conditions at the base of the fleece depended on activity. The accompanying table gives readings of fleece atmosphere humidity for a single dry-fleeced Herdwick $\times$ Swaledale wether, 18 months old, before and after running for 10 minutes around a field on a sunny afternoon in August 1946 (air temperature, 16° C.).

% R.H. FLEECE ATMOSPHERE, AS MEASURED BY COBALT CHLORIDE PAPERS
(Papers reading 20–40% R.H. were not accurately read, but are recorded as 'below 40%')

Position in the fleece	15 min. before running		30 min. after running		2 hours after running	
	Skin surface	1 in. off the skin	Skin surface	1 in. off the skin	Skin surface	1 in. off the skin
Withers	below 40	below 40	55	48	below 40	below 40
Tailhead	below 40	below 40	57	—	below 40	—
R. crutch.	below 40	below 40	62	62	45	—

It is seen that after the sheep was run the relative humidity at the base of the fleece rose, clearly indicating that an increased rate of sweating had occurred. Further, the fall in humidity after two hours indicates that the effect was transitory. The experiment was repeated four times on the same sheep on different days with similar results. A single experiment on a Swaledale ram lamb also showed a transitory rise in basal fleece humidity after running.

The full results of fleece humidity measurements by cobalt chloride papers will be published elsewhere.

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Activity of Thermophilic Bacteria in Composts of Fresh Green Material

DURING the course of an investigation on the microbiology of composts made from fresh grass cuttings, it was noticed that a dark brown liquid oozed from the material. A large volume of this liquid is produced, and it is very rich in ammonia nitrogen. Under normal conditions of composting it would be lost, and therefore some knowledge of its production is of considerable interest. The liquid first appears when the compost is at a temperature of 65°–55° C.

It has been found possible to reproduce the above phenomenon on a small scale in the laboratory. The arrangement illustrated has proved particularly satisfactory. Series of these tubes can be incubated in a thermostatically controlled water-bath at 65° and 55° C. From the results of experiments with these tubes, it is suggested that this dark brown liquid may be formed through the degradation of organic nitrogen to ammonia by thermophilic bacteria, and the subsequent hydrolysis of chlorophyll under the alkaline conditions produced by this ammonia.

At the temperatures mentioned above, a thermophilic bacterial flora has been found to develop both in the compost and in the tubes. In the compost it can be seen as a white coating covering the cuttings, particularly in the upper layers. Also the dark-

coloured liquid produced in the compost and in the laboratory experiment is in both cases very rich in thermophilic bacteria. It was thought that there might be some relationship between the activity of the thermophilic flora and the production of the liquid. The following evidence supports this view.

(a) Fresh grass cuttings sterilized with 1/1,000 corrosive sublimate when incubated for five days at 65° C., followed by eight days at 55° C., failed to produce the typical dark brown liquid. The grass also retained its green colour and showed no evidence of decomposition.

(b) Unsterilized fresh cuttings under the same conditions of incubation gave the liquid, the grass changing its colour from green to brown, and obviously undergoing decomposition.

(c) Many isolates of the thermophilic flora have been made from both the compost and the tubes. True and facultative thermophilic bacteria have been found to be present. They are rod-shaped, spore-forming bacilli and are very strong ammonifiers. They do not attack chlorophyll in culture media.

(d) Chemical analyses have shown a marked increase in ammonia nitrogen when fresh grass is incubated at 65° C. This does not occur when the cuttings have been sterilized.

It would appear, therefore, that the thermophilic flora attacks organic nitrogenous material of the compost, liberating ammonia. As a result of this, it would be expected that conditions in the tubes and compost would become alkaline. Measurement of pH shows this to be the case.

It is well known that chlorophyll can undergo changes from green to brown when hydrolysed under alkaline conditions. In view of this, it seemed possible that the explanation of the dark brown colour might be connected with the production of alkaline conditions. Moreover, the thermophilic bacteria isolated did not attack chlorophyll in culture media.

The following experiment supports this hypothesis. Tubes with sterilized grass were set up, and into the bulb of each tube a few c.c. of strong ammonium hydroxide were introduced. The tubes were then incubated at 65° C. In a few days the grass began to change from green to brown, and the liquid which collected in the bulbs was very similar in appearance to that produced during composting.

Full details and further information on the microbiology of grass composting will be published in due course.

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