

particularly so when the gland materials have to be transported from one centre to another.

The final yield of the post. pituitary powder is determined by a number of factors including the skill of the operation. In some centres about 70 glands are required to yield one gram of the finished powder, while at others, even 25 to 30 glands are sufficient to yield the same result. The practical success would naturally depend on obtaining as favourable a ratio as possible.

We have carried out numerous assays on the products prepared by us. Practically every batch has been found to conform to the new International Standard. Our results have been independently confirmed by our colleagues at other centres. We can now state, with a certain amount of confidence, that, with necessary care and control, a product conforming absolutely to the new International Standard can be produced on a large scale in India.

THYROID GLAND

We have processed useful quantities of beef as well as sheep glands and have supplied the material for certain emergency requirements. The process offers no difficulty. The final product which was derived exclusively from one centre was found to contain about twice the amount of iodine (in combination as thyroxine) as that prescribed according to B.P. Standard. This may not, however, apply to other centres, so we refrain from generalising on this point.

The use of the thyroid in medicine is limited and the average medical practitioner seldom prescribes it. Fairly large quantities of the desiccated gland are, however, being prepared in different parts of the world (as also in India) and the major part of this material as also other whole gland materials go to make up certain rejuvenation remedies of a doubtful value.

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1. *Curr. Sci.*, 1944, 13, 35.

ADRENAL GLANDS

We have been primarily interested in the production of *l*-adrenalin and have concentrated chiefly on beef glands as being of practical value. We have handled about 50,000 glands at one centre with a view to standardising the method of production.

We have occasionally found the absolute adrenalin content to be as much as 3 mgm. per gram of fresh tissues, but the average is about the same as that stated by Prof. Dey and his associates. Our earlier average yield was 1.8 gram per kg., but by improving the method of extraction, we have lately been able to raise it to 2 grams. The products prepared by us have been assayed by us and independently by a colleague at another centre and found to conform (within limits) to the standard.

There has been a certain amount of controversy regarding the relative merits of natural and synthetic adrenalin, with a strong section of medical opinion in favour of the former. From the economic point of view it is usually assumed that the natural product cannot hope to compete with the synthetic one, but this opinion is not justified. If the glands can be obtained at a reasonable price, adrenalin from the gland can be made at a lower cost than by synthetic method. Apart from the usually well-known precautions to ensure the stability of the hormone, effective extraction from the glands is an important factor determining the success.

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UPPER JURASSIC MARINE ALGÆ FROM TRICHINOPOLY, S. INDIA

THE discovery of *Solenopora* in the Cullygoody limestone was reported by me on a previous occasion,¹ and two species, *S. jurassica* Nich. and *S. coromandelensis* S. R. N. Rao were figured and briefly described. A detailed account which has since been completed is now ready for publication. The marine flora recorded is a small one, but of exceptional interest; for the first time, it establishes a Jurassic horizon in the Trichinopoly area; and it has an important bearing on the age of the Upper Gondwanas of this region. The species present are listed below and the stratigraphical results arrived at briefly discussed.

The genus *Solenopora* has world-wide distribution and its range is from the Ordovician to Jurassic.² The Cullygoody algae provide critical evidence for an Upper Jurassic age; they are very similar to marine floras from the Jurassic of other parts of the world.

The plants as a whole are definitely archaic; the algal vegetation of the world took a modern aspect in the Lower Cretaceous when true Corallinaceæ (with *Archæolithothamnium* as the earliest representative) first appeared—shortly after *Solenopora* and other ancient genera had become extinct.

Besides the algae, thin sections of the limestone occasionally show indeterminate fragments of a land plant and some arenaceous foraminifera. The latter consist mostly of *Choffatella* whose age is Lower Jurassic to Lower Cretaceous.

It is interesting to note that a Jurassic alga (*parachætetes*) has already been recorded by Dr. Pia from the Danian Niniyur beds of the Trichinopoly area.³ This genus is not known to have survived the Upper Jurassic in other parts of the world. I have some reasons to believe that it is a derived fossil in a Danian matrix; palæontological anachronisms of this kind are frequent in the Trichinopoly area.

The Cullygoody limestone⁴ is correlated with the Coral reef limestone (the basal member of

Cullygoody Algæ: Geographical and Stratigraphical Distribution

	Perm.	Trias.	Lias.	Oolite.	L. Cret.	Up. Cret	Eocene
<i>S. coromandelensis</i> S. R. N. Rao ..							
<i>S. jurassica</i> Nich. ..				E, Fr.			
<i>Marinella jurassica</i> Pfender ..	Nm.		Sp, Sy.	M, J.	A.		
<i>Symploca jurassica</i> Framley & Dangeard			Sp.	Fr, C, Mg.			
<i>Pseudolithothamnium alba</i> Pfender ..					C, Sy, Sp.	Fr.	An, B, Mg.

A=Angola.
An=Anatolia.
B=Baluchistan.

C=Carpathians.
E=England.
Fr.=France.

J=Japan.
M=Moravia.
Mg=Madagascar.

Nm=New Mexico.
Sp=Spain.
Sy=Syria

the Utatur series) and considered to be Albian in age. In view of the discovery of *Solenopora* in this limestone, its relationship with the Utatur series needs further examination. The Coral reef limestone, it may be noted, rests directly on the Archæans and in some places Upper Gondwana plant beds intervene between the two.

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1. Rao, S. R. N., *Palæobotany in India, Prog. Rep.*, Lucknow, 1942, 4, 178. 2. *Solenopora urgoniana* Pfender described from the Lower Cretaceous of France differs markedly from the Jurassic *Solenopora* as admitted by the author (*Bull. Soc. Geol. Fr.*, 1930, 30, 104) and it is probably a *Petrophyton*. *Solenopora rothpletzi* Yabe (*Metasolenopora rothpletzi* Yabe) stated to be Lower Cretaceous by Dr. Pia (Handbuch der Palæobotanik, 1927) is really Upper Jurassic (see Yabe and Toyama, *Sci. Rep. Tohoku Imp. Univ.*, 1928, 1, 3). 3. Rama Rao and Pia, *Pal. Ind. n. s.*, 1936, 21, No. 4. 4. Blandford, H. F., *Mem. Geol. Surv. Ind.*, 1862, 4; Rama Rao, 'The Cretaceous rocks of South India', *Lucknow Univ. Studies*, 1942, 17.

ON THE PRODUCTION OF TRUE PILEI OF *POLYPORUS BRUMALIS* (PERS.) FR. IN ARTIFICIAL CULTURE

THE exact conditions under which a fungus will produce sporophores on artificial media is still an open question. Buller² has tackled the problem mainly with the Agarics. Many other workers during recent years have tried to throw light on the subject but no definite conclusions have yet been arrived at.

Polyporus brumalis was growing saprophytically on a dead log in Calcutta, in July, 1942. A fresh fruit-body was collected and spore-deposits were taken on sterile agar plates from which several polyporus cultures were made in culture tubes (6"×½") on Potato-dextrose agar, Oat-meal agar, Malt-extract agar, and Brown's Potato-starch agar. These cultures were then kept in an inclined position and subjected to different conditions of temperature, namely,

constant temperatures of 22° C. and 33° C. and a variable temperature of 23°-27° C. of the laboratory. Under these conditions, again, the cultures were kept in complete darkness as well as in diffused light. In all cases, however, germination of spores started within 24 hours.

All young cultures at first developed a felty mat which later on became appressed and sub-felty. Stalks of fruit-bodies appeared in several cultures under the aforesaid different conditions. The first culture to fructify was on Oat-meal-agar kept in diffused light and at 33° C. (Fig. 1) in about a month. In this particular case, three rudimentary stalks appeared at the base of the tube when the original position of the tube was altered and made vertical. Subsequently, it was observed that the growth of two stalks was checked while the third one continued its upward development. In no case, however, pileus was formed. Later on, similar stalks developed in tubes kept in other conditions including those placed in complete darkness. The treatments suggested by Long and Harsch³ were made for *Polyporus brumalis* but without any success. By allowing the light to fall on the top and none from the sides, the stalks of the fruit-bodies elongated in the direction of light proving that they are positively phototropic. The upward growth of the stalks is purely incidental and has no relation to gravity. This was shown in culture-tubes which were kept in a horizontal position and the vertical stalks arising at the base of the tubes soon turned their apices and grew horizontally parallel to the glass surface. To see whether lowered humidity in the culture-tubes due to age was preventing pileus-formation, a few drops of sterile distilled water were introduced aseptically into the culture-tubes from time to time but with no desired result.

It appeared to the authors that aeration might possibly be the factor preventing pileus-formation in this case, since in such closed culture tubes, the space was limited and consequently the aeration affected. Several cultures were then made on the new medium advocated by Badcock¹ in Erlenmeyer flasks of 1,000 c.c. capacity each. A good growth was obtained in all of them. A stalk of the fruit-body developed in about a month which elongated and branched repeatedly. The surfaces of such stalks were not smooth but had numerous