Specific Gravity of Lapis Lazuli

IN the course of some work on lapis lazuli, we were astonished to find how wide was the discrepancy between the specific gravities of our specimens and the values accorded to this rock by all the standard textbooks. Of more than five hundred representative specimens examined, we found that 95 per cent had specific gravities falling within the range 2·75–2·90, the extreme limits being 2·45 and 2·94. Ever since the 1850 edition of Dana's "System", the figures almost universally quoted have been 2·38–2·45. This value is derived from Breithaupt's "Handbuch" (1847), in which he states that he found the density of "quite pure grains" to be 2·406, and gives as the range 2·38–2·42. 2·5–2·9 (Dana's "System" 1844 Ed.) and 2·76–2·95 (Brisson : "Pésanteurs Specifiques des Corps", Paris, 1787) are examples of the better values given prior to Breithaupt.

As the specific gravity provides a constant of considerable importance for testing purposes, it is to be hoped that future works on mineralogy will revert to more representative figures for this widely-used material.

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Chemistry of Anaerobic Recovery in Muscle

The three series of major chemical changes which are associated with muscular activity, namely : disintegration and resynthesis of adenosinetriphosphoric acid ; disintegration and resynthesis of phosphocreatine ; and glycogenolysis, or transformation of glycogen into lactic acid, have been considered, until recently, as independent chemical reactions, but as in some way linked—energetically and chemically. It was known that the presence of adenosinetriphosphoric acid is a condition of glycolysis in muscle, and that glycolysis is a condition of the resynthesis of adenosinetriphosphoric acid from adenylic acid and phosphates. Recently it has been made clear, by Lohmann[1], that the resynthesis of adenosinetriphosphoric acid from adenylic acid is brought about by splitting off phosphate groups from phosphocreatine ; at the same time, we have demonstrated[2] the linkage between glycogenolysis and the resynthesis of adenosinetriphosphoric acid, depending probably on the intermediate resynthesis of phosphocreatine, and this later linked to a definite intermediate step of glycogenolysis.

Taking into consideration some further facts, for example, that the dephosphorylation of adenosinetriphosphoric acid does not lead, in iodoacetate poisoned muscle, to free phosphates, but to carbohydrate-phosphoric esters, we come to certain conclusions concerning the linkage of the three series, which can be pictured, tentatively, in the following equations :

1. $C_5N_5H_4.C_5H_8O_4.PO_3H.P_2O_6H_3 + \frac{1}{n}(C_6H_{10}O_5)_n + H_2O =$
adenosinetriphosphoric acid glycogen
$= C_5N_5H_4.C_5H_8O_4.PO_3H_2 + C_6H_{10}O_5(PO_3H_2)_2$
adenylic acid fructosediphosphoric ester

2. $C_5N_5H_4.C_5H_8O_4.PO_3H_2 + 2C_4H_7N_3O_2.PO_3H_2 =$
phosphocreatine
$= C_5N_5H_4.C_5H_8O_4.PO_3H.P_2O_6H_3 + 2C_4H_9N_3O_2$
adenosinetriphosphoric acid creatine

3. $C_6H_{10}O_4(PO_3H_2)_2 + 2C_4H_9N_3O_2 = 2C_3H_6O_3 + 2C_4H_7N_3O_2.PO_3H_2.$
fructosediphosphoric ester creatine lactic acid phosphocreatine

The third reaction is obviously simplified ; the second is Lohmann's reaction. It will be noted that the ultimate effect of the whole transformation is the conversion of glycogen into lactic acid ; and that the three series appear as intermediate reactions in this conversion.

We consider the above changes as the main course of the changes connected with anaerobic recovery, to which, of course, the well-known minor changes, such as ammonia formation from adenylic acid, are subsidiary reactions.

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Effect of the Male Sex Hormone on the Genital Tract of the Female

BROUHA and Simonnet[1] have already given evidence that testicular extracts produce œstrus in castrated rats, as shown by the cornification test, causing also the proliferation of the uterine mucous membrane in immature female rats. A similar reaction has been observed after injections of the male hormone extracted from the urine (hombreol)[2]. The horns of the uterus increase, their lumens fill up with the excreted fluid, the glands and muscular layers are better developed and the epithelial cells become elongated. These changes are comparable to those caused by the female sex hormone. The fact that both the female and the male hormones affect the genital tract of the female similarly is, I think, in accord with the results of recent biochemical work[3,4]. It is interesting to note that the proliferational changes are most striking in animals treated simultaneously with the male and female hormones.

Analogous changes, though perhaps less accentuated as regards the glands and epithelium, can be induced by the male hormone in rabbits 10–60 days old. Ten day old female rabbits give a macroscopic positive reaction (increase of the uterus and its hyperæmia) and also a positive microscopic reaction on the day after the last of three subcutaneous injections given every second day and containing a total of about 15 capon units.

This test can therefore be used in examining the activity of preparations free from the greater quantities of the female sex hormone ; it gives satisfactory results on unoperated animals without histological examination of the uterus wall. Younger animals (4–5 days old) react in a lesser degree. In this connexion, it is perhaps worth stating that, in immature female rabbits, the male and female hormone (in the proportion of 1 c.u. to 10 m.u.) produce quantitatively the same effect, and that the female organism does not react earlier in its development to the female hormone than to the male hormone.

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