

After a very lengthy investigation of the biochemical changes which occur in the natural ripening of the wheat berry, its preparation or "conditioning" in the mill, and the influence of variations in the treatment of the resulting flour in the bakehouse, I am fully convinced that it is no longer the bakehouse that has to give the final verdict on the qualities of flour, as laboratory methods can now provide all the data necessary for inferring the antecedent conditions, defining the present qualities, and anticipating the future evolution of wheat or its product, flour.

A. J. BANKS.

Waterloo, Liverpool, March 11.

#### Ionisation and Anomalous Dispersion.

IN NATURE of February 21, Prof. Wood, referring to my letter of January 17, says that the effects observed were probably due to disturbance of the density gradient of the sodium vapour caused by "local heating by the wire." I am afraid that in my letter I cannot have described the experimental arrangement sufficiently clearly; at any rate, Prof. Wood seems to be under a mistaken impression.

The wire was merely an electrode insulated from the tube containing the sodium vapour, but connected to one pole of a battery, the other being connected to the tube. A current passed through the sodium vapour, or the nitrogen left in the tube after exhaustion and heating, presumably an ionisation current; and this was of the order of one microampere, and could hardly produce much local heating.

Be this as it may, since I left Aberystwyth my pupil, Mr. Needham, noticed an effect which, if confirmed, appears to me to be decisive in favour of a connection between ionisation and dispersion. While the tube was heated, by a flame as usual, with 10 volts there was a current of 4 divisions and an anomalous dispersion of 9 divisions. On raising the voltage to 58 volts, the current rose to 10 divisions, but the *anomalous dispersion immediately fell to zero*, and thereafter slowly increased to a value somewhat greater than before.

That an increase of current, and presumably of local heating, if there be any, should diminish the dispersion temporarily can hardly be understood, unless the systems producing the dispersion are themselves electrically charged and swept away to the electrode. I hope shortly to investigate the whole question fully, so as to decide definitely what connection, if any, exists between ionisation and dispersion.

G. A. SCHOTT.

Physical Institute, Bonn, February 26.

#### The Rusting of Iron.

IN NATURE of February 21 (p. 390) Prof. W. R. Dunstan states that rusting of iron takes place in the presence of water and oxygen when every trace of carbonic acid has been removed. To a certain extent this is the result obtained by our chemist, but his experiments proved conclusively that rusting must be due to an admixture of carbonic acid, for with improved precautions against its presence rusting was enormously reduced, and, this is important, confined to one or two spots. In some cases this local rusting took place where the steel samples rested on the glass vessels, and it was but natural to suppose that this local corrosion was brought about by silicic acid of the glass. The obvious precaution was to arrange an iron bowl in the centre of the glass vessel into which water could be distilled, but although this apparatus was constructed, it was not used, because if corrosion can be caused by the silica of the glass, then it may also be caused by specks of exposed slag in the iron or by the oxidised specks of manganese sulphite which can be seen with the microscope, or by other impurities. Corrosion may even be brought about by carbonic acid occluded in the iron. In order to settle the question, the experiment should be repeated with a piece of iron of absolute purity.

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Manchester, March 5.

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#### A Problem in Chance.

THE law of probability is often illustrated by the simple method of supposing a bag filled with an equal number of white and black balls, which are presumably uniformly distributed within the bag. It is stated that the chances are equal that any extracted ball will be black or white.

I am desirous of ascertaining how this equality of extraction of either colour would be disturbed if it be assumed that the balls are not merely inert, but that there is an inherent tendency for like-coloured balls to cluster together. Two subsidiary and mutually alternative conditions may be further assumed: either the tendency of the black balls to cluster together is greater than that existing between the white balls, or it is equal. It is the former of these two subsidiary conditions that interests me.

Perhaps I may state the problem in more definite form. Assume 2000 balls, of which half shall be black and half white, placed in a bag. The intensity with which the latter tend to cluster= $d$ , and that of the former is greater, but to a less degree than half as much again. The balls are extracted in groups of eight. In four separate extractions, what will be the probable proportion of black and white balls at each extraction? And how many extractions will have to be made before it is probable that an equal number of black and white balls will have been withdrawn?

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#### THE UNIVERSITY OF THE CAPE OF GOOD HOPE.

ON the invitation of Sir Lauder Brunton, a meeting took place at his residence on January 21 of gentlemen interested in university education. Among those present were Sir Arthur Rücker (of the London University), Dr. Donald MacAlister (then of Cambridge University, and president of the General Medical Council), Prof. Perry (Royal College of Science), Sir W. Arbuckle (Agent-General of Natal), Sir David Gill, Sir John Buchanan, and Mr. Howard d'Egville, honorary secretary Imperial Federation (Defence) Committee. Prof. Osler (of Oxford University), Sir Norman Lockyer, K.C.B., Sir Thomas Fuller (Agent-General for Cape Colony), and Prof. Stirling, dean of the medical faculty of the Victoria University, were unfortunately prevented from attending. Copies of the proposals provisionally agreed to by the committee of University of the Cape of Good Hope, relative to the re-organisation of that University, had been circulated before the meeting, and formed the basis of the evening's discussion. The result was a consensus of opinion on several leading issues, which may be summarised as under:—

(1) That in the existing condition of South Africa the interests of the higher education of the country would best be served by the continuance of only one examining and degree-conferring university.

(2) That the conferring on single colleges in the country the power of granting degrees to their own students would be detrimental to higher education, and specially injurious to the status of all such South African graduates. Such degrees would be depreciated, not only in the estimation of the people of the country itself, but also outside the colony, and would not have the same value or consideration given them which degrees granted by one general University would receive. The tendency of multiplying degree-granting institutions in the circumstances such as those existing in South Africa would be in the direction of unhealthy competition, which would inevitably lower, and not raise, the worth of degrees so obtained.

(3) That sound education would be promoted by associating in examinations the teacher with independent examiners, but the University should control all