

dation upon which all other senses are based. The skin is the largest sensory organ of the body, and the tactile system is the earliest sensory system to become functional in all species thus far studied—human, animal, and bird. Perhaps next to the brain, the skin is the most important of all our organ systems. The sense most closely associated with the skin, the sense of touch, is the earliest to develop in the human embryo. When the embryo is less than an inch long from crown to rump, and less than six weeks old, light stroking of the upper lip or wings of the nose will cause bending of the neck and trunk away from the source of stimulation. At this stage in its development the embryo has neither eyes nor ears. Yet its skin is already highly developed, although in a manner not at all comparable to the development it is still to undergo. At nine fetal weeks, when the palm is touched the fingers will bend as if to grip; at twelve weeks, the fingers and thumb will close. Pressure at the base of the thumb will cause the fetus to open its mouth and move its tongue. Firm touching of the back or sole of the foot will result in toe-curling or fanning-out, as well as the placing reflex—bending of the knee and hip, as if to withdraw from the touch. In the womb, bathed by its mother's amniotic fluid and enveloped by the soft walls of the womb, "rocked in the cradle of the deep," the conceptus* leads an aquatic existence. In this environment its skin must have the capacity to resist the absorption of too much water, the soaking effects of its liquid medium, to respond appropriately to physical, chemical, and neural changes, and to changes in temperature.

The skin in common with the nervous system arises from the outermost of the three embryonic cell layers, the ectoderm. The ectoderm constitutes the general surface covering of the embryonic body. The ectoderm also gives rise to the hair, teeth, and the sense organs of smell, taste, hearing, vision, and touch—everything involved with what goes on outside the or-

**Conceptus*, the organism from conception to birth. *Embryo*, the organism from conception to the end of the eighth week. *Fetus*, from the beginning of the ninth week to birth.

ganism. The central nervous system, which has as a principal function keeping the organism informed of what is going on outside it, develops as the intumed portion of the general surface of the embryonic body. The rest of the surface covering, after the differentiation of the brain, spinal cord, and all the other parts of the central nervous system, becomes the skin and its derivatives—hair, nails, and teeth. The nervous system is, then, a buried part of the skin, or alternatively the skin may be regarded as an exposed portion of the nervous system. It would, therefore, improve our understanding of these matters if we were to think and speak of the skin as the external nervous system, an organ system which from its earliest differentiation remains in intimate association with the internal or central nervous system. As Frederic Wood Jones, the English anatomist, put it, "He is the wise physician and philosopher who realises that in regarding the external appearance of his fellowmen he is studying the external nervous system and not merely the skin and its appendages." As the most ancient and largest sense organ of the body, the skin enables the organism to learn about its environment. It is the medium, in all its differentiated parts, by which the external world is perceived. The face and the hand as "sense organs" not only convey to the brain a knowledge of the environment, but convey to the environment certain information about the "internal nervous system."

André Virél, anthropologist and neurologist, puts it very well when he writes:

Our skin is a mirror endowed with properties even more wonderful than those of a magic looking glass. The primeval mirror that envelops the ovum splits apart only to be swallowed up within itself. Then it reappears on the other side of the original fissure. The divided mirror that is the skin and nervous system combined thus ends up looking at itself, so to speak, resulting in a confrontation that stimulates a never-ending movement of images and the birth of what is aptly referred to as reflexive thought.