Geology. — *Preliminary note on the occurrence of a new ammonoid fauna of Permian age on the island of Timor.* By F. A. H. W. DE MAREZ OYENS. (Communicated by Prof. H. A. BROUWER.)

(Communicated at the meeting of November 26, 1938.)

During Prof. BROUWER's expedition to the Lesser Sunda islands in 1937, the writer had the opportunity to visit the various localities of Permian fossils in the neighbourhood of the village Basleo on the island of Timor.

It is a known fact that the Paleozoic rocks in the vicinity of Basleo contain the richest layers of marin Permian evertebrates of the world (Lit. 13, p. 539). The localities consist for the greater part of isolated occurrences of limestones, tuffaceous rocks, marls and conglomerates, separated from each other in some cases by Permian basic eruptive rocks, but more generally folded together in a varied series of Mesozoic and Old-Tertiary (Eocene) sediments, whilst also a large amount of bigger and smaller faults is responsible for the separated occurrence of the individual localities.

In the field it has been impossible so far to make a stratigraphical sequence of the individual layers, in the first place on account of their isolated occurrence above mentioned, but also because the larger localities (for instance the locality Toenioen Eno, being locality n^0. 25 of WANNER's sketch [Lit. 13, pp. 544—545]) yield their fossiliferous material exclusively from a thick crust of weathered soil.

It is therefore very lucky that the common occurrence of ammonoids, these important fossils for local and interregional correlations — in the Basleo district occurring with an enormous quantity of corals, echinoderms, brachiopods, pelecypods, gastropods, etc., in most of the localities (exception made for the conglomerates) — enable us to compare the different localities as to their stratigraphical position. HANIEL (Lit. 1) and WANNER (Lit. 13) have paid due attention to this fact: the former surmising the occurrence of two different horizons between the Basleo localities, the latter coming to the conclusion that all of the Basleo ammonoids were of the same age. Both authors were right: HANIEL's collections, as well as JONKER's, (which were described by SMITH [Lit. 7]), came for the majority from material purchased from natives, whereas WANNER's study was founded on material collected personally by EHRAT from specifically mentioned localities, all of which proved to be of the same age. But it happened during the writers visit to these localities that natives offered him for purchase a collection of fossils, which at first sight were thought to originate from the much older horizon of the locality Bitaoeni, situated at some 40 km distance from Basleo. They proved

however to be from two new neighbouring localities at about 5 km to the N.E. of Basleo on the left slope of the upper course of the creek Aintenoe, a right tributary of the river Boenoe, which in its turn is a right tributary of the river Benain. The rock from which the fossils weather is a violet-brown tuffaceous marl, very like the rock of some of the layers of the Bitaoeni horizon.

The ammonoids of these two localities, Tae Wei [1]) and Tae Lina, of which the first mentioned proved to be the most prolific, are particularly interesting on account of their stratigraphical position between the horizons of Bitaoeni and Basleo.

A preliminary survey of this ammonoid fauna (crinoids, brachiopods and corals being the principal other components) has given the following 23 species:

1. *Daraelites submeeki* HAN.
2. *Parapronorites* cf. *timorensis* HAN.
3. *Propinacoceras* spec. det. aff. *P. affine* GEMM.
4. *Artinskia simile* (HAN.)
5. *Medlicottia* spec. det. aff. *M. orbignyana* VERN.
6. *Sicanites* spec. det. aff. *S. mojsisovicsi* GEMM.
7. *Rhiphaeites* spec. det. n^0. 1
8. *Rhiphaeites* spec. det. n^0. 2
9. *Metalegoceras ?sundaicum* (HAN.)
10. *Agathiceras brouweri* SMITH
11. *Agathiceras* cf. *martini* HAN.
12. *Agathiceras* cf. *sundaicum* HAN.
13. *Adrianites cancellatus* (HAN.)
14. *Adrianites* cf. *oyensi* (HAN.) (*?Crimites* TOUM. 1937)
15. *Epadrianites involutus* SCHINDEW. 1931
16. *Marathonites dieneri* SMITH
17. *Stacheoceras arthaberi* SMITH (s. SCHINDEW. 1931)
18. *Stacheoceras* spec. det.
19. *Popanoceras* cf. *indo-australicum* HAN. (*?Gemmellaroceras* TOUM. 1937)
20. *Popanoceras* spec. det.
21. *Waagenoceras* spec. det. (non *Hanieloceras* MILLER 1933)
22. *Hyattoceras* spec. det.
23. *Adrianitidae* (?) gen. nov. et spec. nov. det.

This assemblage has strong affinities to the fauna of Bitaoeni: not less than 13 out of 23 listed species are conspecific with, or at least very nearly related to, forms of Bitaoeni. These are the species 1, 2, 4, 5, 9, 10, 11, 12, 13, 14, 16, 17 and 19. Four or five however of these species (nos 4, 10?, 11, 13 and 17) are apparently long lived, they having been also listed from

[1]) Tae means hill.

Basleo and/or Amarassi. Species 15 is the only one that has been found in Basleo and Amarassi, without also occurring in Bitaoeni.

From the commonest forms of Bitaoeni the genus *Pronorites* is missing, as are *Vidrioceras timorense* (HAN.) (= *Popanoceras timorense* forma α HAN.) and *Vidrioceras wanneri* SCHINDEWOLF 1931 (= *Popanoceras tridens* forma α HANIEL), whilst *Metalegoceras ? sundaicum* (HAN.) has been found only in one scanty fragment and *Agathiceras* cf. *sundaicum* HAN. only in one specimen.

Very suggestive is the occurrence of the genus *Waagenoceras* in a primitive form, which is very distinct from the *Hanieloceras* (MILLER 1933) forms from Basleo and Amarassi, but which shows affinity (in the number of lobal elements) to the Sicilian *Waagenoceras*. The same interest must be accorded to the very primitive *Hyattoceras*, which probably shall have to be attributed to a new genus *Prohyattoceras*, which has an undivided first lateral saddle as its most prominent characteristic.

Further interesting forms are: *Sicanites* sp. which can hardly be distinguished from *S. mojsisovicsi* GEMM.; *Rhiphaeites* (RUZENCEV 1933) sp. with Sicilian affinities; *Agathiceras brouweri* SMITH, being the most common form of the Tae Wei horizon. This species has formerly been listed in a restricted number of specimens both from Bitaoeni and from Basleo, but neither EHRAT nor the writer who have personally searched the actual Basleo localities, have encountered *Agathiceras brouweri* SMITH; whereas specimens in hand of the writer from former acquisitions (purchased from natives in the years 1933 and 1934 and sent to the Amsterdam Geological Institute) show the utmost lithological probability of being from Tae Wei.

Trying to coordinate the Tae Wei formation with the Permian systems of other countries it has first to be noted that TOUMANSKAJA (Lit. 10, 11) by reason of her studies of the Crimean deposits, comes to the conclusion that there must be a gap between the Bitaoeni and Basleo formations, in which gap she places her Martian horizon and the major part of the Sosio beds, only the lower part of the Roccapalumba beds being incorporated with part of the Burnian and Bitaoeni horizons.

From the enumeration of the species of Tae Wei given above it can be concluded, 1°. that the ammonoid fauna has a strong affinity to the fauna of Bitaoeni, but that on the other hand obviously younger elements are mixed with it; 2°. that these younger elements do not reach the Basleo stage of development: *Waagenoceras* having not yet reached the *Hanieloceras* stage; *Hyattoceras* (or perhaps *Prohyattoceras*) being more primitive than *Hyattoceras subgeinitzi* HANIEL (this latter species being listed from Amarassi and from Basleo; whereas *„Hyattoceras" waageni* SMITH from Bitaoeni has proved to be a *Perrinites* [Lit. 4, p. 306 and 312]); *Neostacheoceras*, an abundant form of Basleo is missing from Tae Wei; 3°. that the only form conspecific with a Basleo species, that

does not occur also in Bitaoeni is *Epadrianites involutus* SCHIND.; 4°. that marked affinities can be established to Sicilian forms: the genera *Daraelites*, *Parapronorites*, *Popanoceras*, *Propinacoceras*, *Sicanites*, and perhaps *Waagenoceras* having yielded species closely related to Sicilian forms.

Recapitulating, it can be said that the ammonoid fauna of Tae Wei is intermediate between the faunas of Bitaoeni and of Basleo, presumably however nearer connected with the former and consequently not filling completely the existing hiatus between the two faunas, but leaving another gap between the formations of Tae Wei and of Basleo.

Taking into consideration the close relation existing between several Tae Wei forms and certain Sosio elements and consequently between Tae Wei and the Crimean faunas, the following tentative zonal correlation table might prove correct:

<table>
<tr><th>Timor</th><th>Crimea</th><th>Pamir</th><th>Sicily</th><th>W. Texas</th></tr>
<tr><td>Basleo + Amarassi</td><td></td><td rowspan="4"></td><td></td><td></td></tr>
<tr><td rowspan="3">TAE WEI</td><td rowspan="3">Marta</td><td rowspan="2">Rupe Paso + Pietro di Salomone</td><td>Upper Word</td></tr>
<tr><td rowspan="2">Roccapalumba</td><td>Lower Word</td></tr>
<tr><td>Bitaoeni</td><td>Burnu</td><td>Kubergandy</td><td>Leonard + Hess</td></tr>
<tr><td></td><td></td><td>Bouz-téré</td><td></td><td></td></tr>
<tr><td>Somohole</td><td>Soraman</td><td></td><td></td><td>Wolfcamp</td></tr>
</table>

For the correlation with the Urals reference be made to MILLER's latest publication (Lit. 3).

Geological Institute.

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Anatomy. — *Ueber das Verhältnis der Oberfläche des Frontalhirns zu derjenigen des ganzen Gehirnes bei höheren Affen und Menschen.* Von R. BRUMMELKAMP. (Communicated by Prof. C. U. ARIËNS KAPPERS.)

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Schon eine vorläufige Betrachtung der Gehirne von Anthropomorphen und Menschen zeigt eine sehr grosse Uebereinstimmung dieser Organe in deren allgemeinen Struktur. Nicht nur in der Anordnung der Felderung, sondern auch in den relativen Ausdehnungsverhältnissen der einzelen Territorien gibt sich eine grosse Aehnlichkeit kund.

Von altersher war die Frage wichtig, inwieweit das Frontalhirn einer elektiven Grössenzunahme in der phylogenetischen Reihe unterworfen war. Dass eine solche Zunahme stattgefunden hat, ergibt sich, wenn man weit auseinander liegende Ordnungen der Säugetiere, wie z.B. Ungulaten, Carnivoren, Lemuriden und höhere Affen vergleicht. Ob dies aber innerhalb einer Gruppe von nahen verwandten Arten auch der Fall ist, ist noch eine offene Frage und wird unten näher untersucht werden. Verschiedene Hirnanatomen haben sich besonders bemüht, zu zeigen, dass z.B. in der Familie der Anthropomorphen ein progressives Wachstum des Frontalhirns, in relativer wie absoluter Hinsicht stattfindet. Man glaubte aus dem relativ hohen Mass beim Menschen seinen intellektuellen Adel, kurz seine hervorragende Stellung im Tierreich ablesen zu können.

Da das Gehirn, im besonderen das Vorderhirn, ein Oberflächenorgan ist, dessen bedeutsamste Elemente in den äusseren Schichten liegen, leuchtet es ein, dass bei einer Beurteilung der absoluten und relativen Grösse seiner einzelnen Teile an erster Stelle die Oberflächenbestimmung beachtet werden muss, bei welcher Bestimmung es gilt, ebensogut auf die Furchen wie auf die Windungen zu achten. Zur Erreichung dieses Zieles hat man verschiedene Methoden erdacht, welche teils nur noch historischen Wert haben (BAILLARGER, CALORI), teils noch nähere Betrachtung verdienen (WAGNER, JENSEN, HENNEBERG, BRODMANN, TRAMER, LEBOUCQ, u.a.). Die Methoden lassen sich in drei Gruppen verteilen: Bei der ersten Gruppe wird die Gehirnfläche zwecks Messung mit verschiedenen geeigneten Stoffen belegt, so z.B. mit *Goldblattpapier* (WAGNER), *Stanniol* (JENSEN), oder *Seidenpapier* (BRODMANN, HENNEBERG). Bei der zweiten Gruppe sucht man die Gehirnoberfläche mittels eines chemischen Niederschlages und nachfolgender Titrierung (LEBOUCQ) zu bestimmen. Bei der dritten Gruppe endlich wird die Oberfläche auf *kurvimetrischem* Wege (TRAMER, DAVISON, BRUMMELKAMP) bestimmt. Es scheint mir, dass die kurvimetrische Methode, welche unten noch