A SECOND SPECIES OF BIPLANISPIRA FROM THE EOCENE OF BORNEO

BY

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In 1928, when studying the genus Pellatispira[1]), I found some sections of the foraminifer described below in a limestone from S.E. Borneo (no. 1446 B. 414). The foraminifer resembles Pellatispira in many respects, but the distal part of the test shows a different structure, consisting of a double arrangement of median chambers on either side of an equatorial system of pores. Because the material was insufficient I put it aside. Some time afterwards a more intense study was made possible, as another limestone from S.E. Borneo (no. 1408 B. 404) was crowded with the same interesting species. It was, however, not before now that I had the opportunity of finishing this study and to publish the results. I now describe this foraminifer as *Biplanispira absurda.*

In the mean time I met with a foraminifer, which too possesses a single coil of median chambers in the central part of the test, but a double arrangement of median chambers on either side of an equatorial system of pores in the distal part of the test.

This foraminifer was described by me as a new genus *Heterospira*[2]). Shortly afterwards when I learned the name *Heterospira* had to be altered on reasons of homonomy I substituted the name *Biplanispira*[3]).

As the sections of this species, named *Biplanispira mirabilis,* showed no marginal cord, it is evident that I considered this genus as not related to *Pellatispira,* not even belonging to the family of *Camerinidae.*

However, only thinsections of a limestone could be studied by me. In such a material it is exceptional luck when a section cuts through the marginal cord provided that it really exists. (Thus in the material of Bipl. absurda described below only just one section clearly demonstrates the presence of a marginal cord, fig. 1 and 2).

Dr. TAN who, as he told me, had the privilege of studying free

[1]) J. H. F. UMBGROVE. Het Genus Pellatispira in het Indo-Pacifisch Gebied (Summary in English). Wetensch. Mededeelingen Nr. 10, Dienst van den Mijnbouw in Nederl. Indië 1928.

[2]) J. H. F. UMBGROVE. Heterospira, a new foraminiferal genus from the Tertiary of Borneo. Leidsche Geol. Mededeelingen Vol. 8, pag. 155—159, 1936.

[3]) J. H. F. UMBGROVE. A new name for the foraminiferal genus Heterospira. Ibidim, Vol. 8, p. 309, 1937.

prepared tests of *Biplanispira mirabilis*, could undoubtedly state a marginal cord and interseptal canals. TAN mentioned these facts in a footnote of a paper on *Lepidocyclina* [1]) as well as, very concisely, in another publication [2]). We may hope that TAN's preliminary notes will be followed by a more extensive communication accompanied by convincing illustrations. There is of course not the sligthest reason to doubt the statements of Dr. TAN's even now. So we must consider *Biplanispira* as a camerinid genus, closely related to *Pellatispira*. In that sense the definition of the genus *Biplanispira* has to be elaborated and enlarged as in done in § 3.

A related, though different species is *Biplanispira absurda* described below. This species may be at once distinguishged from *Bipl. mirabilis* by the extreme flatness of the test, the irregular shape and arrangement of the chambers in the peripheral part of the test (as will be described more fully below) and the strong development of a trabecular structure in the periphery.

Thus the often indeed absurd looking vertical sections of this species differ widely from those of *Bipl. mirabilis*, which have a much more regular and discoidal shape, which show a thick layer of calcareous material (pillars) on either side of the equatorial plane, whose chambers ar arranged in a more regular manner (in a vertical section appearing like a cluster of berries) and in which the trabecular structure is limited to a small part of the periphery.

It is worth mentioning that a specimen of *Bipl. mirabilis* has been met with in the material studied just now and which seems to be of undoubtedly Eocene age (see § 2). Moreover Miss IRENE CRESPIN wrote to tell me that she studied *Bipl. mirabilis* in limestones from the Mandated Territory of New Guinea, together with *Lacazina*. We hope that this interesting finding will be described and published by her in the near future.

In 1932 WHIPPLE described two new species of *Pellatispira* from Eua, Tonga. Although differing from *Biplanispira* these species show as well irregularities in the arrangement of the peripheral median chambers [3]).

Acknowledgements are due to Mr. A. C. DE JONGH, formerly director of the geological Survey in the East Indies, who lent me the material and to Dr. G. LESLIE WHIPPLE, who kindly compared some photographs of my material with the *Pellatispira* species described by him, now at the University of California. The writer is also indebted to Dr. P. KRUIZINGA at Delft, who kindly made the photographs.

2. Localities; age and facies of the rocks.

The description of *Biplanispira absurda* is based on thinsections of

[1]) TAN SIN HOK. Zur Kenntnis der Lepidocycliniden. Natuurk. Tijdschr. van Ned. Indië, Dl. XCVI, 1936, pag. 272, note 7.

[2]) TAN SIN HOK. Over verschillende paleontologische criteria voor de geleding van het Tertiair. De Ingenieur in Ned. Indië IV, 1936, pag. 177, note 5.

[3]) G. LESLIE WHIPPLE. Eocene Foraminifera from Eua, Tonga Islands, in: Bernice P. Bishop Museum Bulletin 96, 1932.

a greyish limestone, no. 1408 B. 404, collected by Ir. G. POTT in the Soengei (= river) Sangajam up the stream near the village („kampong") Sangajam (patok 31. O.) in Tanah Boemboe, S.E. Borneo.

From this locality the best and most abundant material was available.

In this limestone occur rather abundantly undamaged specimens as well as fragments of *Pellatispira inflata, Pellatispira rutteni, Pellatispira irregularis, Camerina, Operculina,* and *Operculinella,* a few specimens of *Pellatispira orbitoidea, Pellatispira crassicolumnata, Discocyclina, Linderina, Amphistegina, Textularia, Miliolides* and a single vertical section of *Biplanispira mirabilis.* Moreover fragments occur of *Echinodermata, Anthozoa, Bryozoa, Lamellibranchiata, Ostracoda, Lithothamnium, Corallina, Amphiroa* and *Halimeda.* I often saw specimens of *Biplanispira absurda* overgrown by *Lithothamnium.*

From these data the rock seems to be of an Eocene age. As to facies the organic remains point to sedimentation in a very shallow sea on or near reefs. No terrigenous material is present in this rock specimen.

Moreover few sections of *Biplanispira absurda* were studied in a limestone, no. 1446 B. 414, collected by Ir. G. POTT in a small river a little to the North of Sangajam (patok 28) Tanah Boemboe, S.E. Borneo. In this rock specimen the accompanying organisms are as follows. A large species of *Camerina,* many large specimens of *Discocyclina, Pellatispira irregularis, Pellatispira orbitoidea, Lithothamnium* and *Halimeda.*

According to the foraminifera just mentioned the age of this rock seems to be Eocene too.

3. Description.

Genus *Biplanispira* UMBGROVE 1937 (= *Heterospira* UMBGROVE 1936, non *Heterospira* KOKEN 1896).

Test flat, or inflated, discoidal or lenticular, almost bilaterally symmetrical, calcareous, perforate; the central part of the test showing a single layer of chambers which are spirally arranged, the peripheral part showing chambers arranged in two planes on either side of the equatorial plane.

The proloculum is followed by a single coil of non-overlapping chambers connected by a proximal foramen. Marginal cord present, running in a „crête spirale" which though it may be thin is conspicuous. Interseptal canals originate from the marginal cord. The lateral walls of the foraminifer are perforated by pores originating from the distal walls of the chambers. Moreover from the distal walls of the primary coil of chambers a great number of tubules proceed, running radially and bifurcating in the equatorial plane (equatorial pores). From these equatorial pores tubules branch off in lateral directions. Part of these lateral pores communicate with the surface of the test; partly they open in the distal chambers, which are arranged in two planes on either side of the equatorial plane.

The presence of a marginal cord proves this genus to belong to the family of *Camerinidae*. The structure of the central part of the test proves that it is closely allied to the genus *Pellatispira*.

Genotype: *Biplanispira mirabilis* UMBGROVE.

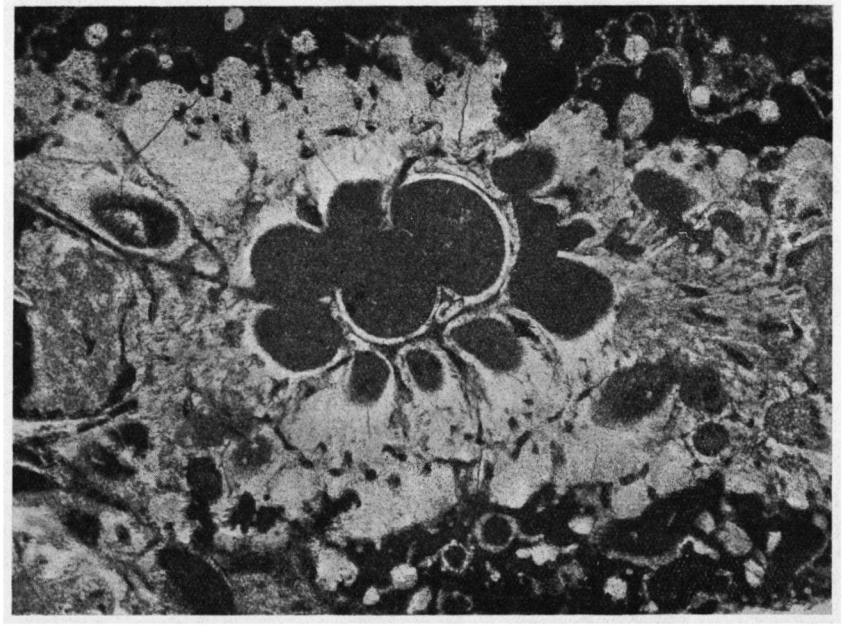
Biplanispira absurda species nova.

Fig. 1—17.

1928. *Pellatispira crassicolumnata* UMBGROVE, pro parte. Wetenschappelijke Mededeelingen no. 10. Dienst van den Mijnbouw in Nederl. Indië fig. 79 (? fig. 76 and fig. 80).

Fig. 2—17 are all of the same size and enlarged 14 ×; fig. 1 is a magnification up to 42 × of the same specimen as is shown by fig. 2.

Fig. 1, a nearly equatorial section illustrates the structure of the



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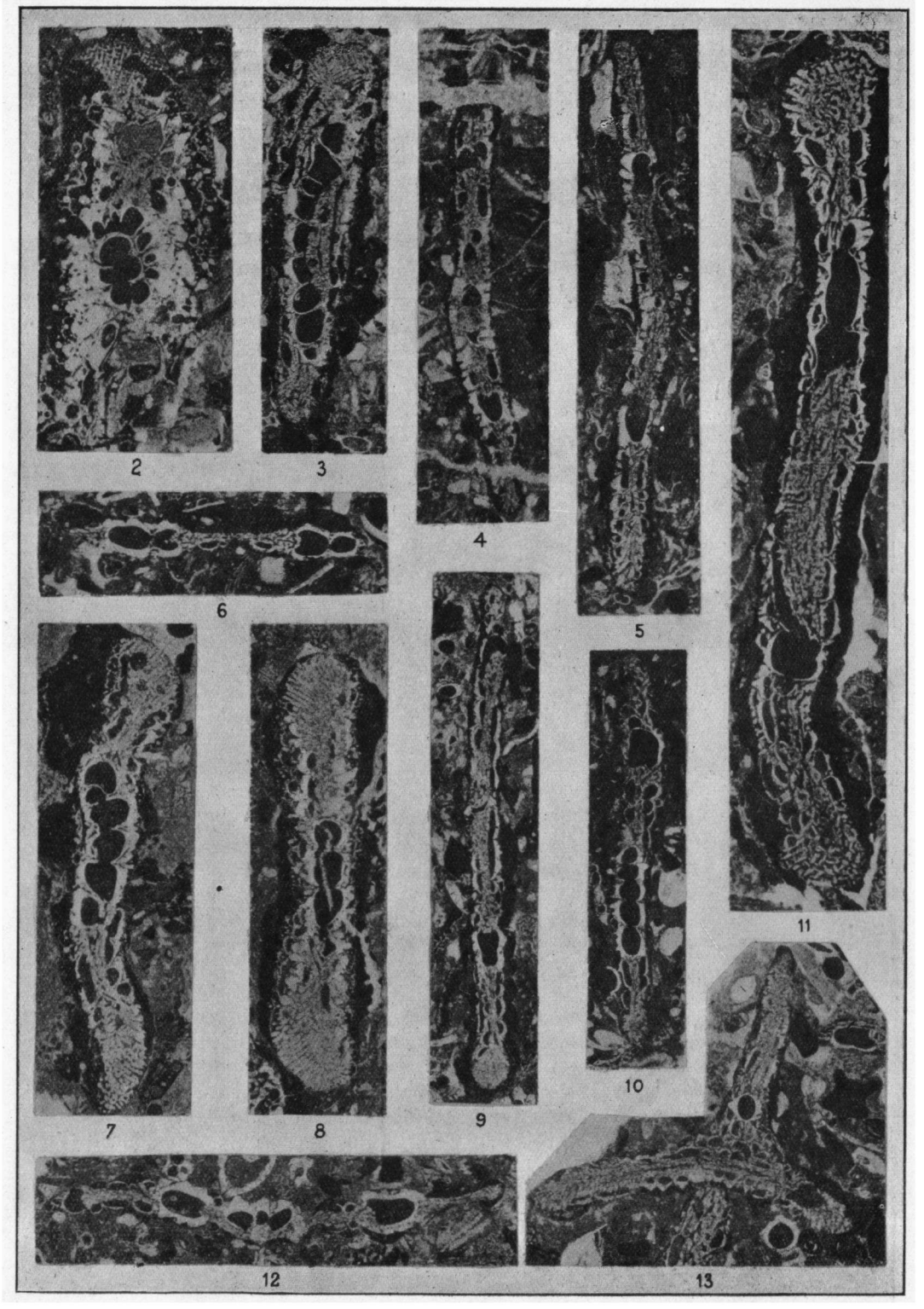
central part of this species. It shows the proloculum followed by eight normally developed chambers of the primary coil. Locally the section shows the proximal connection between the chambers. Moreover these foramina are clearly shown in fig. 3. The third chamber, in fig. 1, has a canalis externus of the same type as I described of *Pellatispira* (1928, fig. 11, 13, 14, 15). The ninth chamber in this specimen is an abnormally developed so called abortive one as is often seen in *Pellatispira* and other camerinid foraminifera. Following that abortive chamber seven more chambers of the primary coil may be noticed. This section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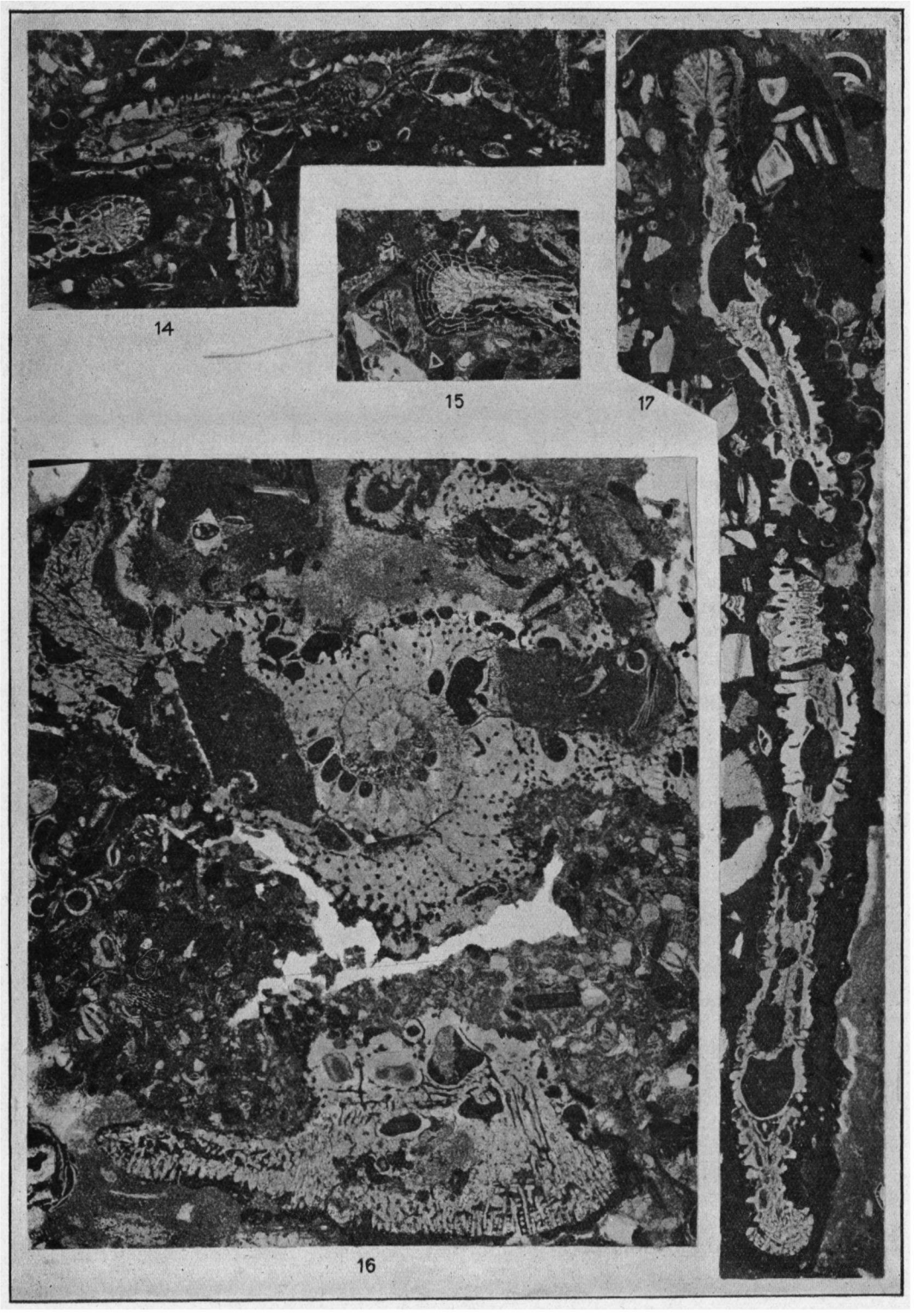

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demonstrates also in a convincing manner the existence of a marginal cord, which is such a valuable characteristic anatomically as well as systematically, and the interseptal canals emerging from it.

In this section only fragments of the peripheral part of the test have been preserved; especially from the „lower" half in fig. 2 part seems to have been broken off. Nevertheless fig. 2 shows a double arrangement of the chambers, a more distally situated big chamber and the trabecular structure in the periphery of the test. Moreover we see pores running from the primary coil and opening in some distal chambers. Lastly the occurrence of spines, merging from the external wall of the chambers, and the existence of surface chambers is proved by fig. 2.

It is evident, that a vertical section through the centre of such a test, will cut the primary coil as well as the distal part of the test with its more complicated structure. Such a radial and vertical section is presented by fig. 4, running exactly through the proloculum. Another specimen fig. 12 shows a radial but oblique section. Nearly radial but excentrical is the section of fig. 10, still running through the primary coil. On the other hand the section of fig. 5 is far off the centre and outside of the primary coil.

These sections demonstrate in an obvious way the remarkable fact that though a double arrangement of chambers occurs on either side of a median plane, the whole thickness of the test is locally taken up by one single chamber. Fig. 10 shows such a chamber on one side, fig. 4, 5 and 12 at both sides. Fig. 6 even shows two single chambers on either side of the centre in a very excentrical non-radial section. However, other sections show no single chambers at all outside the primary coil, as in fig. 7 and 8. Fig. 4, 9, 11 and 17 elucidate some connections between these distal single chambers and the chambers which occur in double arrangement.

From these data it is obvious that the structure of this foraminifer is very complicated and irregular. Moreover I met with some specimens of a very curious and irregular shape of growth, illustrated in fig. 13 and 14.

The test is of a much flattened lenticular shape. In megaspheric specimens the equatorial diameter is on an average about 5 m.m., being about 10—15 times the vertical diameter. Specimens of a much larger size, fig. 17 and fig. 11 possessing an equatorial diameter of 9 respectively 14 m.m. probably belong to microspheric specimens, though it can not be ascertained with certainty. The only nearly equatorial section through a probably microspheric specimen I met with, has a diameter of at least 10 m.m. (fig. 16).

The surface of the test is crowded with small thorn like projections merging from the external walls of the chambers. These projections are especially crowded on the distal parts of the test. Surface chambers are to be seen in several sections.

A study of the radial and equatorial sections leads to the supposition that the test was provided with a number of spines of a shape that may be compared to those of e.g. *Calcarina spengleri*. These spines as well

as the peripheral part of the test possess a fine trabecular structure (fig. 15).

Among his material of *Pellatispira hoffmeisteri,* WHIPPLE found specimens whose chambers towards the periphery appeared to be subdivided due to the irregular arrangement. From comparison of the description and the illustrations in the paper of Dr. WHIPPLE with *Biplanispira absurda* it appears that we have to deal with different species.

After finishing the study of *Biplanispira absurda* it does not seem improbable to me that a few sections of foraminifera, which I described formerly, in 1928, as *Pellatispira crassicolumnata,* belong to the present species. This applies especially to fig. 79, and in a lesser degree to fig. 76 and fig. 80. At the time no free prepared tests of *Pellatispira crassicolumnata* were available; as a representation of that species I now consider fig. 75; fig. 77 and fig. 78 (1928) in all probability also belong to that species.

Type locality of *Biplanispira absurda*: no. 1408 B. 404 Soengei Sangajam (patok 31.0) Tanah Boemboe, S.E. Borneo. Syntypes are 1°. in the Museum of the Geological Survey of the Netherlands East Indies at Bandoeng, Java, 2°. in the Museum of the Institute of Mining at Delft (the specimens figured), 3°. in the Geological Institute of the University of Leyden, 4°. in the Geological Institute of the University of Utrecht.