investigations of the same subject. However, the technique was very imperfect, but in 1933 APPLEBAUM, HOLLANDER, and BÖDECKER[13] managed to get radiograms of the minute structures of the teeth. Next year WARREN *et al.*[14] published a semi-quantitative method for estimating the relative calcium content in different parts of a tooth.

Other investigators are e.g. VAN HUYSEN, HODGE, THEWLIS, and LEFKOWITZ[15] working with the mineral distribution of intact or carious teeth. Several interesting findings have been published by these authors, e.g. the highly absorbing Mackie-line in the superficial layer of the enamel. The mineral distribution in osteogenesis imperfecta and in cases of osteopetrosis is studied by BERGMAN, ENGFELDT and HAMMARLUND-ESSLER[16].

The microradiographic technique makes it possible to correlate the calcium distribution of teeth directly to the morphological structures. This is possible by exposing ground sections of teeth (in this case 20–30 μ thick) to roentgen radiation within a narrow wave length region, here 2·5–5 Å. The absorption curve of calcium has its K-edge at 3·07 Å. A Machlet type AEG 50 tube (1 mm Be filter) has been used[17].

Some parts of the dentin and the cementum contain great amounts of organic components, e.g. the dentinal tubules and the cementocytes. Consequently in the radiograms these parts appear as black areas in contrast to their surroundings. However, the more calcified areas show a distinct variation in the mineralisation. In the radiograms close to the pulp the dentin often shows a zone containing more calcium than the surroundings (Fig. 2*b*). In the periphery of the dentin at the dentin-cementum junction, a hypocalcified zone appears practically constant (Fig. 1*a*). In decalcified sections stained with Sudan B LORBER[18] has published a similiar picture with a dark zone at the same place containing a concentration of lipids.

A more inconstant appearance but by no means unusual is the presence of bands in the cementum due to rhythmical mineralisation. The microradiograms show that the cementocytes are sometimes situated between the bands. These are present mostly in teeth with branching roots and they appear most distinctly in cross sections from the bifurcation of the root. In this case the absorption of the light bands is 1·5–2 times bigger than that of the darkest band. (The absorption is registered by a microphotometer constructed by BOURGHARDT, BRATTGÅRD, HYDÉN, JIEWERTZ, and LARSSON[19].)

It is evident that in the cementum a rhythmical mineralisation is present although its appearance here is a little more difficult to show. The bands might originate because of nutritional factors, e.g. illness, starvation and so on, like the transverse lines of childrens' long bones described by ASADA, ELIOT *et al.*[20]. In both cases (see Figures texts) the enamel shows no Hunter-Schreger bands and only a few lines of Retzius. However, the latter appear very distinctly.

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Zusammenfassung

Nach einer Übersicht über die Literatur werden die folgenden Befunde angeführt:

1. Eine hyperkalzifizierte Zone im Dentin nahe der Pulpa.
2. Eine hypokalzifizierte Zone an der Grenze zwischen Dentin und Zement.
3. Banden im Zement, verursacht durch rhythmische Mineralisation.

Mikroradiogramme und Mikrophotographien derselben Zahnschnitte werden miteinander verglichen und so die zytochemischen Befunde in Zusammenhang gebracht mit dem zytologischen Bild.

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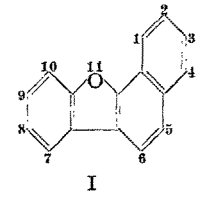
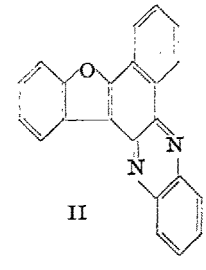
A Synthesis of α-Brazan and the Related Quinone

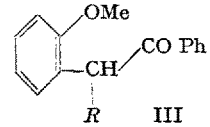
KRUBER and OBERKOBUSCH[1] have isolated α-brazan[2] (I, m. p. 103–104°) from coal tar distillation products. On oxidation with chromic acid, this compound gave, along with other products, α-brazanquinone which was isolated as the quinoxalin derivative (II, m.p. 252–253°). A simple synthesis of both these compounds is now reported.



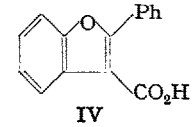
I



II



III



IV

The keto-nitrile (III, R = CN, m.p. 88–89°) obtained by the condensation of ethyl benzoate with *o*-methoxyphenylacetonitrile[3] gave the related ester (III, R = COOEt, m.p. 71–72°) on treatment with alcoholic hydro-

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[3] W. BAKER, H. B. HARBORNE, and W. D. OLLIS, J. chem. Soc. *1953*, 1860.

gen chloride[4]. This was converted into 2-phenylcoumarone-3-carboxylic acid (IV, m.p. 195°; amide, m.p. 261°) by aluminium chloride in benzene. This was followed by homologation by ARNDT-EISTERT procedure to 2-phenylcoumarone-3-acetic acid (m.p. 142–143°; *p*-toluidide, m.p. 209°) which underwent cyclization in quantitative yield to 5-hydroxy-α-brazan (m.p. 204 to 205°) with phosphoric anhydride in benzene[5]. On oxidation with chromic acid in acetic acid, this α-naphthol gave a mixture of quinones from which (II, m.p. 250 to 253°) was isolated on treatment with *o*-phenylenediamine. Reduction of the hydroxy brazan with boiling hydriodic acid gave α-brazan (m.p. 102–103°) identical with an authentic specimen.

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Chemical Laboratory, Science College, Patna, India, September 8, 1955.

Résumé

On décrit une methode pour la synthèse des α-brazan et α-brazanquinone de KRUBER.

[4] W. WISLICENUS, H. EICHERT and M. MARQUARDT, Ann. Chem. *436*, 88 (1924).

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Nucleoside Decomposition by Bacterial Cells

Partially purified nucleosidases extracted from microbial cells have been described by several investigators[1]. Two modes of action have been postulated: phosphorolysis[2] and hydrolysis[3], yielding base and ribose-1-phosphate and base and ribose respectively as the products of nucleoside decomposition.

In the present study, an attempt was made to confirm these findings with living bacteria by comparing the rates of breakdown of ribose, barium ribose-1-phosphate, barium ribose-5-phosphate, 3 ribosides and their free bases by resting cells of *Escherichia coli*, *Proteus vulgaris*, and *Micrococcus pyogenes* var. *aureus*. Ribose-5-phosphate was included because its formation from ribose-1-phosphate has been reported by ABRAMS and KLENOW[4]. The substrates were added in 0·5 micromole quantities and exposed to bacterial action at 37°C and pH 7 for 15 min in the presence of 2,3,5-triphenyltetrazolium chloride (TTC). The amount of TTC reduced to red formazan was used as a measure of terminal respiratory changes instead of the more commonly employed determinations of oxygen uptake or methylene blue reduction. The method has been described elsewhere[5]. The values presented in the accompanying Table are adjusted for endogenous reducing activity. The latter was not increased in the presence of the free bases tested.

Substrate	Amount of TTC reduced in γ		
	E. coli	*P. vulgaris*	*M. pyogenes* var. *aureus*
Ribose	37	21	199
Ba ribose-1-phosphate	39	31	100
Ba ribose-5-phosphate	19	19	38
Adenosine	112	235	173
Guanosine	136	155	114
Uridine	90	145	266

While differences in the rates of decomposition of nucleosides are presumably due to the specificity of the enzymes involved, the discrepancy in the rates of breakdown of ribose and its phosphoric esters, on the one hand, and ribosides, on the other, cannot be explained on this basis. It was observed with 12 more bacterial species tested. The only apparent exception was the strain of *M. pyogenes* listed. However, this organism could be shown to be a vigorous ribose fermenter but weak phosphatase producer.

ROTHSTEIN and MEIER[6] postulated that yeast cell walls were impermeable to phosphoric esters. The uptake of such compounds by yeast was almost completely inhibited in the presence of sodium molybdate, which inactivated cell surface phosphatases. With the 3 organisms under study, no change in the amount of TTC reduced was observed when 2×10^{-4} M sodium molybdate was added to reaction mixtures of bacteria, TTC, and ribose phosphates. In view of the results reported, the sequence of events in the metabolic breakdown of nucleosides by living bacterial cells would seem to require further clarification.

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Zusammenfassung

Ruhende Zellen verschiedener bakterieller Arten zersetzen Nukleoside mit viel grösserer Geschwindigkeit als Ribose und ihre phosphorischen Ester. Phosphatasen der Zellenoberfläche scheinen in den untersuchten Bakterien keine Rolle im Substrattransport in die Zelle zu spielen. Die Stufen im Abbau der Nukleoside durch lebende Bakterien müssen darum noch weiter aufgeklärt werden.

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Über physiologische, durch einen Gehalt an verschiedenen Alkaloiden charakterisierte Rassen von *Sedum acre* L.

Aus in Kanada gesammelten blühenden Pflanzen von *Sedum acre* L., dem scharfen Mauerpfeffer, hat MARION[1] ein bei 89° schmelzendes Alkaloid der Summenformel $C_{14}H_{21}ON$ isoliert, das dem Schmelzpunkt nach offenbar identisch ist mit dem von KOLESNIKOV und SHVARTSMAN[2] aus der gleichen Pflanze gewonnenen *Sedamin*, für

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