possible application would be to the measurement of anti-*M* antibody in the sera of patients with streptococcal diseases. It is often difficult to detect small amounts of antibody in such sera by the conventional bactericidal or 'long chaining' tests; and, in any event, the testing of large numbers of sera by these methods can be time-consuming and tedious. The microelectrophoretic technique, however, might well be used to advantage both as a rapid screening test and as a method of titration of the serum.

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M. J. HILL
A. M. JAMES

Department of Chemistry,
Chelsea College of Science and Technology,
Manresa Road, London, S.W.3.

W. R. MAXTED

Streptococcal Reference Laboratory,
Central Public Health Laboratory,
Colindale, London, N.W.9.

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Biogenetic Hypotheses for Aflatoxin

THE recent proposals^{1,2} of structures for aflatoxin B₁ (I and II), the biologically active^{3,4} metabolite of *Aspergillus flavus*, prompt consideration of its biogenesis. It is the purpose of this communication to show that of the two modes of forming carbon skeletons summarized in the *Acetate and Isoprene Rules* the former does not lead to a simple hypothesis in spite of the suggestive pattern of oxygen substituents on ring C and the β (or δ) keto-acyl group of rings D and E.

(I) $R_1 = O$; $R_2 = H_2$
(II) $R_1 = H_2$; $R_2 = O$

A scheme (III) involving no loss or gain of carbon necessitates three separate chains linked in an implausible manner (bonds (a)). This difficulty is avoided for rings A, B and C in schemes (IV)–(VI) but appears unavoidable for rings D and E. Further, no precedent can be cited for (V) or for the addition of another acetate or isoprene unit to a system such as (VI).

In view of these difficulties consideration must be given to the possibility that mevalonate is a precursor of aflatoxin. Partial derivation from mevalonate is implicit in (V) and (VI) while (VII) shows a wholly isoprenoid origin for the carbon skeleton. Oxidative removal of four carbons from a side-chain with formation of a β-substituted furan ring from the remainder has been postulated⁵ for the group of compounds related to limonin. Clerodin⁶ provides an analogy for the subsequent formation of ring

B. Although conversion of the skeleton (VII) to aflatoxin requires a rearrangement it is of interest that a C, D, E ring system as in (VIII) can be made easily with Dreiding models. Base-catalysed fission of ring E and reclosure in the alternative way is an attractive possible mechanism for the rearrangement.

D. P. MOODY

Department of Biochemistry,
Medical College of St. Bartholomew's Hospital,
London, E.C.1.

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Some Phosphorus Compounds in Royal Jelly

SYSTEMATIC investigations, mainly during the past decade, have led to the discovery of a number of biologically highly valuable substances in the jelly of the honey-bee. Comparatively little is known so far as its contents of phosphorus compounds are concerned. Recently, Jacoli and Sanguinetti¹, and Rembold² have isolated and identified some adenine nucleotides in this substance. Since these compounds play a decisive part in many important biological processes we have undertaken the chemical analysis of royal jelly.

We used a lyophilized substance obtained from local sources and supplied by the Slovafarma National Enterprise, Hlohovec, Czechoslovakia. The ribonucleic (RNA) and deoxyribonucleic acids (DNA) were determined by means of a modified method of Logan *et al.*³ whereby the lipidic substances were eliminated through repeated extraction with methanol, a chloroform/methanol mixture (2:1) and ether.

The determination of free acid-soluble nucleotides in preparation under observation was carried out on their extraction by means of a ten-fold volume of ice-cold 0.6 N perchloric acid and re-extraction with a double volume of 0.2 N perchloric acid. After neutralization with 6 N potassium hydroxide, the extract was kept frozen at a temperature of -20° C for 24 h. Then the extract was thawed and the resulting precipitate, potassium perchlorate, was centrifuged off. The clear supernatant was adsorbed on a column of 'Dowex-1 × 8' (200–400 mesh) in the formate form—dimensions 1 cm × 15 cm. The column was then rinsed with water and the nucleotides eluted with increasing concentrations of formic acid and ammonium formate (rate of flow: 0.8 ml./min). By means of an automatic fraction collector we obtained samples of 5 ml. each and measured their optical density at 260 mμ. The individual peaks were then combined and, after concentration in a rotatory vacuum evaporator, they were freed of salts by adsorption on 'Norite-A' charcoal and elution with 2 per cent pyridine in 50 per cent ethanol. The fractions were then submitted to paper-chromatographical analysis in a solvent of isobutyric acid/water/25 per cent ammonium hydroxide (66:33:1.5), and after the hydrolysis of established spots with formic acid their bases were determined chromatographically in a