in the palm of the hand and sole of the foot, where there may be as many as 21 to every square millimetre (1 mm. = 1/25 inch). They are not so numerous on the back of the hand or foot, mamma, lips and tip of the tongue, and they are rare in the genital organs.

3. *The Corpuscles of Vater or*

*Pacini.—*These, first described by Vater so long ago as 1741, are small oval bodies, quite visible to thc naked eye, from 1/16 to 1/10 of an inch long and

1/25 to 1/20 of an inch in breadth, attached to the nerves of the hands and feet. They can be readily demonstrated in the mesentery of the cat (fig. 7). Each corpuscle consists of 40 to 50 lamellae or coats, like the folds of an onion, thinner and closer together on approaching the centre. Each lamella is formed of an elastic material mixed with delicate connective-tissue fibres, and the inner surface of each is lined by a single continuous layer of endothelial cells. A double-contoured nerve fibre passes to each. The white substance of Schwann becomes continuous with the lamellae, whilst the axis cylinder passes into the body, and ends in a small knob or in a plexus. Some­times a blood-vessel also penetrates the Pacinian body, entering along with the nerve. Such bodies are found in the sub­cutaneous tissue on the nerves of the fingers and toes, near joints, attached to the nerves of the abdominal plexuses of the sympathetic, on the coccygeal gland, on the dorsum of the penis and clitoris, in the meso-colon, in the course of the intercostal and periosteal nerves, and in the capsules of lymphatic glands.

*Physiology of Touch in Man.—*Such are the special end-organs of touch. It has also been ascertained that many sensory nerves end in a plexus or network, the ultimate fibrils being connected with the cells of the particular tissue in which they are found. Thus they exist in thc cornea of the eye, and at the junctions of tendons with muscles. In thc latter situation "flattened end-flakes or plates ” and “ elongated oval end-bulbs ” have also been found. A consideration of these various types of structure show that they facilitate intermittent pressure being made on the nerve endings. They are all, as it were, elastic cushions into which the nerve endings penetrate, so that the slight variation of pressure will be transmitted to the nerve. Probably also they serve to break the force of a sudden shock on the nerve endings.

*Sensitiveness and Sense of Locality.*—The degree of sensitiveness of the skin is determined by finding the smallest distance at which the two points of a pair of compasses can be felt. This method first followed by Weber, is employed by physicians in the diagnosis

|  |  |
| --- | --- |
|  | Mm. |
| Tip of tongue 1·1 | |
| Third phalanx of finger, volar surface 2-2·3 | |
| Red part of the lip 4∙5 | |
| Second phalanx of finger, volar surface 4-4∙5 | |
| First phalanx of finger, volar surface 5-5∙5 | |
| Third phalanx of finger, dorsal surface 6∙8 | |
| Tip of nose 6∙8 | |
| Head of metacarpal bone, volar 5-6·8 | |
| Ball of thumb 6∙5-7 | |
| Ball of little finger 5·5-6 | |
| Centre of palm 8-9 | |
| Dorsum and side of tongue; white of the lips; metacarpal  part of the thumb 9 | |
| Third phalanx of the great toe, plantar surface. . 11∙3 | |
| Second phalanx of the fingers, dorsal surface . . 11∙3 | |
| Back 11∙3 | |
| Eyelid 11∙3 | |
| Centre of hard palate 13∙5 | |
| Lower third of the forearm, volar surface 15 | |
| In front of the zygoma 15∙8 | |
| Plantar surface of the great toe. 15∙8 | |
| Inner surface of the lip .... 20∙3 | |
| Behind the zygoma 22∙6 | |
| Forehead 22∙6 | |
| Occiput 27∙1 | |
| Back of the hand 31∙6 | |
| Under the chin 33∙8 | |
| Vertex 33 ∙8 | |
| Knee 36·1 | |
| Sacrum (gluteal region) 44∙6 | |
| Forearm and leg 45∙1 | |
| Neck 54∙1 | |
| Back of the fifth dorsal vertebra; lower dorsal and lumbar region 54 ∙1 | |
| Middle of the neck 67·7 | |
| Upper arm; thigh; centre of the back 67∙7 | |

These investigations show not only that the skin is sensitive, but that one is able with great precision to distinguish the part touched. This latter power is usually called the *sense of locality,* and it is influenced by various conditions. The greater the number of sensory nerves in a given area of skin the greater is the degree of accuracy in distinguishing different points. Contrast in this way the tip of the finger and the back of the hand. Sensitiveness increases from the joints towards the extremities, and sensitiveness is great in parts of the body that are actively moved. The sensibility of the limbs is finer in the transverse axis than in the long axis of the limb, to the extent of J on the flexor surface of the upper limb and ¼ on the extensor surface. It is doubtful if exercise improves sensitiveness, as Francis Galton found that the performances of blind boys were not superior to those of other boys, and he says that “ the guidance of the blind depends mainly on the multitude of collateral indications, to which they give much heed, and not their superiority to any one of them.” When the skin is moistened with indifferent fluids sensibility is increased. Suslowa made the curious discovery that, if the area between two points distinctly felt be tickled or be stimulated by a weak electric current, the impressions are fused. Stretching the skin, and baths in water containing carbonic acid or common salt, increase the power of localizing tactile impressions. In experimenting with the com­passes, it will be found that a smaller distance can be distinguished if one proceeds from greater to smaller distances than in the reverse direction. A smaller distance can also be detected when the points of the compasses are placed one after the other on the skin than when they are placed simultaneously. If the points of the com­passes are unequally heated, the sensation of two contacts becomes confused. An anaemic condition, or a state of venous congestion, or the application of cold, or violent stretching of the skin, or the use of such substances as atropine, daturin, morphia, strychnine, alcohol, bromide of potassium, cannabin and hydrate of chloral blunt sensibility. The only active substance said to increase it is caffein.