Hönigschmid and Goubeau, whose value 39·104 for ordinary potassium could not, as stated above, be confirmed. A further check on the value of ordinary potassium gave 39·096. The difference between the two values is thus 0·013, as contrasted with 0·005 found by Hönigschmid and Goubeau. The maximum difference to be expected in the distillation had been calculated as 0·010, but this was based on a percentage of K^{41} in ordinary potassium of 5·2, from an atomic weight 39·104, and integral values of the isotopes. A recalculated value is 6·6, whilst the experimental result leads to 7·3.

Since the discovery of the isotope C^{13} it has become clear that the value for the atomic weight of carbon accepted by the International Commission, namely, 12·00, is too low. The atomic weight of C^{12} on the old O^{16} basis, according to Aston, is 12·0036, which, when reduced to the chemical standard [isotopic mixture] oxygen = 16·000, becomes 12·0010 or 12·0023, depending on the factor used for conversion from O^{16} to O = 16·000. The chemical value found by Richards and Hoover in 1915 from the ratios Na_2CO_3 : NaBr : Ag varied in individual measurements from 11·997 to 12·008, the mean being uncertain by ±0·011 per cent of a unit. Physico-chemical methods depending on the densities and compressibilities of gaseous compounds of carbon have given values from 11·996 to 12·008.

It is obvious that the uncertainty in this important constant is considerable. Woodhead and Whytlaw-Gray (*J. Chem. Soc.*, July) now report a range of measurements at a series of pressures of the relative densities of oxygen and carbon monoxide by the use of a microbalance in such a way that no values of the compressibilities were required. Very concordant earlier density measurements by Leduc, Rayleigh, and Pire and Moles exist, and the new value gives an atomic weight of carbon, 12·011, in close agreement with Rayleigh's, but considerably higher than the accepted chemical value. The compressibility had also been fixed between narrow limits by Bateucas, Maverick and Schlatter. The density ratios of carbon monoxide and oxygen of Rayleigh and Leduc, and the compressibilities at 0° $(1+\lambda)$ 1·00048 and 1·00094, give 12·011(8) and 12·015(5), respectively; Pire and Moles' value, with the weight of a normal litre of oxygen, 1·42892, found by Moles and Gonzalez, gives 12·008(5). There was, therefore, already little doubt that the value was nearer 12·01 than 12·00, and the new value 12·011 confirms this result and is in agreement with other observations. The proportion of the C^{13} isotope must, therefore, be so high as 1 per cent, in close agreement with the results recently obtained by band spectrum methods by Jenkins and Ornstein.

Lamarckian Inheritance and Learning in the Rat

ONE of the most interesting papers read before Section J (Psychology) at the recent British Association meeting at Leicester was that by Prof. F. A. E. Crew, of the Department of Animal Genetics, University of Edinburgh, on "An Attempt to determine the Factors operating in Professor McDougall's Lamarckian Experiment". Prof. McDougall's findings are that:

(1) his experimental rat stock has, in the course of many generations, come to differ from his control stock in that the average number of errors made per rat by the individuals of the experimental stock is now significantly less than that made by the individuals of the control stock;

(2) that with the passing of the generations the average number of errors per rat made by individuals of the experimental stock has decreased gently and progressively; and

(3) that the rats of the control and of the experimental stocks respectively are to be readily distinguished by marked differences in their behaviour in the water tank.

Prof. Crew complained that the details regarding the performances of the rats which Prof. McDougall has published have never been given in full and that for this reason it has been impossible for anyone to gather from them whether or not the figures themselves are significant. He maintained that the method of recording adopted by Prof. McDougall could not possibly be expected to allow anyone to determine whether or not genetic factors are operating in the production of the increased facility for mastering the task. He showed the records of six generations of tank-trained rats and of a large number of control groups, and demonstrated that there is no significant difference between the performances of any of these generations amongst themselves or between the experimental groups and the controls, and that whatever improvement has been achieved can be explained as a result of deliberate and favourable selection. The first generation of tank-trained rats in respect of the average score was equal to the twenty-third generation of Prof. McDougall's, whilst the average score of some six hundred controls was also equal to that of this twenty-third generation.

Prof. Crew showed that, in the case of his own stock, though in respect of behaviour in the tank individual differed from individual, it is quite impossible to distinguish between control and tank-trained stocks. So that out of the results of three years' experimentation, involving nearly one thousand individuals, nothing emerges which supports Prof. McDougall's conclusion that in the case of his own stocks the results are only to be explained on the assumption that modifications acquired by the parents as a result of training have become transmitted to their offspring.

Prof. McDougall took part in the discussion which followed. He pointed out that the actual conditions of Prof. Crew's experiments were different from his, that the tank was different, and that the intensities of the lights used were different. He also defended the method of averages which he had used.

A paper on an allied subject was that by Prof. E. C. Tolman, who described three investigations which are in progress at the University of California. The first is an experiment on the genetics of maze-learning ability. Using a 17-unit *T*-maze as the measure of the rat's learning ability, Prof. R. C. Tryon has been selecting for a strain of 'maze-bright' rats and also for a strain of 'maze-dull' rats. In the *F*9 generation, the two strains had become so separated that only one or two of the bright strain proved duller than the brightest of the dull strain. No evidence for a Lamarckian effect, such as Prof. McDougall claims, has been found; that is, the rats

as a whole do not show any tendency to become brighter simply because of the training of their parents.

The second experiment described was one by Dr. I. Krechevsky on "Hypotheses" in rats. Using some of Prof. Tryon's bright and dull strains in a discrimination box which has four successive choices, Dr. Krechevsky has found that the maze-bright rats tend to establish 'spatial' position-habits first, whereas the maze-dull rats tend to establish 'visual' position-habits first. This seems to indicate that Prof. Tryon has been selecting not for an absolute *g*, in Spearman's sense, but for some more specific ability to be called perhaps 'spatial ability'. Dr. Krechevsky's experiment is also theoretically important because it indicates that what in the past were considered as mere blind 'position-habits' in rats have really the properties of 'hypotheses'. They are adopted one at a time and are persevered in or abandoned as they prove to be successful or otherwise.

The third experiment reported was one carried out by Prof. Tolman himself, and is to be regarded as a further analysis of the rat's spatial abilities. Two food-boxes were used, one reached by a short path, and one by a longer path. After the rats had learned to go very consistently to the nearer of the two boxes, they were put into this box by hand, and received there unexpectedly an electric shock. When they were placed at the starting point immediately afterwards, only some thirty per cent proved sufficiently aware of the relationships involved in that they refused to go towards this box, and took the path to the other box instead. If, however, they were run into the nearer food-box just before receiving the shock in it, practically all of them refused to go to it in an immediately subsequent trial. It appears that the ability to recognise a given path as leading to a given result—in this case an electric shock—is much easier when the actual sequence has been just experienced, than when the sequence has to be inferred, so to speak.

Prof. Tolman also discovered that if the rats found themselves unexpectedly blocked in all directions, they exhibited emotional breakdowns very similar to those reported by Prof. Lewin when working with children and adults in similar situations.

A National Academy of Sciences for India

IN our issue of September 23 last, support was given to the movement to establish a national Academy of Sciences in India. Reference was made to the Academy of Sciences of the United Provinces, which its founders hoped might develop into an All-India organisation, and to the Asiatic Society of Bengal, which will celebrate its 150th anniversary in January next. There is a strong feeling in India in favour of the formation of a national academy, to represent so far as possible all scientific interests in the country, but difficulties are likely to arise in deciding upon the most suitable centre for the new organisation. We outlined the position in the article already mentioned, and have now received from Dr. S. L. Hora, of the Indian Museum, Calcutta, a copy of twelve resolutions adopted at a general meeting of men of science in Calcutta held on September 17, and therefore before the issue of NATURE of September 23 reached India. Dr. L. L. Fermor, director of the Geological Survey, seems to have taken a leading part in preparing a constitution for the proposed Academy, and he has been empowered to put the views of Calcutta scientific workers before the Indian Science Congress when it meets at Poona.

We have not space to print the resolutions in full, but the following abridgement represents fairly the views of a large body of men of science in India in support of both the proposal for the foundation of an All-India Academy of Sciences and also upon the claims of Calcutta for recognition as the centre of such an organisation.

In view of the rapid advances that scientific research has made, and continues to make, in India, a Central Body should be organised capable of co-ordinating research, safeguarding the interests of scientific workers, advising both the Central and Provincial Governments regarding the application of scientific methods to ameliorating the condition of the masses and to establishing contact with other International scientific bodies. In view of the above, the proposal for the foundation of an Indian Academy of Sciences was unanimously approved and strongly supported.

All departments of science, both pure and applied, such as Mathematics, Physics, Meteorology, Chemistry, Geology, Zoology, Botany, Medicine, Anthropology, Psychology, Agriculture, Forest Research, Engineering, Veterinary Research, Geography, etc., should be included in the scope of the Academy and allowed effective representation in the proposed constitution.

The Academy should undertake to encourage scientific research in all its aspects by holding meetings, by publishing results of research of outstanding merit, by providing suitable library facilities, and by such other means as may appear conducive to the advancement of science in India. It should further be the object of the Academy to stimulate research in less-developed sciences and to arrange for provision of equal facilities for research in all the departments of science included in its scope.

The existing scientific bodies in India should be represented on the Academy with a view to ensuring co-ordination of research and the much needed co-operation of all scientific workers in India. This will enable scientific knowledge in the country to be pooled and applied to the practical needs of the nation.

The Academy should be of an All-India nature and represent as far as possible all scientific interests in the country. It should be so designed as to command the greatest respect and influence both in India and in International circles. It was, therefore, considered desirable to associate the new body, when founded, with the Asiatic Society of Bengal. Such an association is desirable for several reasons, such as facilities for meetings offered by this Society, its rich library, its existing relations with outside academies and societies, its influence with the Central and Provincial Governments and, above all, because a strong *liaison* with the various branches of Letters will thus be preserved, for it is most desirable that Science and Letters should not lose the benefit of healthy intellectual co-operation.