that there may be no single pattern of universal application.

Contrary to what Plaut and Mazia[3] say, all these hypotheses are compatible with the Watson and Crick hypothesis of duplication of deoxyribonucleic acid molecules: a simple calculation shows there are usually several thousands of these per chromosome, so that a different order of magnitude is involved.

Crucial experiments are difficult to devise in this field where matters are complicated by errors due to the random decay of the isotopes and to the methods of quantitative assessment of radioactivity. It seems, however, that if hypothesis (*b*) is correct, we should find some unlabelled anaphase chromosomes (in a species where their number is large) after one premitotic synthesis in the presence of a radioactive precursor. If in such an experiment *all* chromosomes are labelled, hypothesis (*b*) becomes extremely unlikely. With the precise localization given by tritiated thymidine (but not with thymidine labelled with carbon-14), such an experiment now seems possible and I intend to try to tackle the matter shortly.

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Comparison of the Salivary Secretion of Both Parotid Glands in a Sheep

NUMEROUS workers have shown that the parotid glands of ruminants secrete saliva continuously, but only a small number of observations have been made on the secretion of both glands in the one animal. Scheunert and his colleagues[1] observed that the two parotids of sheep secrete independently of one another and considered it probable that the fistulated parotid secretes only a minimal amount of saliva. Colin[2] ascribed the differences in the secretion of the two parotid glands which he observed in the case of an ox to the preference on the part of the animal for chewing on the non-operated side.

In the course of investigations on the return of nitrogen to the rumen in the parotid saliva of sheep, the secretion from both parotid glands in a Merino wether was measured over fourteen days. Into each duct two cannulæ were inserted, one directed towards the gland, the other towards the orifice on the buccal mucosa. The free ends of the cannula on either side could be joined so that the saliva was able to flow into the mouth from one gland, while that from the opposite member was being collected. By reversing the opening and closing of the bridge from side to side, the daily secretion from each parotid gland was measured on alternate days. In this way the animal received the secretion from one gland at all times.

The collections were commenced three days after the surgical operation and continued for the following fourteen days. During this time the animal consumed the whole of its daily ration of 680 gm. of dry matter composed of sheep cubes, oat grain, oat chaff and lucerne hay. The animal had free access to water. Instead of giving the sheep a daily ruminal infusion of sodium bicarbonate to replace the sodium lost in the secretion from the operating gland, the remainder of the saliva collected, after samples had been kept for nitrogen analysis, was infused back into the rumen per cannulum at a rate simulating the natural flow.

For the duration of the experiment the animal was kept under the same environmental conditions to which it had been accustomed for the previous six months and maintained the same position in relation to its regular neighbours in the colony. It was attended by only one member of the department.

Under these conditions the daily volume was recorded for each gland on alternate days and the nitrogen content of the saliva determined by the micro-Kjeldahl method. The results are given in Table 1.

Table 1

Saliva	Left gland	Right gland
Total volume for 7 days (ml.)	16,665	17,468
Mean daily volume (ml.)	2,381 ± 94·3*	2,495 ± 94·3*
Range in daily volume (ml.)	1,992–2,745	2,268–2,775
Total nitrogen content for 7 days (mgm.)	2,076	2,007
Mean daily nitrogen (mgm.)	297 ± 10·6*	287 ± 10·6*
Range in daily nitrogen (mgm.)	257–327	251–341

* Standard error of mean

The mean daily volume of the left and right gland did not differ significantly (t, 0·86 on 12 degrees of freedom). Similarly in the case of the mean daily output of nitrogen, the left and right gland did not differ significantly (t, 0·66 on 12 degrees of freedom).

The mean daily volume of saliva and nitrogen content accord well with similar values recorded for sheep with permanent unilateral parotid fistulæ kept under the same feeding and environmental conditions at this Institute. Denton[3] has reported that the daily volume of saliva secreted by sheep with permanent unilateral parotid fistulæ is relatively constant on any one diet. However, the volume collected daily varies with the diet[4].

Both parotid glands continued to function for a further nine days until on the twenty-sixth day after the operation one of the cannulæ became dislodged. During the whole period of observation the animal did not appear to suffer any overt ill effect from the presence of the cannulæ in the ducts. It remained in good health, ruminated normally, and passed fæces of uniform consistency. Over the twenty-six days of observation the sheep gained 2·5 lb. in weight.

The procedure adopted of infusing the animal's own saliva back into the rumen as a continuous flow was designed to approximate the secretion of the saliva under normal physiological conditions and thus maintain the buffered fluid environment in the rumen. As an alternative I have observed that sheep with permanent unilateral parotid fistulæ will drink their own saliva, or that from another animal, and remain in a healthy condition without a daily supplement of sodium bicarbonate.

The significance of the salivary nitrogen contribution to the rumen under different dietary conditions will be discussed elsewhere.

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