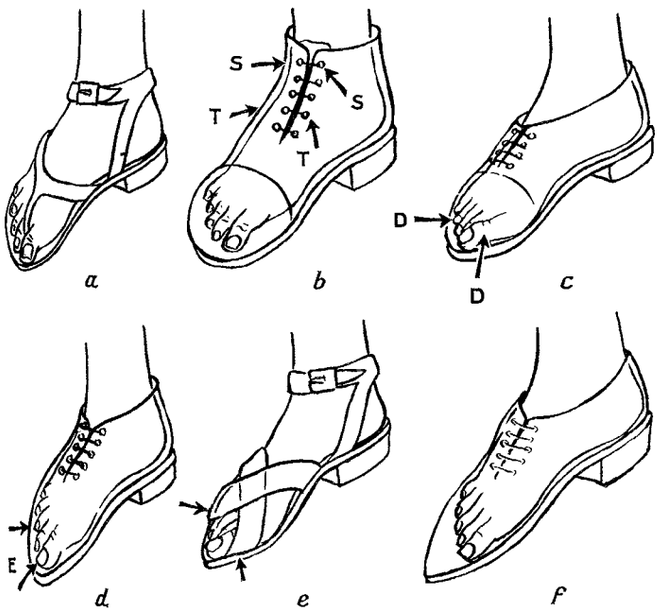
Letters to the Editor

SHOE DESIGN AND THE GREAT TOE

SIR,—Craigmile's demonstration [1] of the effectiveness of children's shoes in causing or curing early hallux valgus has again brought up the question of shoe design for adults; and Pratt [2] has once more emphasised the importance of a straight inner border that will not force the great toe into valgus deformity, though he said [3] that he had "failed to discover a single pair of shoes for the late teenager or for an adult that would accommodate the hallux in its normal position," and "the very firms that acquired their custom by 'straight inner border' publicity supply to the teenage girl, but still under the same trademark, footwear that deforms." But perhaps the shoemakers are not altogether to blame.

When a forward thrust of the bare foot has to be resisted by the ground, as in walking downhill or stopping



from a run, direct friction between the ground and the sole at the heel and ball is sufficient to prevent slipping. Even if the foot carries a sandal (see *a* in accompanying figure) the friction of skin to leather and leather to ground is sufficient to meet the thrust; but when the foot is cased in a woollen sock or, worse, a 'Nylon' stocking, the friction between the foot and the ground is broken by the nylon-leather plane, and a great part of the thrust must be taken up by some other mechanism.

In a boot the lower part of the shin presses against the upper (S in fig. *b*), and the "tarsal wedge," where the tarsal bones narrow, pushes against the narrowing part of the boot which covers the instep (T). In such a boot the toecap merely acts as a protection to the toes, which need not actually touch the leather, and the cap can be removed altogether without altering the efficiency of the boot in walking or running. In a shoe (fig. *c*) S is absent and the lower the shoe is cut the less effective T can be. A remnant of the thrust now has to be taken up by the "digital wedge," and herein danger lies.

The toes do not naturally form a good wedge, but can be moulded into one by tight stockings or by the toecap of the shoe. Usually the cap is bevelled off on both sides, so that the great toe is forced into valgus and its medial surface takes pressure, while the other digits are bunched together to form the other side of the wedge (D in fig. *c*). Such a shoe must be tightly fitting if the foot is not to slide forward in it, and, as Booth [4] says, "it is quite clear that the present shoe design for the adult is based upon the almost universal hallux valgus of the adult population." If, in addition, the heel is high, the forward thrust occurs at each step and not only when walking downhill, and here again the shoe must be tight fitting for it to be reasonably comfortable. Removal of the toecap would make the shoe unwearable.

If now the medial side of the cap is made straight, as in the shoe designed by Lindsay,[5] the whole of the toe thrust may fall on the lateral digits or some may be taken by the end of the great toe (E in fig. *d*). Both these arrangements may be uncomfortable, for the first leads to compressive discomfort of the toes, the second to trauma, terminal corns, and hallux rigidus; and such a shoe as that shown in fig. *d* would, without a high upper to relieve the toes of strain, be uncomfortable in wear. The "peep-toe" shoe of fig. *e* again depends on the formation of a digital wedge for its efficiency, and the long pointed shoe with empty toecap built on to a wide base, suggested by Mennell [6] to provide elegance without deformity (fig. *f*), would need a high upper to stop the foot sliding forwards in the shoe.

In fact, it seems improbable that giving a shoe a straight inner border would improve it greatly. The best preventive of hallux valgus in our climate might be the wearing of sandals without socks in summer and of roomy-toed boots with roughish socks (as worn by soldiers on active service) in winter. The next best would be a shoe with sufficiently high overwork or strapping, perhaps disguised, as in Stuart times, by a bow or buckle. A shoe without overwork necessarily throws great strain on the digital wedge, particularly if slippery stockings are worn.

The forces at work would be comparatively easy to measure, and may already have been measured by the shoe manufacturers' research-workers, but figures do not seem to be available in the general scientific literature. A study of simple foot mechanics by an independent worker with access to experimental footwear fitted with removable heels, alternative and transparent toecaps, strapping, &c., is badly needed, and such a study should certainly be undertaken before handing over the control of shoe design to the Ministry of Health, as suggested by Pratt [2] and Sherriff [7] for children's shoes.

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1. Craigmile, D. A. *Brit. med. J.* 1953, ii, 749.
2. Pratt, C. A. *Lancet*, 1953, i, 746.
3. Pratt, C. A. *Brit. med. J.* 1953, ii, 935.
4. Booth, W. G. *Lancet*, 1953, ii, 40.
5. Lindsay, E. A. *Ibid*, 1939, ii, 1211.
6. Mennell, J. *Proc. R. Soc. Med.* 1939, **33**, 105.
7. Sherriff, G. G. *Lancet*, 1953, ii, 200.

PAIN AFTER HÆMORRHOIDECTOMY

SIR,—Mr. Lee, in his article of Jan. 2, quotes well-known authorities to support his contention that hæmorrhoidectomy is one of the more painful operations of surgery. I have, however, for many years past made a point of asking patients and attendant nursing staff afterwards whether the operation was in fact as painful as anticipated, and I have always been gratified to find that it was not, many in fact expressing surprise about the freedom from pain.

Mr. Lee has rightly paid attention to detail, and no doubt his methods are successful in his hands. However, in his description of the procedure no mention is made of preliminary stretching of the sphincter. I maintain that, when the sphincters are slowly and forcibly stretched with first two, then three, and sometimes four fingers, then the sphincters are temporarily paralysed and unable to cause painful contraction for the first few postoperative days.

I believe that a further cause of pain is reactionary œdema (and even hæmatoma formation) in the lax skin of the three intervening mucocutaneous bridges. The likelihood of such œdema is to my mind lessened by a