

rine-suspended lymph against the staphylococci which are greatly reduced in number within 72 hours. Crude non-concentrated watery extracts of Penicillin have been used for the purpose.

It is hoped soon to publish detailed reports of experiments on the use of Penicillin for sterilising cow-pox lymph so as to shorten the time of storage.

Public Health Institute,  
Bangalore,  
May 2, 1945.

C. V. NATARAJAN.

*Post-script.*—After the above note was written, it was noticed in the letter to the Editor of the *Journal of the American Medical Association*, from Brazil, wherein it is stated that Dr. C. Miranda, of the Oswaldo Cruz Institute, Rio De Janerio, has been experimenting with Penicillin on the same lines, i.e., to sterilise cow-pox vaccine by Penicillin, so as to make cow-pox vaccine available for general use within a few weeks, instead of a year or longer, as obtains now.

*Journal of the American Medical Association*, Feb. 24, 1945, 127, 476.

### TETANISATION OF THE HEART

It is generally believed that heart muscle cannot be tetanised. We have come across frogs, the hearts of which resembled striated and unstriated muscle, in that they were thrown into a complete tetanus by frequent stimulation with induction shocks (Fig. 1). The results

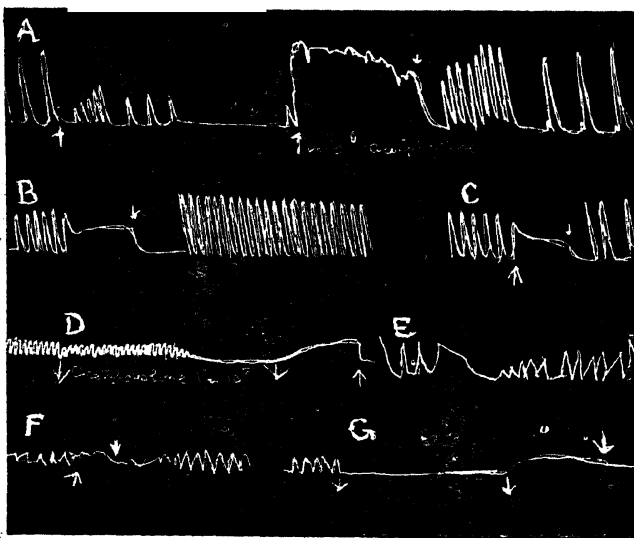


FIG. 1. *A.* Frog heart. Acetylcholine 1 in  $10^9$  added at first arrow. Stimulated with induction shocks from 2nd to 3rd arrow. Note the tetanus. After stimulation, the heart may be at standstill or hyperirritable. *B.* Frog heart. Note complete tetanus. After effects same as in IA. *C.* Frog heart same as IB. *D.* Effect of acetylcholine. Complete tetanus on stimulation. *E.* Same as IB. *C.* *F.* Frog heart, incomplete tetanus. *G.* Same heart as in F; addition of acetylcholine at first arrow. Subsequent stimulation with induction shocks. Note acetylcholine converts incomplete into complete tetanus.

obtained were similar to those in striated muscle, incomplete tetanus passing into tetanus.

Doubling the concentration of calcium in the Ringer solution prevented the tetanus, the heart responding by frequent beats instead (Fig. 2). This effect of calcium in preventing tetanus resembles that found in plain muscle (Singh, 1938). Acetylcholine had a normal effect. When the heart was brought to a complete stand still by the drug (1 in 10),

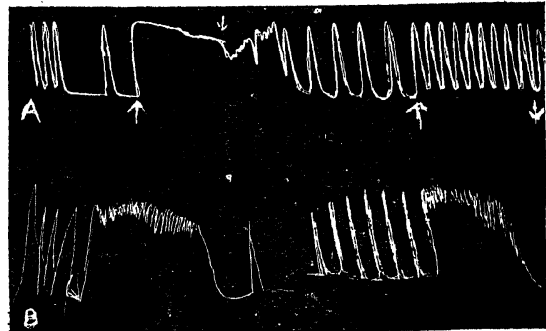


FIG. 2. Frog heart. Effect of calcium (twice normal) on tetanus. *A.* Complete tetanus. On cessation of stimulation at the 2nd arrow, the heart is still contracted. The solution now contains double the calcium content. Stimulation between 3rd and 4th arrow shows no tetanus; the heart is slightly contracted, and rate increased. *B.* Frog heart, tetanus. With adaptation the tetanus becomes more incomplete, as happens in the plain muscle. The 2nd figure shows the effect of doubling the concentration, same as in IIA. This suggests that as in the plain muscle, adaptation is due to liberation of calcium.

stimulation with repeated induction shocks produced tetanus.

INDERGIT SINGH.

K. B. SEHARA.

MRS. SUNITA INDERGIT SINGH.

Department of Physiology,  
Medical College,  
Hyderabad (Sind),  
January 26, 1945.

I. Singh, I., *J. Physiol.*, 1938, 94, 322.

### BLOOD GROUPS AMONG THE MAKRANIS OF WESTERN KHANDESH

THE bloods of 108 Makranis ages varying from 5 to 40, all of whom were born in their present domicile, were tested by the 'tube method'. The testing sera were supplied by the Haffkine Institute, Bombay, through the Gujarat Research Society. A few cases in which doubtful reaction (W or ?) occurred were retested against anti-A serum of known titre with capacity to react with known A, B cells, made in Lucknow. The following was the result of the grouping tests.

The Makranis belong to the same racial stock as the Baluchis and a comparison of the blood groups' incidence among them with that of the Baluchis may be of interest. According to the blood group data collected from 74 Baluchis of Baluchistan by Malone and Lahiri (1927),<sup>1</sup> there are 47.2 per cent. O, 24.3 per

Name of group	Total number typed	Blood group percentages				Frequency of genes		
		O	A	B	AB	r	R	rR
Makrani Moslems	108	37.03 (40·n)	25.92 (28·n)	24.07 (26·n)	12.96 (14·n)	·632	·192	·176

cent. A, 24.3 per cent. B, and 4.2 per cent. AB. It appears that the immigrant Baluchis of Akkalkua, i.e., the Makranis, have less O, similar A and B, and 9 per cent. more AB. In other words, there is a significant increase of AB at the expense of O. The total B + AB among the Baluch (Malone and Lahiri) is 28.5, while that among the Makranis is 37.03.

The Bhil blood groups are as follows:—

	O	A	B	AB
Panchmahal Bhils <sup>2</sup> (N·369: Majumdar)	37.0	27.5	26.5	9.0
Rajpipla Bhils <sup>3</sup> (N·136: Majumdar)	38.4	24.3	28.8	8.5

There is 35.5 per cent. B + AB among the Panchmahal Bhils and 37.3 per cent. among the Rajpipla Bhils showing close approximation to the Makrani data.

We found a very high incidence of AB (18.4 per cent.) among the Tharus of Tarai, who live in an unhealthy tract rife with malaria.<sup>4</sup> The high incidence of AB among the Makranis living in similar malarious areas, may tell us something more than appears on the surface. Wherever we find the conditions of life hard, the toll of diseases considerable, or large-scale intermixture, the percentage of B and AB is higher than in groups otherwise situated. Has tropical conditions any selective effect on blood group distribution?

Lucknow University, D. N. MAJUMDAR.  
March 12, 1945.

1. Malone, R. H., and Lahiri, M. N., "The distribution of the blood groups in certain races and castes in India," *Ind. J. Med. Res.*, 1929, 25. 2. Majumdar, D. N., "The Blood Groups of the Bhils of Gujarat," *Curr. Sci.*, 1942, 9. 3. —, "Racial Affiliation of the Bhils of Gujarat," *J. Guj. Res. Soc.*, 6, 4, Oct. 1944. 4. —, "The Tharus and their Blood Groups," *J. Roy. As. Soc. Bengal, Science*, 1942. Also *Nature*, September, 1944.

### TAMARIND SEED 'PECTIN'

TAMARIND seed has been described as a rich source of pectin, the de-husked kernel providing nearly 60 per cent. of it.<sup>1</sup> A re-examination of this constituent has, however, revealed interesting differences from other pectic substances of which the chief sources hitherto have been the waste cider and citrus residues. The latter consist essentially of methoxylated galacturonic acid units, with varying amounts

of arabinose and galactose, presumably derived from associated araban and galactan loosely attached.<sup>2</sup> Another defining characteristic of these pectins is the formation through de-esterification, of pectic acid, a product of definite chemical composition which is obtained either directly or, better, through the insoluble calcium salt<sup>4</sup> after hydrolysis by mild alkali followed by neutralisation with acid. In all these respects, the alcohol-insoluble fraction from the water extract of the tamarind seed meal behaves differently and is probably, therefore, not a pectin as ordinarily understood. Thus, it is free from methyl ester groups and reducing sugars. It does not give the Carre and Hayne reaction<sup>5</sup> characteristic of pectins although calcium and copper salts are precipitated in alkaline medium. Nor is galacturonic acid formed on hydrolysis with acids.<sup>6</sup>

Perhaps the most significant difference lies in the observation that the preparation obtained according to the procedure outlined by Ghose and Krishna,<sup>1</sup> is invariably associated with about 15 per cent. of albuminoids, accounting for nearly half the total proteins of the seed. The proteins are not removed or even appreciably reduced on repeated dissolution in water and re-precipitation with alcohol while mild acid hydrolysis results in simultaneous degradation, to varying degrees, of both the protein and polysaccharide constituents. The latter are also thrown out together from solution by protein precipitants such as phosphotungstic acid and tannic acid while excessive dilution with water followed preferably by overnight's standing results in the precipitation of the proteins only, an addition of six hundred volumes of water yielding a product with less than 2 per cent. of albuminoids. Prolonged digestion with proteolytic enzymes like pepsin and papain also removes most of the nitrogenous fraction.

In spite of these differences, the preparation from tamarind seed meal sets, like pectins, to a gel with the appropriate quantities of sugar and acid. Such jellies could also be obtained from the whole seed meal due obviously to the high content of its gel-setting constituent. But, quite unlike the pectins, this gelation is not hampered by hydrolysis with dilute alkalis. Again, as with low-methoxyl pectins, commonly referred to as pectinic acids or "pectin LM", gels, though somewhat pasty in consistency, are also formed in presence of low concentrations of sugar and metallic ions such as calcium<sup>7</sup> while, as observed by Ghose and Krishna,<sup>1</sup> a thick gum is formed on reaction with borax in aqueous solution.