Polarisation of the Raman Spectrum of Water.

THE Raman spectrum of water has been studied in great detail by a large number of workers, notably A. S. Ganesan and S. Venkateswaran and A. L. Meyer. So far as I am aware, however, no attempt seems to have been made to study the polarisation of the Raman bands. I have studied the Raman spectrum of pure water by the original method of Raman. The liquid, which was enclosed in a large bulb, had been carefully purified by repeated distillation *in vacuo*. The polarisation photographs of the liquid were taken with a fairly wide slit, due corrections in the exposures for the two directions of the nicol, for the polarisation introduced by the optical train in the glass spectrograph itself, having been made by a previous calibration of the instrument.

The intensities of the bands were estimated by a plate containing a series of graded exposures of the mercury spectrum. The following table indicates the results obtained :

Wave number shift (mean) excited by 4358·3 A.	Depolarisation factor.	Intensity.
3100	0·60	Medium.
3400	0·48	Strong.
3600	0·75	Weak.

From these observations I conclude that :

(1) The three different Raman bands excited by the same incident lines are differently polarised.

(2) The degree of polarisation of the different Raman bands (excited by the same line) seems to increase as the intensity of the band increases.

The 3·13μ band has been attributed to a polymer of H_2O. But whether the variation of the depolarisation factor is to be attributed to the variation in the geometric character of the oscillations involved, or has a definite bearing on the relative intensities of the bands themselves, is more than we can say at present.

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Thermophilic Bacteria in Milk.

MUDGE and Thorwaldson[1] have advanced a new theory to account for the proliferation of the so-called thermophilic bacteria in milk during pasteurisation at 62·8° C. The fluctuations in numbers which occur at short intervals during pasteurisation are so sudden and violent as to require some further explanation than is supplied by mere proliferation, even if it is at its optimum. They suggest that the organisms exist in milk as dormant spores which, unless the milk is subjected to the action of certain physical and chemical stimuli such as heat, cold, or the action of alkalis, remain ungerminated.

Work which is in the process of completion in this laboratory has furnished evidence in support of this suggestion of Mudge and Thorwaldson, although it was arrived at by an entirely different route. During the investigation of a spore-forming organism isolated from commercial sterilised milk, it has been found that the germination of the spore, and subsequent spore formation, depends upon the effect of heat.

If after inoculation into milk the spores are heated, germination invariably occurs. If, however, the culture is not heated, germination is very much reduced and fails in the second generation. The original spores are gradually lost by a process of dilution during subsequent cultivation and a stable vegetative form of the organism is obtained.

If to a culture of heated spores (possessing the power to germinate) a small quantity of a living culture of the vegetative form be added, a number of these spores are so affected that they immediately lose the power of germination, and if they are allowed to remain in contact with the vegetative culture for 24 hours, this power is lost by all. If, however, to a culture of a number of spores, isolated by the Barber single cell technique, which cannot be induced to germinate by heating alone, a small quantity of a *killed* culture of the stable vegetative form of the organism be added, germination, followed by normal spore formation, takes place.

It appears that the stable vegetative form, which has been found to dissociate from the sporing form, bears an inhibiting factor which is heat labile. It therefore seems that the significance of heating lies in the destruction of this factor, and it may be that the dormancy of the spores of thermophilic bacteria in milk, which is destroyed by heating, is due to the presence of a similar inhibitory factor.

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[1] *Milk Dealer*, December 1930, 57.

Two New Colour-types in Cats.

DURING the past year, we have obtained two cats, each of which is apparently a new colour-type. The first seems to be an albino. He was exhibited at a cat show in Paris in 1930 and came into our possession shortly afterwards.

Hitherto albinism in cats has been unknown. White cats do occur and are sometimes referred to as albinos, but their eyes are pigmented—often blue, sometimes yellow or green—and the white coat-colour is actually dominant white.

The white cat in our possession has eyes very like those of an albino rabbit. The iris is translucent white, and when the pupil is dilated the eyes look blood red. In appearance the cat is a perfect albino, but it is not yet known how his colour is transmitted. He appeared in a strain of Siamese, and it is of interest to note that the Siamese coloration is the nearest approach to albinism hitherto found amongst cats. Siamese in cats is almost certainly comparable to Himalayan in rabbits, and Himalayan is next to the lowest member of the series of allelomorphs extending from black to albino.

The second cat is a self-brown, very much the colour of ground coffee. He was previously owned by the late Mr. H. C. Brooke and was shown by him at the Crystal Palace as a self-red. Brown coat-colour occurs in many domestic animals, but also has not hitherto been recorded in cats. Yellow cats are fairly common. They are often referred to as orange, red, or marmalade—actually they are yellow with darker, orange-brown markings.

The self-brown cat in our possession was evidently considered to be such a 'red' without the lighter patches. His colour is, however, entirely different from anything found on a red—it is a true dark brown without markings. It is not yet known how his colour is transmitted, and nothing is known of his origin.

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