Table 1. Number of skin anomalies ascribed to inheritance.

Autosomal		Gonosomal	
Dominant	Recessive	X	Y
105	38	8	1

New tools for diagnosis could improve not only the scarce knowledge about genic action, mutant and normal, but also the accuracy of family prognosis by tracing micromanifestations in heterozygous carriers of mutant genes.

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28 November 1966

Seal Ears

The possible mechanism, recently offered by Odend'hal and Poulter (*1*), for pressure regulation in the cavity of the middle ear of sea lions is of interest to evolutionary biologists as well as to physiologists. The use of distensible venous sinuses to maintain the auditory ossicles in an air-filled space with a pressure equal to extratympanum pressure has been reported for members of two widely separated mammalian cohorts, the pinnipeds (*1*) and the cetaceans (*2*), although this physiological convergence varies in detail. Since the opinion that the seals are biphyletic (*3, 4*) is finally gaining favor, physiological investigation of the middle ear of "true seals" (not covered by Odend'hal and Poulter) would be enthusiastically received.

Studies of the osteology of the basicranium and ear region in both groups of seals indicates that they differ considerably with respect to detailed structure of this region (*5*). The Phocidae ("true seals") and Otariidae (sea lions) are less like each other than each is like some other group within the Carnivora. The phocids are closer to mustelids; the otariids are closer to the bears. Among many observable differences is that the epitympanic sinus and recess is larger than the tympanic cavity in the "true seals" but not in the sea lions; also, the "true seals" have a well-developed posttympanic sinus and a greatly expanded hypotympanic sinus, all combining to form a relatively larger middle-ear cavity than that of the sea lions.

The volume of the middle ear at surface pressure would determine the final volume of air available in the middle ear at depth, when it is in equilibrium with the increased environmental pressure. Since the auditory ossicles are most effectively operative in such an equilibrated air-filled space, the final depth to which a seal can dive and still receive effective transossicular vibrations would be predetermined by the relative size of the ossicles (reflected in the size of the tympanic cavity) and the rest of the middle-ear cavity. If, as seems likely, there is a venous complex within the bulla to equalize pressure in the "true seals," and if we use Odend'hal and Poulter's line of reasoning, the "true seals" should be able to reach greater depths than the otariids and still be able to use sonar.

To my knowledge, sonar has been reported for sea lions (*6*) but not yet for phocids, although some are known to feed at depth [for example, the Northern elephant seal eats ratfish, which are always found below 50 fathoms (*4*)]. Since light is extinguished with increasing depth, the "true seals" probably also use sonar. Moreover, their ancestors were apparently more highly preadapted to this mode of life than the otariid antecedents. Some of the trends discussed above were already being expressed in early lutrines (*7*) and are in process of still greater refinement in the phocids, which are derivable from the mustelid stock. By contrast, the ancestors of the sea lions were probably primarily terrestrial proursids, and the anatomical modification of their middle-ear cavity is not as extreme. Some degree of preadaptation is implicit though, since they have effectively shifted into this adaptive zone.

This discussion is intended to illustrate how imperative information from physiological ecology can be to morphologists and systematists. How else can we explain hypertrophication of the middle-ear cavity, which in some aquatic mammals is for high-frequency reception, when this same hypertrophication in a terrestrial mammal, *Dipodomys*, is for low-frequency reception (*8*)?

I suggest that in addition to the suction-pump effect for decreasing intrabullar pressure and thus for filling these sinuses during diving, there may be a positive force as well. Since there are massive cardiovascular adjustments in diving mammals, such as the marked decrease in peripheral circulation (*9*), and since there are numerous reports that apnea and bradycardia are correlated with increased central blood pressure in mammals generally (*10*), the filling of the bullar sinuses may be facilitated by the physiological adaptation to the anoxia that accompanies diving. This would seem to be a classic example of correlated adaptation in two physiological systems.

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11. I thank Drs. M. C. McKenna and R. G. Van Gelder of the American Museum for use of collections and, along with Dr. G. T. McIntyre, for their stimulating discussions.

13 September 1966