather than on low probability, and would therefore like to make use of a distribution with finite range. Mr. Finney replied that even though a measurement is known not to be able to take an infinite range of values, the satisfactory determination of the extremes is not easy. For many purposes the normal distribution has been found a sufficiently good approximation, as the true limits of the distribution are so wide that even the assumption of normality allows an exceedingly small probability of their being surpassed. Furthermore, it can be demonstrated that the distribution of a mean of several observations will generally be much closer to normality than that of a single observation, and usually decisions will be taken only on mean values. He stated that the statistician would use other forms of distribution function when these are found to be more appropriate, but that often it is impracticable to obtain positive evidence of any other distribution fitting the material more closely than the normal. Mr. A. L. Bacharach suggested that a statement of the analyst's experience that "a value so extreme has never been found for a product known to be of satisfactory quality" would often be a more effective way of presenting evidence than a quotation of probability levels. Mr. E. C. Wood reminded the meeting that the choice of 5 per cent significance level is arbitrary, and that, for the purpose of an action at law, a more stringent criterion might be desirable.

Dr. Nicholls inquired about the possibility of combining evidence that a product is below standard; statistical analyses of sample determinations of two or more different constituents might show each to be below standard, though not significantly so, and a composite test would be needed in order to summarize the weight of evidence against the product. Mr. Steiner suggested that a combined index might be formed which would be more sensitive to discrepancies than any one of the measurements used in forming it. Mr. Wood mentioned the use of discriminant functions.

Mr. Wood emphasized that the statistical analysis of data need not require a great amount of tedious calculation. Often a simple preliminary examination of the figures will readily indicate the answers to all the main questions, and no complete analysis will then be needed; this is particularly likely when efficient experimental designs are used. Occasionally the full analysis might mean all the difference between obtaining unreliable, or even misleading, information from an experiment, and obtaining a sound and detailed interpretation of the data; in an investigation for which the experimental work had taken a much longer time, a few hours of computing might be a small price to pay for valid conclusions.

As a simple example of the planning of experimentation, Mr. Wood said that the practice of combining a number of independent samples of a product into a single bulk, from which duplicate sub-samples are drawn for chemical analysis, leads only to an estimation of analytical variations; if, instead, the original samples are combined into two bulks, from each of which a single sub-sample is drawn, the difference between the sub-samples also estimates the true sampling variability of the product.

Mr. K. A. Brownlee spoke of the importance of ensuring that so-called 'duplicate' analyses are really based upon repetition of all the analyst's procedure, and are not merely obtained by simultaneous parallel chemical analyses of two sub-samples under practically identical conditions; for many purposes the co-operation of different workers, and even of different laboratories, is necessary if the true variability of an analytical technique is to be assessed.

D. J. FINNEY

## FRENCH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE sixty-fifth meeting of the French Association for the Advancement of Science was held at Nice during September 9-14, 1946, under the presidency of Prof. Paul Montel. The opening meeting was held in the great hall of the Centre Universitaire Méditerranéen, which had been placed at the disposal of the Congress, and served as the general headquarters. Speeches of welcome were made by the Préfet of the Alpes Maritimes, the Mayor of Nice, and by Prof. Mario Roques, who pointed out that although Nice had the reputation of being a town of pleasure, it was also a town for meditation and study. Then followed addresses by representatives of the foreign delegates to the Congress, including H. Munro Fox (Britain), de Selys-Longchamps (Belgium), Wavre (Switzerland), Burgers (Holland), Bydovský (Czechoslovakia), Sergescu (Rumania), and Kepinski (Poland). Finally, Prof. Montel delivered his presidential address on the role of mathematics in the ordinary life of individuals.

The afternoon was devoted to certain inter-sectional meetings at the Centre Universitaire, and the organisation of sectional programmes at the Lycée de Garçons which had just been rebuilt. Tuesday, Wednesday and Friday were occupied mainly by the work of the sections, but the proverbial hospitality of Nice was shown in the variety of entertainments arranged by the municipality, including a reception at the Villa Masséna and a concert at the Opera. Thursday was devoted to an excursion to Monaco, including visits *en route* to the Mont Gros observatory and the famous Augustus Monument and Museum at La Turbie.

At Monaco the afternoon was spent at the Oceanographical Institute, where the Director, Commandant Rouch, gave an account of the work of the Institute. Afterwards a visit was paid to the Jardins Exotiques with their extensive collection of cacti and other xerophytes.

Saturday, the last day of the Congress, concluded with an address by Commandant Rouch on French oceanographers, from Pythéas to Charcot; he recalled that it was exactly ten years since the *Pourquoi Pas* disappeared with Charcot and his crew.

A special feature of the Congress was the number of papers dealing with local problems, and excursions were arranged by many of the sections, including those of geology, botany, biogeography, agronomy and forestry. There was, for example, a valuable day excursion in motor coaches ascending the mountains inland from Nice to a height of 1,700 metres to view the successive altitudinal zones of the forests (at a number of places the excursionists were not allowed to walk off the road owing to unexploded mines).

The Congress was attended by many foreign delegates and also by representatives of more than forty French academies and scientific societies. The British Association was represented by Dr. Edward Hindle, one of its general secretaries, and Prof. H. Munro Fox.

It was decided to hold the Congress for 1947 at Biarritz towards the end of September. Dr. L. Fage, professor at the National Museum of Natural History, was elected president, and Dr. Lavier, professor at the Faculty of Medicine, Paris, was appointed secretary.

E. HINDLE

## GROWTH OF MODERN PSYCHIATRY\*

**I**N his three Salmon Memorial Lectures before the New York Academy of Medicine, Dr. D. M. Levy traced the growth of modern psychiatry and showed its influence on psychiatric thought. Dr. Levy commenced his career in the Illinois Institute for Juvenile Research in 1920. The study of delinquency was then very much under the influence of the work of Dr. William Healy, and was beginning to be applied to criminology. Healy himself was building upon the foundations laid by Meyer, Binet and Freud. Meyer had developed the view that behaviour is a reaction to environment, and under him psychiatry became the study of purpose and response. Binet had opened the way to the measurement of mental powers by his work on school-children, and Freud had stripped

\* Substance of the Salmon Memorial Lectures delivered at the New York Academy of Medicine by Dr. David Mordecai Levy, director of the Information Control, Division Screening Centre, U.S. Army, Germany, on November 6, 13 and 20.

away illusions to show the real motivation behind conduct. The result of their impact upon Healy was his book, "Mental Conflict and Misconduct".

Dr. Levy showed the development of child guidance and demonstrated it by an interesting recital of a case which attended the clinic where he then worked. The different approaches to the child's problem were studied with earnestness and enthusiasm, so that one feels, as he said, that these were exciting days and even the smallest discovery was fascinating. He showed how the environmentalist exploited milieu psychology and the impact of social forces upon the child's behaviour; the psychometric testing revealed the individual's intellectual capacities, and the organic approach showed underlying physical disease. Although all these were rival methods, and to some extent still are, they have been integrated into teamwork which reveals the whole. Yet in spite of all its advances, child psychiatry is still in a formative phase.

In his second lecture, Dr. Levy discussed delinquency, and pointed out that here, on the whole, psychiatry has not made notable progress. This is partly because of the legal difficulties and the lack of institutions suitable to exploit the psychiatrist's recommendations.

Psychotherapy may be useful for the criminal, but it is prolonged, and an impractical treatment with present resources. The correction of environment is helpful, and group psychotherapy offers promise. Foster homes are useful in certain cases. When institutions are used, every member of the staff should have an understanding, non-authoritarian attitude. Delinquent children previously exposed to disciplinary measures are confused when they breathe this new air. They suspect trickery, try to discover the weak spots, attempt to escape or run amok. Finally they settle down and the remedial aspects of the new method appear.

Dr. Levy traced the gradual advances from dungeon to prison, from prison to reformatory, and showed that this was an evolution of society's attitude to the criminal from primitive vengeance, graded punishment according to the seriousness of the offence, then the acceptance of some responsibility for the delinquent behaviour, and at last to the attempt to reform him. Modern psychiatry regards crime as something curable, something from which the criminal suffers. Reform in Britain has progressed farther than in the United States, but America leads in psychiatric study and treatment. He deplored the fact that psychiatry is so often neglected, and pointed out that many penitentiaries still have no psychiatric service.

Dr. Levy discussed the inroads which lay-psychotherapists are making into psychiatry; he fears that they will cause a permanent lowering of standards.

In his last lecture, Dr. Levy demonstrated that psychiatry is progressing through various phases. At first the psychiatrist dealt only with the severe neuroses and psychoses. Then he tended to be consulted regarding personal problems by labour and management. The third phase would be an integration with industry, but it remains a remote possibility. He gave various interesting points regarding the relationship between foremen and workers. These have shown a gradual transition in behaviour. The first and most primitive type of relationship was when the foreman gave an order categorically. Dr. Levy called this authoritarian. A further step was when