on human subjects and found that the biological value of the 'milk' is 95 when egg protein is taken as the standard. The method of manufacture is not given.

That the nutritive value of raw soya-bean is not good has been shown by the researches of Osborne and Mendel[5]. They found that raw soya-bean when fed to rats as the sole source of protein in an otherwise complete ration did not support appreciable growth. However, normal growth resulted when they fed soya-beans which had been previously cooked. Hayward *et al.*[6] have shown that the expeller process soya-bean meal contains proteins which have twice the nutritive value of raw soya-beans. Everson *et al.*[7] from growth-studies on young rats have found that germination increases the biological value of the protein to more than triple the original value. Germination not only increases the nutritive value of the protein, but the vitamin content is also greatly increased.[8] The riboflavin and nicotinic acid content are increased to more than double the original value.

In view of the foregoing observations, we tried to prepare soya-milk from the germinated bean. Another advantage of the germination is that it makes the beans more palatable. The procedure employed by us for the production of milk is as follows:—

Take 1 lb. of soya-bean and soak it in sufficient water for 5 hours, then put it in bags and suspend in an open place for 48 hours. The bags are soaked thrice daily in water to keep the seeds moist. By this time, the seedlings attain an average length of ½ cm. The seeds are then freed from the adhering skin by rubbing with hand. The next procedure is the removal of the bitter principle and the colouring matter and this is largely effected by heating the seeds at 70° C. for 30 minutes with four times its weight of water. Addition of 0·2 per cent. sodium bicarbonate or 1 per cent. glycerine to the extracting water improves the efficiency of extraction. The water extracting the colouring matter and the bitter principle is thrown away and the beans are washed thoroughly with hot water. The clean kernel is then made into a fine paste. This can be done in any suitable wet grinding machine if the 'milk' is to be prepared on a large scale. The pasty mass is then boiled with four times its weight of water for half an hour. The 'milk' is strained through cloth. Two per cent. sugar and 0·5 per cent. calcium lactate or gluconate may be added to improve the taste and calcium content. The average composition of the 'milk' thus obtained is as follows:—

Total solids—10·1 per cent.
Protein—4·2 per cent.
Fat—3·4 per cent.
Carbohydrates—1·8 per cent.
Salts—0·7 per cent.

The keeping quality of soya-milk is better than that of ordinary milk and the 'milk' is fairly stable. The growth response of young rats fed on soya-milk is 90 per cent. of that obtained with pure cow's milk. The digestibility and the biological value of the proteins of the 'milk' have been found to be 90 and 81 respectively. The vitamin content of soya-milk as prepared by the above method as compared with that of cow's milk (average of six samples) is as follows:—

Vitamin contents per litre of milk

	Soya milk	Cow's milk
Vitamin A (as carotene) ..	750 I.U.	1050 I.U.
Thiamine	0·82 mg.	0·43 mg.
Riboflavin	1·10 mg.	1·32 mg.
Nicotinic acid	2·49 mg.	1·16 mg.
Ascorbic acid	21·60 mg.	17·84 mg.

From the above results, it will be seen that soya-milk as obtained by the improved method is nearly as good as and in some respects, even superior to good cow's milk. Further investigations bearing on the nutritive value of the 'milk' are in progress.

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July 19, 1945.

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A POSSIBLE USE OF SILKWORM BODY POWDER

Mr. M. J. Narasimhan, Director of Agriculture, Mysore State, kindly supplied a dried powder of apparently uniform quality, obtained after drying the dead bodies of silkworms which are thrown away after the silk is obtained. These silkworm bodies and associated material are at present stacked as refuse, round the villages, where silkworm rearing is a cottage industry or from silk-throwing factories after obtaining the silk, for possible use as manure. An evil smell is produced during the decomposition of this refuse. The powder obtained by drying the silkworm body and grinding, is light brown in colour, fluffy, slightly sticky to the fingers and has a strong characteristic odour not unlike dried meat-powder.

One pound of the powder was extracted with a litre of water at 80° C.; the extract was found to contain about 1·21 grams of total solids per 100 ml.; the broth emulsion so prepared was used, instead of the usual beef-broth, for preparing solid Agar media. No peptone was added. 2·5 per cent. of Agar was used for preparation of Agar slopes and

stands (useful for pour plates); they were transluscent, but deep brown in colour, in spite of using egg-white as a clearing agent. The typhoid bacillus (Rawling's strain), the para-typhoid A & B and vibrio cholera grew rapidly and well on this media ($45 \pm 4{\cdot}5$ millions per square centimetre of surface by 1 ml. of water after 24 hours, at 37° C.); one obtained about the same quantity of growths as becomes available on ordinary Agar slopes prepared with beef-broth, peptone and 2 per cent. Agar, *i.e.*, the routine Agar media used in this Laboratory. Preservation at ice-box temperature (6°C.) for over a week, dries the media so that only a few discrete colonies grow after 24 hours incubation at 37°C.; splitting of the Agar and drying at the tip of the slant occurs. Ordinary Agar media as prepared in this laboratory can, however, be used after 12 days to a fortnight, just as fresh Agar.

Experiments are also in progress for the preparation of peptone (not easily available in the Indian market now—Witte's peptone is not available, and Difco peptone sells at Rs. 65 per lb.) by the use of papain. Preliminary tests are promising.

It is hoped soon to present a more comprehensive study of the use of silkworm powder for bacteriological purposes.

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May 12, 1945.

POPLITEAL FACET IN SQUATTERS

SOME interest has centred round the variations in the lower end of a femur occasioned by the squatting posture,[1-4] and the present communication is to record yet another variation in the lower end of femora from Punjabis of lower classes, who adopt the squatting posture not only during work but also during rest. In a series of two hundred femora examined, a curved facet, covered with cartilage, was detected in all of them in the posterior part of the lateral aspect of the lateral condyle. It was well marked in some, less so in others, but was present in all. This facet may be looked upon as an extension of the femoral condylar articular cartilage on the lateral aspect posteriorly, just as quadriceps facet[1] is an extension of cartilage anteriorly.

The popliteal muscle arising from the anterior end of the popliteal groove on the lateral side of the lateral femoral condyle, and getting insertion on the upper end of the posterior surface of the tibia, lies in the popliteal groove in the flexion of the knee joint but moves in an arc on the lateral side of the lateral femoral condyl during the movement of extension, till the tendon lies obliquely from before backwards, bevelling the anterior part of its lower border. The friction between the tendon and the side of the condyle is obviated by the synovial membrane acting as a bursa.

As the movements of the knee joint are more frequent in squatting than non-squatting races,[1] popliteal tendon rubs against the lateral condyle much more frequently in the former than in the latter. The popliteal facet owes its existence to this fact.

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May 24, 1945.

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ON THE DEVELOPMENT OF THE FEMALE GAMETOPHYTE IN *HYDROLEA ZEYLANICA* VAHL.

THE single Indian genus, *Hydrolea*, of the Hydrophyllaceæ, is represented by a single species, *Zeylanica*, throughout India abundantly in wet places and rice swamps according to Hooker.[1] The ovule is anatropous and has a single integument. The female archesporium is hypodermal in origin and is usually a single cell but two such cells are noticed side by side oftentimes. It directly functions as a megaspore mother-cell. As a result of the reduction divisions a normal linear tetrad of four megaspores is produced. Only the chalazal megaspore is functional, while the upper three degenerate. The mature embryo-sac is eight-nucleate and normal. The antipodals lie as nuclei and persist till fertilization. Polar fusion takes place before fertilization of the egg but their nucleoli remain separate and distinct for some time in the secondary nucleus. The synergids are comparatively larger in size and they possess big vacuoles at their upper and lower ends. The apices are rounded and not pointed and pyriform as observed by Svensson[2] in *Nemophila* and *Phacelia* of the same family. The egg is much smaller in size and lies at the lower level in the much vacuolated cytoplasm of the sac.

Since the formation of the linear tetrad, the nucellar tissue surrounding it begins to degenerate and they lie as disintegrated cells on all sides and persist till the maturity of the embryo-sac. The cells of the jacket layer which is organised by the innermost layer of the integument, enlarge before the tetrad division of the embryo-sac mother-cell; at the apex near the integument they become rich in cytoplasm and elongated in the radial direction. As soon as the cells of the nucellus are disorganised and absorbed, the fully formed embryo-sac is clearly outlined by this jacket layer.

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Dacca, J. N. MITRA.
February 15, 1945.

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