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## I. Wissenschaftliche Mittheilungen.

### 1. The terms of Auxology.

By S. S. Buckman, F.G.S. and F. A. Bather, M.A., F.G.S., London.

(Schluß.)

Etymological Remarks on the above table.

1) Embryonic. The term »Embryologic« means »connected with the study of the embryo«. Hyatt, however, did not wish to say »A stage connected with the study of the embryo«, but »A stage connected with the embryo«; otherwise »Embryonic stage«, a phrase well understood and in ordinary use.

2) Brepnic. The first term used by Hyatt for this stage, was »Silphologic«, which, besides being open to the same objection as »Embryologic«, was apparently derived from a word that meant either a cockroach or a bookworm, neither of which have any obvious connection with the subject. It was in a footnote to Mr. Jackson's paper of 1888, quoted above, that Hyatt substituted the term »Nepionic«. Were this a Greek word we should be glad to retain it; it is, however, only an impossible corruption of  $\nu\acute{\eta}\pi\iota\omicron\varsigma$ , made still worse by the spelling »naepionic« which Hyatt and Beecher now affect. As there is no other word connected with  $\nu\acute{\eta}\pi\iota\omicron\varsigma$  that can be readily anglicised, we have adopted the word  $\beta\rho\epsilon\upsilon\tau\iota\kappa\omicron\varsigma$ , derived from  $\beta\rho\acute{\epsilon}\varphi\omicron\varsigma$ , the unborn or new-born young of men or other animals.

3) Neanic. Hyatt's term »Neologic« is said to be derived from  $\nu\epsilon\alpha\lambda\acute{\eta}\varsigma$  and  $\lambda\acute{o}\gamma\omicron\varsigma$ . If such a compound were possible it would be »Neologic«; but, as before, the latter half is superfluous.  $\text{N}\epsilon\alpha\upsilon\iota\kappa\omicron\varsigma$  springs

from the same root, and, being congruous with the other terms, is the obvious word to employ.

4) Epehelic. The word »Epehelic« has greatly puzzled us. We can only explain it as a corruption of »Epehologic«, but the »logic« is unnecessary, while the word ἐφηβικός, the adjective of ἔφηβος, gives the exact term required.

5) Gerontic. The word »Geratologic« is stated by its author to be derived from γέρας; this, however, instead of denoting »old age«, means »a gift of honour«. There is a word γῆρας, with a genitive γήρατος used by very late authors, it is true; but even so there remains the unnecessary »-logic«. The proper word to use is clearly γεροντικός.

5a) Catabatic. »Clinology« can only mean the Science of Bed-making, so »Clinologic« cannot be used in the sense attributed to it by Hyatt. Καταβατικός which we have chosen to replace it, means literally »affording an easy descent«, and is the best word not already occupied that we can find. It should at least be readily understood.

5b) Hypostrophic. »Nostologic« is open to the same objection as »Embryologic«. The word we suggest, derived from ὑποστροφή, a recurrence or relapse, seems to convey the exact meaning with greater clearness.

#### Definitions of the terms.

It is only possible to define these stages in a very general way, for their characteristics vary greatly in the different classes of animals. It is moreover impossible to draw any hard and fast line between the successive stages, except in rare instances. The following definitions are generalized from the evidence of those groups to which the principles of auxology have already been applied.

1) Embryonic. This stage includes all individual history from the ovum up to the time when the organism can be referred definitely to its class. This stage has been sub-divided by the American authors into Protembryo, Mesembryo, Metembryo, Neoembryo, Typembryo and Phylembryo.

2) Brepheic stage immediately succeeds the Embryonic, and during it no specific characters can be distinguished.

3) Neanic. During this stage specific characters and all other morphological features present in the adult, appear and undergo development.

4) Epehelic stage denotes the period of full development of the individual, when all specific characters are clearly recognisable.

5) Gerontic. During this stage changes take place which are due to gradual failure of powers. The stage may be sub-divided into:

a. Catabatic stage, in which the individual loses its ephebic characters.

b. Hypostrophic stage, in which the continued loss of characters causes pronounced reversion.

#### Examples and Remarks.

It may be noted that in an individual of a progressive series Gerontic changes are truly reversionary, the decline due to diminishing vitality in the Catabatic stage causing a certain degree of reversion to the characters of the Neanic stage. In an individual of a retrogressive series, however, in which the characters of the Ephebic stage are less elaborate in development than those of the Neanic, or even Brephic stages, the Gerontic stages shew simply characters of a still further decline. In some extreme cases, however, the Hypostrophic stage of an individual of a retrogressive series may possess characters of, apparently, a renewed progressive development; from which it would seem that when reversion has completed the cycle of changes, further reversion may produce characters belonging to a recommencement of the cycle.

In applying the definitions of the Brephic and Neanic stages, it should be remembered that specific characters sometimes make their appearance in ontogeny before generic. The period at which any character appears depends largely on the length of time for which it has been a character of the race. In many cases, characters that are regarded as specific have a higher antiquity than those that are regarded as generic.

It may also be pointed out that the physiological episodes of birth and puberty have no definite relation to particular stages in the above scheme, though they may accelerate or retard purely morphological characters.

As a simple example of the ontogenetic stages, we may take the Ammonite now known as *Deroceras ziphus*, of which some good figures were given by Wright under the name of *Aegoceras Duddressieri*. Confining our attention to the surface characters, we see, following on the Embryonic protoconch, these stages:

{ Brephic, Neanic, Ephebic, Gerontic }  
 { Smooth, Costate, Spinous, Costate } . This Gerontic stage is clearly Catabatic with reversion to Neanic characters. It does not happen, in this species, to be succeeded by a Hypostrophic stage; but it is shown by closely allied species that the costate surface would be succeeded by a smooth one, that is to say, a reversion to the Brephic stage so far as this character is concerned.

On the other hand in *Coroniceras trigonatum*, Hyatt<sup>7</sup>, which is an individual of a retrogressive evolutionary series, the following auxologic changes may be noted:

{ Brepheic, Neanic, Ephebic, Gerontic }  
 { Spinous, Costate, Costate, Smooth }. Here also the Gerontic stage is Catabatic; but it is a reversion to a stage of phylogenetic development omitted from the ontogeny on account of earlier inheritance. The same applies to the ornamentation of both the Neanic and Ephebic stages.

#### Phylogenetic stages.

It must be kept in mind that the terms hitherto considered denote stages in the growth of an individual. They or their predecessors have, however, often been applied, even by Hyatt himself, to stages in the history of a race. Beecher, though he points out the difference in clear enough language (op. cit. II, p. 148), nevertheless speaks of *Gwynia* and *Cistella* as Nostologic (= Hypostrophic) types of Terebratuloids; by which he means that in their Ephebic stage they resemble the earlier stages in the history of the group, or the Brepheic stages in the ontogeny of such a form as *Terebratulina*. This use of the same words for two very distinct ideas leads either to confusion of thought, or to the employment of cumbrous qualifying phrases. We therefore suggest that, when it is desired to express stages of phylogeny, the syllable *phyl-* should be prefixed to the above terms, as shown in the annexed table. In this table we also give, in the first column, the physiological terms employed by Hæckel for Growth, Perfection, and Decline in Ontogeny; and, in the last column, the terms used by the same writer to denote corresponding periods in Phylogeny. It should be noted that these latter terms are not Morphological, but have reference chiefly to number of species and individuals, and partly also to size and predominance. They have of late been used, it seems to us wrongly, in a morphological sense, especially by American writers, probably for want of the very terms we now propose. Beecher, for instance, in his most interesting essay on the development of *Bilobites* (= *Orthis biloba* and allies), speaks of certain forms as Epacmic and others as Paracmic, when it would probably be more in accordance with his meaning to call them *Phylobrepheic* and *Phylogerontic*. Thus also we should say that the *Productidae* attained their *Paracme* in the Permian, when they were represented by the *Phylogerontic Strophalosia* and *Aulosteges*; that the characters of the *Neanic* and *Ephebic* stages of *Coroniceras*

<sup>7</sup> Genesis of Arietidae. Pl. VI fig. 3. Pl. VII fig. 1. p. 182.

trigonatum are Phylocatabatic; or, to give one more instance, that the Ephebic *Cistella* and *Baculites* are Phylhypostrophic.

Ontogeny.		Phylogeny.			
Anaplasia	{	Embryonic	Phylembryonic	}	Epacme
		Brephic	Phylobrephic		
		Neanic	Phyloneanic		
Metaplasia	Ephebic	Phylephebic . . . .	Acme		
Cataplasia	{	Gerontic	Phylogerontic	}	Paracme
		Catabatic	Phylocatabatic		
		Hypostrophic	Phylhypostrophic		

The use of the term Phylembryonic does not really clash with Jackson's term Phylembryo; for the Phylembryo of the individual represents the Phylembryonic stage of the race: the essential morphological features of the two are the same.

#### Stages of individual Morphogenesis.

Yet another caution as to the use of the above terms seems required. As already pointed out, the various characters that go to the formation of an individual or a race, at any one period of its development, may themselves differ greatly from one another in the degree of their own development. It is possible to trace the evolution of one character, from its first appearance to its final loss, right through the history of a long line of individuals. For the designation of the successive stages in the history of a character, the ontogenetic terms might be used, with the addition of the prefix morpho-, e. g. Morphobrephic, Morphophebic.

#### Auxology.

It does not seem to us that any apology is needed for the title of our paper. Growth and change do not stop when the embryonic stage has been passed, nor is the study of later stages of less importance than that of the earlier. It is indeed possible that the application of these principles to some of the problems of Anthropology and Sociology might prove of practical utility. To predict the future, as the study of gerontic characters enables one to do, is neither less fascinating nor less valuable than the embryologist's decipherment of the past. And yet, while a part of this science has its special name, its textbooks, and its professors, the whole science, through being unchristened, is in danger of also being unrecognised. In proposing for it the name »Auxology«, we fulfil a want that may not indeed have long been felt, but that would otherwise have been felt more and more

with the progress of years and knowledge. We hope that, in discussing the terms of this science, we have said nothing to offend those who have been most active in laying its foundations.

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## 2. Biologische Notiz.

Von Dr. Franz von Wagner, Privatdocenten in Straßburg.

(Mit 2 Textfiguren.)

eingeg. 22. September 1892.

Im Mai des vorigen Jahres fand mein Freund, Herr H. Friese, im Rabensteiner Holze bei Schwerin in Mecklenburg ein Exemplar einer Fliegenart, dessen Extremitäten vier Individuen einer *Pseudoscorpionidenspecies* trugen. Wenngleich derartige Beobachtungen wohl schon öfter gemacht worden sind<sup>1</sup>, dürfte es vielleicht doch nicht ohne jedes Interesse sein, das hier gegebene biologische Vorkommnis kurz zu schildern.

Das Wesentliche — Ort und Art der Befestigung des Spinnenthieres an der Fliege — ist in den zwei beifolgenden, von Herrn Universitätszeichner C. Scharfenberger nach der Natur nur wenig vergrößert hergestellten Abbildungen wiedergegeben.

Was nun zunächst die Fliege als den Träger der Afterscorpione betrifft, so handelt es sich um eine unserer größeren Formen aus dieser Insectenordnung, die *Ctenophora pectinicornis* L., eine Tipulide<sup>2</sup>. Nach den mündlichen Angaben Friese's findet sich dieselbe an der oben angegebenen Localität nicht gerade selten; insbesondere trifft man sie oft zu mehreren Exemplaren, wohl um ihre Eier abzulegen, an aufgesetztem Klafterholz. Ihre Entwicklung macht diese Fliege in morschem Buchenholze durch. Daß nur ein Individuum mit den gleich näher zu bezeichnenden Pseudoparasiten behaftet war, deutet jedenfalls darauf hin, daß wir es hier mit einem nicht eben häufigen Vorkommen zu thun haben.

Der *Pseudoscorpionide* erwies sich als eine augenlose Form, welche zur Gattung *Chernes* gehört; leider konnte Mangels der einschlägigen Litteratur die Species nicht mit Sicherheit bestimmt werden, wahrscheinlich liegt indes *Chernes Halmii* C. L. Koch (= *Ch. cimicoides*

<sup>1</sup> So schreibt Ludwig in Leunis' Synopsis der Thierkunde (2. Bd. p. 569) von den Afterscorpionen: ». . . mitunter trifft man sie, wie schmarotzend, auf dem Körper von Fliegen, Ohrwürmern, Wanzen, Afterspinnen etc. an.« — Nähere Angaben konnte ich in der Litteratur, so weit sie mir zugänglich ist, nicht auffinden.

<sup>2</sup> Vgl. die Charakteristik dieser Art in Schiner, Fauna austriaca. 1864. 2. Bd. p. 500.

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