Recently I have made a re-examination of the British Museum, Geological Survey, and Royal Scottish Museum specimens of this fish, and made sections of the scales of specimens in the Leeds City Museum. While confirming Traquair in all the above mentioned facts, I have been able to add the following information. The microscopic structure of the scales is of the type characteristic of Palæoniscids, as described by Goodrich³, consisting of a layer of cosmin between a layer of ganoine and a layer of bone, and the whole scale having grown by additions of concentric layers of ganoine on the outer and bone on the inner surface. The internal skeleton of the lobed pectoral fin is easily discernible owing to the absence of scales, and consists of five radials arranged in the form of a fan, thus is more characteristic of actinopterygians than crossopterygians. The radials of the continuous fins arise between the ends of the neural and hæmal spines, and do not articulate with them as in Crossopterygii and Dipnoi. The bones of the head show a maxilla with a narrow anterior end and an expanded posterior portion characteristic of palæoniscids. There is no pineal foramen visible, and the opercular bones, although imperfect, show outlines which are quite consistent with those of other palæoniscids. The general ornamentation of the maxilla, mandible, and frontals is also very suggestive of this group. The lepidotrichia do not branch, in this resembling *Holurus*, a palæoniscid in which also the dorsal fin has a much elongated base. There can, therefore, be very little doubt that *Tarrasius* is merely a palæoniscid which has become eel-like in form.

These new facts concerning *Tarrasius* throw considerable light on the phylogenetic position of *Polypterus*. Goodrich⁴ has shown that *Polypterus* has many characters in common with palæoniscids. The occurrence of an indubitable palæoniscid (*Tarrasius*) with a lobed pectoral fin, no fulcral scales, a continuous median fin, and a diphyccercal tail, on which the scales do not suddenly alter their direction, removes most of the discrepancies between *Polypterus* and this group, and confirms Prof. Goodrich's views on its systematic position. *Polypterus* is a specialised palæoniscid, which has survived to the present day.

A full account of the anatomy and affinities of *Tarrasius* will be published elsewhere.

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¹ *Trans. Roy. Soc. Edin.*, 1881. *Ann. Mag. Nat. Hist.*, 1890.

² "Handbuch der Palæontologie", 1887.

³ *Proc. Zool. Soc.*, 1908.

⁴ *Palæobiologica*, 1928.

Growth in Muscle

In the growth of the eye muscles of plaice, I have made an observation which may concern the general problem of muscular development. When transverse sections were taken of the head of a young plaice 4 cm. long, its internal rectus was seen to consist of 42 distinct fibres. Similar sections were taken of plaice of lengths increasing up to 10 cm. and it was found that up to 8 cm. the muscle grows in stoutness by the thickening of the fibres—a fibre in the internal rectus of a 8 cm. plaice being twice as thick as the

fibre of a 4 cm. fish: the number of the fibres in the muscle showed practically no increase. But a section through a plaice 10 cm. long revealed a sudden proliferation in the number of fibres so that about 342 could now be counted. Here is evidence therefore that the muscle fibres, originally formed from the embryonic cells of the mesoderm, do not keep to a constant number all through life, and that a muscle grows not only by a thickening of the component fibres as happens in the early stages of plaice, but also by a multiplication of them as happens later.

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The International Phenological Journal, *Acta Phænologica*

In the middle 'twenties, three letters on behalf of the Phenological Committee of the Royal Meteorological Society appeared in *NATURE*, in which was urged the great importance, not least for agriculture, of more systematic correlation between the workers in different countries.

In the last of these letters¹ we were able to report an unexpectedly large and sympathetic response, revealing the existence of fully 3,000 stations in ten European countries, the United States and elsewhere, not a few in the south temperate zone, besides isolated observers working independently. Moreover, agricultural authorities in all directions were awakening to the importance of the subject, yet each developing its own schemes. Hence, from more than one authority the necessity for an international phenological journal was urged, thus also preparing the way for an international congress.

The response of the Dutch Phenological Society under its then president, Dr. H. Bos, was particularly practical. Its position relative to two other well-organised networks, Belgium under Prof. Vanderlinden, and Germany with adjacent areas under the veteran worker, Dr. E. Ihne of Darmstadt, accentuated the disadvantages arising from lack of co-ordination. Its own organisation, under the guidance of Dr. Bos and now of Dr. Pinkhof, is exceptionally complete. From them, invitations were broadcast to phenologists in all countries, inviting their co-operation in such a journal. Wide-spread approval was expressed and accordingly, *Acta Phænologica* came into being in July 1931, with six issues yearly. These form a volume with a total of 175 to 200 pages, large octavo. Contributions are accepted in either French, German or English. Its success has been marked save in one fundamental respect; so far, the number of subscriptions falls far short of actual cost, for its appearance coincided with the world-wide 'slump'. No start, indeed, would have been possible had it not been for the whole-hearted co-operation of the Hague publishing firm, Martinus Nijhoff. Recognising the importance of the venture, this firm guaranteed, financially, its appearance for the first three years.

Failure to establish the journal financially is a misfortune, which may mean indefinite postponement of phenological unification, upon which more than anything else will depend preparation of the ground for establishing the universal bond which would result from an international phenological congress.