rich and Mosely[8] found that these amebae *(Entameba gingivalis)* are in greatest numbers on the under side of the tartar ridge. They claim that the parasites do not burrow into the tissues of the gum but often between the terminal branches of the leptotrichia which are found in abundance in the pyorrhoea lesion.

The space between the leptotrichial bed on the one side and the inflamed epithelial wall on the other, contains inflammatory tissue exudate, large numbers of bacteria of many varieties, spirochetes and usually some amebae which have come out from their bed to their feeding ground where there are an abundance of pus cells upon which they feed. After feeding the parasite usually withdraws into the leptothrix bed for safety and protection. Individuals that venture too far away from the bed into the open space are unable to return and are swept out with the pus, especially when it is squeezed out by pressure upon the tooth in chewing, biting, etc.

The parasites are found scattered among the branches and fruiting heads (Fig. 1) of the leptothrix bed. The individual not only burrows between the different elements—stems, filaments, falciforms—making up the outer surface, but apparently they also burrow about in the abundant jelly-like material imbedding these elements (Fig. 2, 3, 4). In studying several hundred such specimens as suggested here, I have often observed several amebae clustered about a leptothrix stalk and especially in the fork where a large stalk apparently divides into 2 smaller ones. For the most part, however, they are found separate and not in direct contact with each other.

Summary. A simple method is given, of collecting material from the area on extracted teeth, which is inhabited by *E. buccalis.*

The habitat of *E. buccalis* is the outer part of the filamentous bacterial film on the tooth, within the periodontoclasia lesion. There they are protected and live, grow and multiply among the strands and fruiting heads of leptotrichia, principally *L. falciformis.*

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Creeping Eruption Caused by the Larvae of the Cattle Hookworm *Bunostomum phlebotomum.*

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Several years ago while making a series of inoculations with third stage larvae of the hookworm, *Bunostomum phlebotomum,* and the nodular worm, *Oesophagostomum radiatum,* by placing the larvae on the skin of the calves we frequently noted the appearance of small inflamed spots between our fingers.[1] Some of these spots increased after a few hours to about ¼ inch in diameter, followed after 2 or 3 days by the appearance of a narrow, linear, tortuous eruption which became extended at intervals during the next few days. Following the course of these eruption areas a slightly raised, vesicular line generally developed within a few hours which might be interrupted at points. The entire area became more or less swollen and intensely itchy particularly in the mornings. Within about 2 weeks the surface of the skin was dry, scaly, and the irritation gone. Recently another series of inoculations were undertaken using pure cultures of hookworm larvae[2] and we again noted the appearance of these spots always coincidently with the skin inoculations on the calves.

The following may be taken as a typical

1 Mayhew, R. L., *Cornell Vet.*, 1939, **29**, 367.

2 Mayhew, R. L., PROC. SOC. EXP. BIOL. AND MED., 1946, **63**, 360.

description of one of these lesions. On October 3, 1946 several lesions developed following the application of larvae to the skin of a calf, one of these being on the interdigital surface of the ring finger on the side adjacent to the middle finger and at the distal joint. This lesion developed to the diameter of ½ inch in 2 or 3 hours, and remained in this condition until the night of October 7, when a narrow, elevated, linear extension about ¼ inch long appeared directed toward the palmar side of the finger. On the night of October 8 a right angle extension about ¼ inch long developed toward the tip of the finger. Between 6 and 9 P. M. on October 9 the eruption area was extended toward the palmar side of the finger about ¾ inch and back almost to the starting point in the form of an irregular oval. On the night of October 10 the eruption area was again extended about ¼ inch toward the tip of the finger. The entire area became swollen and was very itchy especially in the mornings. A slightly raised line, interrupted in places, and becoming vesicular in places after a few hours, developed along the eruption area. This vesicular line possibly represents the path of migration of the larvae. No additional migration was observed and by October 12 the swelling and irritation was beginning to disappear. In about another week the area no longer showed irritation, the swelling was gone, and the outer layer of skin was scaling off along the course of migration.

In our experience there was no evidence that the larvae penetrated by way of the hair follicles since no eruption areas appeared on the back of the fingers or hand where hair follicles are present but always on the relatively thin skin areas between the fingers. Two instances were noted in which larvae penetrated on the palm side of the fingers. One of these was on the palm side of the thumb near the tip and the other between the first and second joints of the left index finger. In each instance the skin had been punctured and slightly torn a day or two before and there was migration over ½ to ¾ inch area.

In a few instances a tingling or prickling sensation was noted. One of these we were able to observe in particular. A drop of the larval suspension was observed to run along between the index and middle finger of the left hand as they were held together, and within a few seconds a distinct prickling sensation was noted. That the calf has similar sensations is indicated by the fact that they have been observed many times to twitch the skin of the area to which the larvae are being applied during the next few minutes after contact with the suspension, and also to switch the tail toward the side on which the larvae had been applied.

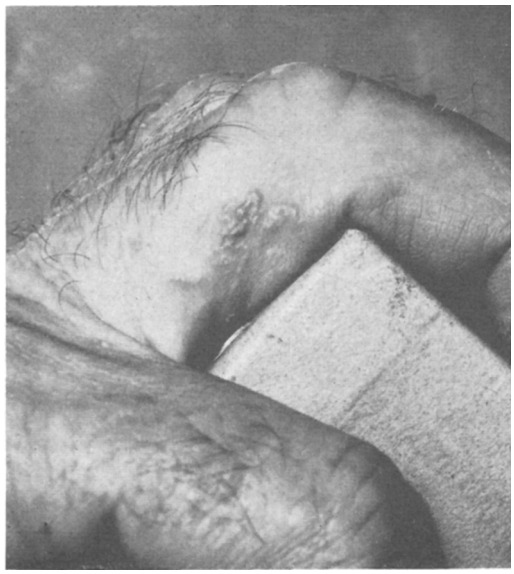

Fig. 1.
Photograph showing eruption area in which 4 and possibly 5 larvae had penetrated. The linear eruptions of 2 of the larvae extended around on to the palmar side of the finger.

The lesions and symptoms are in the main identical with those reported by Kirby-Smith, Dove, and White,[3] and White and Dove,[4] as developing from larvae of the dog hookworm, *Ancylostoma brazilense,* in man, and known as creeping eruption. The principal difference seems to be that the duration of the eruptions and irritation is not so prolonged in the case of the cattle hookworm. In our experience with the cattle hookworm the dura-

[3] Kirby-Smith, J. L., Dove, W. E., and White, G. F., *Arch. Derm. Siph.*, 1926, **13**, 137.

[4] White, G. F., and Dove, W. E., *J. Am. Med. Assn.*, 1928, **90**, 1701.

tion is one to three weeks while that of the dog hookworm is from several weeks to months. We also have the impression that the larvae of the cattle hookworm do not penetrate is as large numbers as those of the dog hookworm. In the instances coming under our observation there was no secondary infection while in the case of the dog hookworm larvae this may develop as a result of the prolonged scratching. There is much similarity to the schistosome dermatitis which has been so extensively studied in recent years by Cort,[5] and his associates. There is, however, no migration in schistosome dermatitis.

[5] Cort, W. W., *Am. J. Hyg.*, 1936, **23**, 349.

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Histochemistry XIX. Localization of Alkaline Phosphatase in Normal and Pathological Human Skin.*

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The present study was undertaken in the hope of establishing the histo- and cytologic distribution of alkaline and acid phosphatase and lipase in normal and pathologic human skin. Our results were essentially negative for the acid phosphatase and lipase, so that this report deals with alkaline phosphatase alone. The methods of Gomori[1] for the demonstration of the enzymes were employed throughout. All tissue sections were placed in 0.1 M citrate buffer, pH 4.5-5.0, for 30 minutes before the enzyme staining reaction was applied in order to remove preformed phosphates and other substances which might give a positive reaction. Inasmuch as control experiments on these sections demonstrated no staining whatsoever in the absence of substrate, any staining obtained could be ascribed to enzyme action alone. An incubation period of 12-24 hours in the substrate medium was used. In this study 32 specimens of normal skin, collected from 27 individuals, were selected from the scalp, face, breast, axilla, chest, palm, back, abdomen, penis, scrotum and hip. This selection was made because of the differences in histologic structure of skin from those sources. The 33 pathological specimens were biopsied from 8 cases of eczema, 2 cases of lupus erythematosus, 2 cases of psoriasis, 1 case of papular urticaria, 2 cases of pyogenic granuloma, 15 cases of healing wounds and scars, and 3 cases of acne vulgaris.

In normal skin, alkaline phosphatase activity was demonstrated in all specimens. There was slight staining in the stratum granulosum in agreement with the findings of Bourne and MacKinnon[2] who investigated guinea pig skin. The endothelial walls of the capillaries showed the most uniform and clear cut staining effects as previously observed by Gomori[3] and others. The reaction was most pronounced in the nuclei of the endothelial cells and the nucleoli showed a stronger reaction than the other parts of the nuclei. The hairs and hair follicles, especially the papillae, gave an intense reaction in much the same manner as found for guinea pig skin by Johnson *et al.*,[4] and Bourne and MacKinnon.[2] However, in the present investigation, a

* Aided by a grant from the Medical Research Fund of the Graduate School, University of Minnesota.

[1] Gomori, G., *Am. J. Clin. Path.*, 1946, **16**, 347.

[2] Bourne, G., and MacKinnon, M., *Quart. J. Exp. Physiol.*, 1943, **32**, 1.

[3] Gomori, G., *J. Cell. and Comp. Physiol.*, 1941, **17**, 71.

[4] Johnson, P. L., and Bevelander, G., *Anat. Rec.*, 1946, **95**, 193.