

schemes for the nuclear structure of the elements from neon to potassium, analogous to his second scheme for the lighter elements, but with the modification that the maximum number of  $\alpha$ -particles which could occur on purely numerical grounds is not employed, to obtain agreement with the results of disintegration experiments. It is interesting to note that there is some indication from this of why potassium (41) should have a natural radioactivity.

**The Bleaching of Cellulose Materials.**—In 1927, Clibbens and Ridge, of the Shirley Institute, carried out some important work on the action of chlorous bleach liquors on cotton, and revealed the surprising fact that in such cases the degradation of the cellulose was most rapid at a  $pH$  value of about 7, that is, at the neutral point. Subsequent work by Kauffmann, Weiss, and others, along different lines, has led to the same conclusions, although none of the theories advanced in explanation is entirely satisfactory, since they ignore the effects of variations in the concentration of cellulose. The problem has now been

attacked from the point of view of the bleaching of wood cellulose by F. H. Yorston, of the Canadian Forest Products Laboratory (*Proc. of the Canadian Pulp and Paper Assoc.*, p. 31; 1932), who has found that an experimental bleaching mixture may be buffered to a  $pH$  value of 8.8-9.2 by addition of light magnesia, increase in acidity by neutralisation of the free lime by carbon dioxide being thereby avoided. In addition, it was possible to follow the rate of reduction, at  $pH$  9, of hypochlorite by pulps which had already consumed various amounts of bleach, and to show that this reaction is monomolecular with respect to hypochlorite. It is concluded that the proportion of those substances present in the pulp in relatively high concentrations (for example, celluloses and pentosans) is probably little changed by the action of the hypochlorite, especially if allowances are made for the effect of the oxidation of soluble lignins on the apparent rate of reduction of hypochlorite and for the autodecomposition of the hypochlorite itself. An additional observation of interest is the superior colour of pulps bleached in an alkaline medium.

### Astronomical Topics

**Comets.**—It is now established that there was a nebulous object near Newman's comet on the evenings of June 25 and 29. *U.A.I.Circ.* 392 contains a letter from Dr. Schmitt stating that he observed the object visually on June 29 with the Algiers equatorial, and also found it on his plates; he then examined the two exposures made on June 25, and found two images that indicated nearly the same motion as that of Newman's comet, which was registered on the same plate. On the first four days of July, observers at Bergedorf, Neubabelsberg, Heidelberg, Norwood, Yerkes failed to find any companions to Newman's comet, but on July 6 and 7, M. Delporte photographed two companion bodies at Ucele. Computations by Dr. M. Davidson make it unlikely that either of these is identical with the object of June 25 and 29.

A plausible conjecture is that Newman's comet has been expelling a series of vaporous masses, which have remained visible for a few days and then dissipated. The following table gives the distances of the three objects from Newman's comet:—First Object, June 25, E.100.43<sup>sec</sup>, N.11' 44.8"; June 29, E.114.42<sup>sec</sup>, N.7' 29.9"; Second Object, July 6, E.49.17<sup>sec</sup>, S.3' 34.9"; July 7, E.47.09<sup>sec</sup>, S.1' 45.4"; Third Object, July 6, W.65<sup>sec</sup>, N.7'; July 7, W.68<sup>sec</sup>, N.5'. It will be recalled that the great comet of 1882 expelled several portions. A sketch by C. L. Prince on Oct. 23 showed 4 nuclei (see Chambers' "The Story of the Comets", page 152, which also records that "on one occasion the comet seems to have thrown off a mass of matter which became, and for several days was observed as, a distinct comet").

*Harvard Cards* No. 224, 225, 227 give the following positions of comet 1932 *g* (Geddes). They are for the equinox of 1932.0. The observers at Cordoba were Dr. Bobone and Mr. Tretter; at La Plata, M. Dartayet. The magnitude was 9.

U.T.	R.A.	S.Decl.	Place.
June 25-9666	10 <sup>h</sup> 43 <sup>m</sup> 13.5 <sup>s</sup>	81° 43' 38"	La Plata.
27-0366	10 55 16.7	80 53 25	Cordoba.
27-9847	11 4 30.4	80 7 46	Cordoba.
29-0740	11 13 28.3	79 14 40	La Plata.

An erroneous position was given in *Card* 226; it is corrected in *Card* 227.

**Hydrogen Content of the Stars.**—Sir Arthur Eddington pointed out some years ago that the discordance between the calculated and observed brightness of

the stars (the calculated one being about ten times too bright) could be removed by supposing a larger proportion of hydrogen in the stars than at that time seemed probable. He now gives reasons for believing that the proportion of hydrogen is actually large enough to remove the discrepancy (*Mon. Not. R.A.S.*, April). He shows that there are two solutions for the percentage of hydrogen, one 33 per cent, the other 99.5 per cent. He regards the smaller value as more probable, but does not absolutely rule out the larger one; five cases are worked out: the sun, Capella, Krueger 60, Algol, V Puppis. The agreement is close except in the case of the last star; it is suggested that the proportion of hydrogen may be greater in very massive stars.

Sir Arthur notes that a paper by Dr. B. Strömngren, which he did not receive until his own was nearly finished, deals with the same problem and reaches results in very good agreement with his. The existence of the second solution with the very high percentage of hydrogen was noticed by both investigators. Incidentally, Sir Arthur notes that he has changed his adopted value of the sun's absolute bolometric magnitude from 4.85 to 4.60.

**A Hebrew Zodiac.**—Mr. Moses B. Cotsworth, the well-known advocate of calendar reform, reproduces in his Pamphlet *W*, issued last year, a photograph of a zodiac, executed in mosaic work, which was discovered in 1929 under the ancient synagogue of Beth Alpha, in the valley of Jezreel; the date is conjectured to be the reign of the Emperor Justin, A.D. 518-527. Several of the figures depart considerably from the usual types. The Lion has its head towards the Virgin, the Scorpion towards the Archer, the Scales are in a man's hand (possibly to correct the anomaly that the Scales, being an inanimate object, break the circle of living things). The Hebrew names of the constellations are inserted, and several of them are distinctly legible in the reproduction: Shor the Bull, Ariyah the Lion, Bethulah the Virgin, Aqrab the Scorpion, Qesheth the Bow; the others are indistinct. Mr. Cotsworth states that a similar zodiac has since been discovered near Jericho. The late Mr. E. W. Maunder, in his "Astronomy of the Bible", collected several passages in the Old Testament that might be allusions to the signs of the zodiac; but this is the first distinctly Hebrew zodiac that has come under the notice of the writer of this note.