various points shows different and varying contents of ions. The approximate extreme values (gm. per 100,000 cm.³ water) are for Cl^- 123–690, for Na^+ (+ K^+) 45–175, for Mg^{++} 20–74, for Ca^{++} 17–55. (I am indebted to Prof. M. Bobtelsky, Department of Inorganic Chemistry, Hebrew University, and Mr. M. Goldschmidt, Hydrological Service (Ministry of Agriculture, Water Department), for their help in securing some of these data. Another part has been taken from the Report of the Palestine Government[1].)

The first author to collect fishes from Ein Feshkha was Tristram[2,3], who reported five species (all scientific names are brought up to date): *Nemachilus insignis* Heckel[2], *Tilapia nilotica* (L.)[2], *Aphanius cypris* (Heckel)[2,3], *A. sophiæ* (Heckel)[2,3], *A. dispar* (Rüpp.)[3]. Aharoni[4] also reported five species, two of them not found previously by Tristram: *Garra rufus* (Heckel), *Tilapia zilli* Gervais, *Aphanius dispar* (Rüpp.), *A. cypris* (Heckel), *A. sophiæ* (Heckel).

During several visits to Ein Feshkha we recovered only three species, namely, one Cichlid and two Cyprinodontids; neither *Nemachilus insignis* nor *Garra rufus* was found.

Tilapia nilotica thrives in Ein Feshkha. It is, however, subspecifically different from the typical form found everywhere in the Jordan valley, and is therefore described as a new subspecies, *T. nilotica exul*[5]. Aharoni seems to have confounded *T. nilotica* with *T. zillii*.

As to the Cyprinodontids, the species which we have found are *Aphanius ?sophiæ* and *A. dispar* (Rüpp.). That Tristram and Aharoni believed they had found *A. cypris* and *A. sophiæ* together in Ein Feshkha can be understood in view of the difficulties of differentiating these species systematically. This difficulty has long been recognized. I am inclined to consider *A. cypris* and *A. sophiæ* as belonging to one systematic entity of subgeneric or specific standing. A reconsideration of the systematics of the group is in progress, but it would be futile to discuss the status of *A. ?sophiæ* from Ein Feshkha before this revision is concluded.

With regard to *A. dispar*, the zoogeographical and ecological position makes desirable a discussion of its systematic status, more especially since both in it and *T. nilotica* of the same locality differences have been discovered which justify a reconsideration of its status. The Ein Feshkha population of *A. dispar* has been referred up to now to the typical form[3,6]. The Dead Sea Valley is apparently the only region in the circum-Mediterranean lands where this fish lives. The original description of the species[7] is based on specimens from the Red Sea. A detailed comparison of specimens from the typical locality with those from Ein Feshkha has not yet been made; but a comparison of Ein Feshkha specimens with those recently immigrated from the Red Sea into the Mediterranean shows differences[8] which seem to indicate that in this case, too, a systematic revision may become necessary.

H. Steinitz

Department of Zoology,
Hebrew University,
Jerusalem. Oct. 26.

[1] Water Measurements prior to Oct. 1944 (Irrigation Service, Jerusalem, 1947).
[2] Tristram, H. B., "Land of Israel", 251 (London, 1865).
[3] Tristram, H. B., "Fauna and Flora of Palestine" (London, 1884).
[4] Aharoni, J., in Blanckenhorn, M., "Naturw. Stud. am Toten Meer...", 434 (Berlin, 1912).
[5] Steinitz, H. (in the press).
[6] Aksiray, Fethi, *Rev. Fac. Sci. Univ. d'Istanbul.*, B, **13**, 114 (1948).
[7] Rüppell, E., "Atlas Reise nördl. Afrika", 66 (Frankf./M., 1826).
[8] Mendelsohn, H., *Nature*, **160**, 123 (1947).

Possible Functional Significance of the Reduction of Cartilage Bone

In a recent article on the evolution of vertebrates, D. M. S. Watson[1] takes into consideration a number of anatomical features of recent and fossil animals, showing that the overwhelming majority of them can be easily understood as the results of functional adaptations. Watson underlines, however, the importance of a major evolutionary trend in lower vertebrates, consisting in the gradual loss of cartilage bone in the skeleton and the growing importance of the membrane bones. This trend can be followed in many groups of fishes and amphibians. It is difficult, however, to find for it an adaptive significance. Watson writes (p. 58): "I have been able to find no advantage that an animal can obtain by a reduction in the amount of cartilage bone", and further: "these basal changes . . . are not of such a character that it is at present possible to explain their occurrence as an adaptation and hence their appearance as a result of natural selection".

A suggestion can be made as to the value of the membrane bones as contrasted with the cartilage bones. The ossification of membrane bones, as is well known, goes on directly, and can be therefore more rapid. The ossification of cartilage bones follows only after the destruction of the cartilage, and must be accordingly a slower process. It is probable that, during the evolution of vertebrates, the speed of embryonic development was gradually increasing. The development of higher forms of recent vertebrates is more rapid than that of the lower ones. The laborious way of building a cartilage skeleton for the needs of the developing embryo[2] and afterwards destroying it during the ossification is made easier if the bones are formed outside the embryonal cartilage skeleton, in the neighbouring connective tissue.

It is therefore suggested that the replacement of the cartilage by bone in the process of enchondral ossification is of value on a lower evolutionary level, when the embryonic development is relatively slow. As a consequence of the hastening of the development, direct ossification proved to be more effective, and therefore membrane bones tend to suppress gradually the cartilage bones, especially in the cranial region, where the rapid growth necessitates great changes in the shape of the skeletal elements. In the long bones, where growth is essentially linear, the enchondral ossification is retained.

H. Szarski

Department of Comparative Anatomy
and Embryology,
Copernicus University,
Toruń.
Aug. 7.

[1] "Genetics, Paleontology, and Evolution", 45 (edit. G. L. Jepsen, E. Mayr and G. G. Simpson; Princeton Univ. Press, Princeton, 1949).
[2] Romer, A. S., *Amer. Natur.*, **76**, 394 (1942).

Thermochemical Efficiency of Growth

The term 'gross efficiency of growth' has usually been meant to denote the ratio of the increase in body-weight during a given period of time to the amount of food ingested during this period. It had been shown previously[1], using the albino rat as the experimental animal, that the gross efficiency of growth can be fitted quite satisfactorily to a logarithmic function, the actual efficiency E_t at time t being represented by