fish. Into one of the beakers, 100 mgs of the mixture of the amino acids were introduced; into another, 100 mgs of the mixture of the fatty acids and glycerole; to the third, 1 cc of 100 per cent. ethyl alcohol was added, and the fourth and fifth beakers to which nothing was added served for controls. Small amounts of the sugar solutions were removed immediately from each beaker and sugar determinations were made according to the method of Benedict. Sugar determinations were also made again after thirty hours at the end of the experiment. Six series of such experiments were made and the following is the average for the six experiments. The average amount of sugar used by the controls in thirty hours was 36 per cent.; the fish to which the alcohol was added used 57 per cent.; those to which the fatty acids and glycerole were added, 58 per cent., and the fish to which the amino acids were added used 62 per cent. of the sugar. By comparing these figures it will be seen that alcohol increased sugar utilization almost as much as the fat and protein or the amino acids. It should be stated that the increase in the sugar utilization produced by these substances was fairly uniform and constant in all the experiments.

SUMMARY

(1) The effect of ethyl alcohol, fat and protein, or the amino acids, on sugar metabolism was determined directly.

(2) It was found that alcohol stimulated sugar metabolism almost as much as fat and protein.

(3) From this it is concluded that alcohol, in addition to serving as a source of heat and energy, may also serve another function of the foodstuffs, namely, that of stimulating metabolism.

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A RELATION BETWEEN THE MEAN DISTANCES OF THE PLANETS FROM THE SUN

IN 1772 Bode drew the attention of the scientific world to an empirical law, previously discovered by Titius, relating the mean distances of the planets from the sun. If we write the following number series: 0, 3, 6, 12, 24, 48, 96, 192, 384, and add 4 to each member of the series we obtain the following numbers, which are very nearly proportional to the mean distances of the planets from the sun: 4, 7, 10, 16, 28, 52, 100, 196, 388.

The first term of this series, which corresponds to the planet Mercury, does not belong to the series but should have the value 5.5 instead of 4. Moreover, the actual distance of Neptune is less than four fifths the expected distance. Nevertheless, Bode's law has served a useful purpose inasmuch as it suggested the existence of an unknown planet in the fifth position and thereby led to the discovery of the host of asteroids.

The writer has discovered another simple relation between the planetary distances, and so far as he is aware this relation has not been reported hitherto. It suggests the possibility that the orbits of the planets may be "quantized" somewhat after the manner of the electronic orbits in the Bohr atom. For this reason it may prove to have some theoretical importance.

The mean distances of the planets from the sun are proportional to the squares of simple integral numbers. The four innermost planets are represented by four successive integers, *viz.*, 3, 4, 5 and 6. The space between Mars and the average mean distance of the asteroids (taken as 2.7 astronomical units) corresponds to a difference of 2 between the corresponding integers, that between the asteroids and Jupiter to a difference of 3, that between Jupiter and Saturn to a difference of 4, that between Saturn and Uranus to a difference of 6, and that between Uranus and Neptune to a second difference of 6. The last two planets do not fit into the law quite as well as the others, but on the whole the agreement is good, and can scarcely be accidental.

The following table gives the data upon which the preceding statements are based. The numbers given in the third column of the table are obtained by dividing the mean distances in astronomical units by 0.0425, and extracting the square roots of the quotients.

TABLE

Planet	Distance from sun in astronomical units	Square root of comparative distance	Nearest integer	Percentage deviation
Mercury	0.3871	3.018	3	+0.60
Venus	0.7233	4.125	4	+3.13
Earth	1.0000	4.851	5	−2.98
Mars	1.5237	5.988	6	−0.20
Planetoids	2.7(?)	7.97	8	−0.4(?)
Jupiter	5.2028	11.06	11	+0.59
Saturn	9.5388	14.98	15	−0.13
Uranus	19.1910	21.25	21	+1.19
Neptune	30.0707	26.60	27	−1.50

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