an average of 57 epsilon amino groups of lysine (56 and 59, respectively) per molecule of human serum albumin, molecular weight 69,000. There was no apparent freeing of additional alpha amino groups of human serum albumin detectable by this method.

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Importance of Proteases as Factors Involved in the Exsheathing Mechanism of Infective Nematode Larvae of Sheep

The importance of pepsin as a factor influencing the exsheathment of third-stage infective nematode larvae in the host has been raised by Crofton (*1*). Working with *Trichostrongylus retortaeformis* from the rabbit, he obtained a high rate of exsheathment by using solutions of pepsin in hydrochloric acid. Solutions of hydrochloric acid alone and of distilled water gave no exsheathment, and boiling the pepsin solutions rendered them inactive.

The researches of Poynter (*2*), however, on infective nematode larvae of parasites of the horse indicate that enzymes do not have a role in the exsheathing mechanism. Sommerville (*3*) recently obtained rapid exsheathment *in vivo* with several species of infective larvae of sheep by using cellophane dialysis membranes in fistulas of the rumen and abomasum. Exsheathment has similarly been obtained in this laboratory at a slower rate and using an abomasal fistula only.

Further evidence that enzymes do not play a part in the exsheathing mechanism of infective larvae of sheep has been obtained by studying the action of pepsin and trypsin on the cast cuticle of *Haemonchus contortus*. Separation of the cuticle was obtained as previously described (*4*). Pepsin was made up in the manner described by Hollaender *et al.* (*5*), and trypsin was made according to the method of Moscona (*6*). The potency of these solutions was tested by using controls containing muscle fibers. Experiments were carried out at 38°C over a period of 3 days, and in no case did hydrolysis of the cuticles occur.

It has been shown that proteins that have a very low aromatic amino acid content, such as gelatin, have a correspondingly slow peptic hydrolysis, and that proteins that contain many aromatic amino acids are hydrolyzed rapidly by pepsin. Recent investigations by Baker (*7*) have shown that dipeptides containing two residues of the *l* form of the aromatic amino acids phenylalanine, tyrosine, and diiodotyrosine are hydrolyzed more rapidly than any previously known synthetic peptide, indicating that the specificity of pepsin is related to the hydrolysis of peptide linkages involving aromatic amino acids. The studies of Hofmann and Bergmann (*8*) on the specificity of trypsin indicate that this is directed to the hydrolysis of peptide bonds involving arginine and lysine.

It has recently been shown that the cuticle of infective larvae of *H. contortus* is composed of proteins, which, however, lack the aromatic amino acids lysine and arginine (*4*). The failure of the proteases to attack the cuticle of the larvae can, therefore, be attributed to the chemical composition of the constituent proteins. It is of further interest to note that more rapid exsheathing rates were obtained in distilled water in which the cuticle had been shown to be soluble at higher temperatures than in solutions of pepsin similar to those used by Crofton (*9*).

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Earthworm Breeding Farms

I have read with interest the news item on earthworm breeding farms [*Science* **120**, 825 (1954)]. It seems necessary that a note of caution be introduced in evaluating the ability of worms to enhance the chemical and physical properties of soil. For example, Chadwick and Bradley [*Proc. Am. Soc. Hort. Sci.* **51**, 552 (1948)] concluded after an extensive series of experiments that although castings are beneficial when added directly to potted plants, the presence of large numbers of worms in the soil had no beneficial results upon plant production. Different species of worms have a strong selectivity for various types of soil.

With regard to this fact it is interesting to note that *Eisenia foetida* is one species that is commonly supplied by worm farms. While easy to culture, the worm is restricted to a habitat of manure or compost, and will die when placed in the loamy soil of the field or garden. Hence any increase in yield from soils to which this species has been added is of a transient nature, being the result of the worms' decomposition