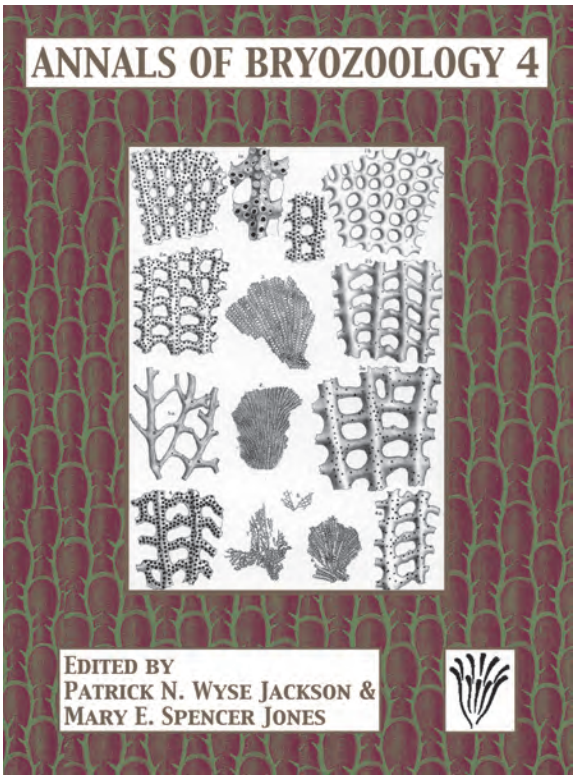

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Things we lost in the fire: the rediscovery of type material from Ehrhard Voigt's early publications (1923–1942) and the bryozoan collection of Hermann Brandes

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1. Introduction

Professor Ehrhard Voigt (1905–2004) is known to the bryozoan community as one of the most passionate and important researchers in the topic from the 20th century (Figure 1a). He published more than 130 papers on bryozoans during a span of more than 80 years, describing over 500 new species and subspecies, and establishing 79 genera, 4 families, and 2 subgenera. His main research field was the Central European fauna of the Upper Cretaceous and early Palaeogene, and he left behind the world's largest collection of bryozoans from this time span. This represents a unique archive documenting some highlights in the evolutionary history of bryozoans: the early expansion of various types of ascophorines and interior-walled cyclostomes, the increasing importance of encrusting taxa, and the evolutionary crisis at the Cretaceous-Paleogene-boundary, resulting in the final breakdown of the bryozoan-rich carbonate platform.

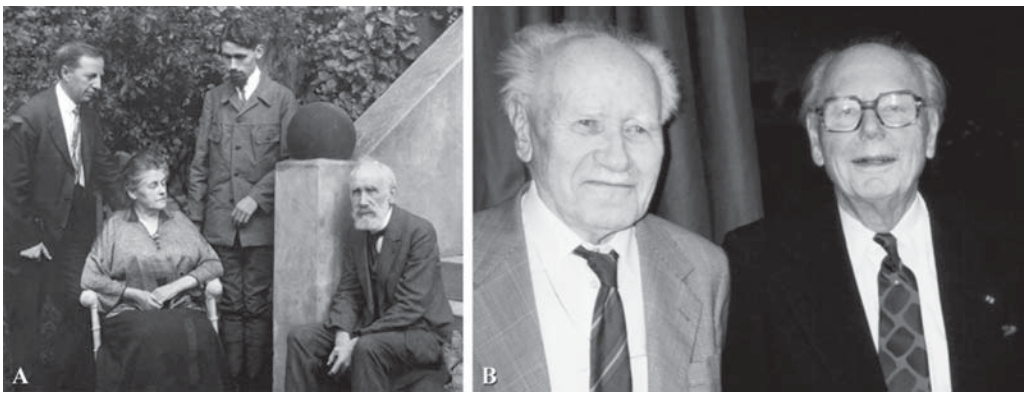


Figure 1. A. The young Ehrhard Voigt with Ray S. Bassler (left) and his parents in Dessau during a visit of Bassler at Voigt in 1928. Modified after Hillmer (2006). B. Two emeriti faculty members of the Institute of Geology and Palaeontology (University of Hamburg), Erhard Voigt and the paleobotanist Wolfgang Hartung (1907-1995), who died just a few months after this photograph being taken, in June 1994. Like Hartung, Voigt was active in academic teaching well beyond retirement age, and was teaching advanced courses of geological mapping. Courtesy of Joachim Scholz.

Hans Adolf Ehrhard Voigt was born on 27 July 1905 in the small town Schönebeck/Elbe. His parents, Mira Voigt, born Stadelmann (1860–1932) and Adolf Karl Voigt (1863–1932), a chemist, always encouraged their only child towards natural sciences. The young Ehrhard dedicated his interest to geology and palaeontology, and started collecting fossils; bryozoans becoming his special interest after he found many of them in flints in his parents' garden. As a teenager he had already built up a remarkable collection and established connections with many famous bryozoologists of that time. He corresponded regularly and exchanged material with Ray S. Bassler (1878–1961; Figure 1b), Ferdinand Canu (1863–1932), Edward O. Ulrich (1857–1944) and many others.

Voigt started working on several publications on bryozoans from his private collection during his schooldays in Dessau and continued publishing papers during his studies, conducted from 1924 onwards, at the universities of Halle, Munich and Greifswald. He received his Ph.D. in 1929 in Halle working on the lithogenesis of Upper Cretaceous sediments. Voigt stayed on at the University of Halle and worked as an assistant for Johannes Weigelt (1890–1948), helping with the excavations at the fossil site Geiseltal during the 1930s. In that time, he invented a method of lacquer peels. He completed his habilitation dissertation on Eocene fish from the Geiseltal in 1934.

In spring 1939 he joined the staff of the University of Hamburg. After serving in World War II, Voigt became the driving force behind the reconstruction of the *Geologische Staatsinstitut Hamburg* (State Department of Geology Hamburg, GSI) that had been destroyed in 1943. He retired from teaching in 1970, but continued working until his death and most of the publications on bryozoans appeared after his retirement. Ehrhard Voigt died on 22 November 2004 in a hospital in Hamburg following a fall that had caused a hip

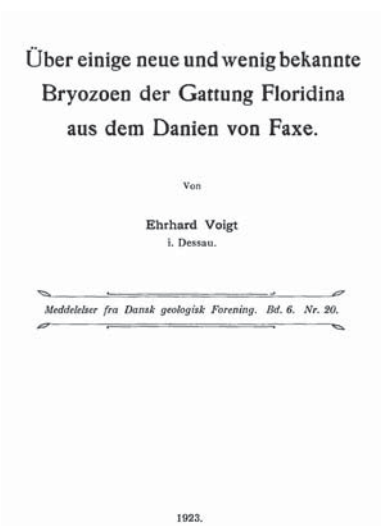
fracture three weeks earlier. Most parts of his enormous bryozoan collection were relocated in 2005 from Hamburg to Frankfurt. For more detailed biographies on Ehrhard Voigt, see Guha (2005) and Hillmer (2006).

2. Voigt's early publications on bryozoans (1923–1929)

Voigt's early publications on bryozoans can be subdivided into three creative phases: his schooldays comprising five publications in 1923–4, his student days (including his time as Ph.D. student) with eight publications between 1925 and 1930, and the post-student era with just three publications in 1932, 1939, and 1942. Until now it was thought that all of the material examined by Voigt in these works had been destroyed during World War II or lost but, as will be shown later, some material has been recovered.

Voigt's first publication appeared 1923 in the Danish journal *Meddelelser fra Dansk geologisk Forening* (Figure 2). He described five species of the genus *Floridina* Jullien, 1882 from the Danian of Herfølge and Faxe in Denmark, material he received from Bassler and J.P.J. Ravn (1866–1951), and compared it with his own material collected from the white chalk of Rügen and glacial drift deposits from northern Germany. The first new bryozoan species Voigt erected were *F. impar*, *F. trifolium* (put into synonymy with *Tornipora canui* (Brydone, 1906) by Jürgensen 1971), *F. tubulosa* and *F. variabilis* (put into synonymy with *F. pulchella* (Kade, 1852) by Berthelsen 1962).[1] It has to be mentioned that Voigt, like many other authors of that time, did not create holotypes for the new species erected in his pre-World War II publications.

In 1924 four descriptive taxonomic publications on Bryozoa appeared in three issues of the journal *Paläontologische Zeitschrift*. In Voigt (1924b), several cyclostome and cheilostome species he had found in glacial drift deposits of Danian age in his home region (area around Dessau) were described. His other three publications (1924a, c, d) are about material from the Subhercynian Cretaceous Basin and its surroundings in northern Germany. Voigt 1924a was a short description of one ctenostome species,[2] while Voigt 1924c, d is a two-part monograph on the Subhercynian fauna of the Upper Cretaceous. The first part is dedicated to the cyclostomes (Voigt 1924c) and the second part deals with the cheilostomes (Voigt 1924d). The entire monograph comprised 117 species, including 18 new cyclostomes and 28 new cheilostomes. Voigt studied for this monograph his own material, samples from the Brandes Collection in Hoheneggelsen, and loans from the *Preußische Geologische*


Über einige neue und wenig bekannte Bryozoen der Gattung Floridina aus dem Danien von Faxe.

Von

Ehrhard Voigt
i. Dessau.

Meddelelser fra Dansk geologisk Forening. Bd. 6. Nr. 20.

1923.

Figure 2. Cover of Voigt's first publication in 1923 on Floridina *from the Danian of Denmark and northern Germany.*

Landesanstalt (PGL; Prussian Geological State Survey) in Berlin. The monograph should originally have contained ten plates but in order to save on printing costs, Voigt was forced to reduce the number of plates to six, so he removed some images and reduced the magnification of the other images. Unfortunately, he could not include images of the newly described cyclostome species *Diastopora cava* in the final version of the monograph, because he received the material for the images too late.[3]

During his freshman year in Halle in 1924, Voigt was one of the founding members of the *Gesellschaft für Geschiebeforschung* ("Society for the research of glacial drifts"), and he contributed several articles to the journal of the society, including also research on bryozoans from glacial drift deposits of his home region (Voigt 1925a, b; 1928a). Some small publications on bryozoan faunas from several regions in northern Germany (Voigt 1929a, b; Hucke & Voigt 1929) and Austria (Voigt 1928b) appeared while Voigt was working on his Ph.D.

3. Voigt's monograph on bryozoans from the Upper Cretaceous and the post-student era (1930–1942)

The last publication of Voigt's student era appeared in 1930 in a Festschrift dedicated to the famous geologist and former teacher of Voigt, Johannes Walther (1860–1937). The monograph (Figure 3) is Voigt's most ambitious and comprehensive work, its full title being *Morphologische und stratigraphische Untersuchungen über die Bryozoenfauna der oberen Kreide. I. Teil. Die cheilostomaten Bryozoen der jüngeren Oberkreide in Nordwestdeutschland, im Baltikum und in Holland*. ("Morphological and stratigraphic researches on the bryozoan fauna of the Upper Cretaceous. 1st part. The cheilostomatous bryozoans of the earlier Upper Cretaceous in northwestern Germany, the Baltic, and Holland").[4]

The main aim of Voigt was to give a complete overview of the bryozoan fauna of the Upper Cretaceous in the examined regions, showing that bryozoans are useful index fossils for the Upper Cretaceous. Many previous authors regarded bryozoans as facies-dependent fossils that are unsuitable for stratigraphical purposes. Voigt ascribed this mainly to insufficient knowledge of the bryozoan fauna to date, and to misidentifications and multiple descriptions of the same species from different regions, due to inaccurate first descriptions and drawings by

Morphologische und stratigraphische Untersuchungen über die Bryozoenfauna der oberen Kreide.

I. Teil.

Die cheilostomen Bryozoen der jüngeren Oberkreide in Nordwestdeutschland, im Baltikum und in Holland.

Von *Ehrhard Voigt*.

Geologisch-Paläontologisches Institut der Universität Halle-Wittenberg.

Mit 39 Tafeln.

A. Einleitende Bemerkungen.

Die Aufgabe der vorliegenden Untersuchung über die Bryozoenfauna der oberen Kreide und die Eignung der Bryozoen als Leitfossilien in der oberen Kreide sowie ihre Bedeutung für die Lithogenese der betreffenden Gesteine zerfällt naturgemäß in eine systematisch-stratigraphische und eine allgemein-paläontologische bzw. biostratonomische Sonderaufgabe. Es ist zweckmäßig, die allgemein paläontologischen Fragen vorweg zu behandeln, um so zugleich eine gewisse Basis für die künftigen rein stratigraphischen Feststellungen zu gewinnen. Es ist dies um so notwendiger, als ja nennenswerte Vorarbeiten über die Eignung der Bryozoen als Leitfossilien in der oberen Kreide kaum existieren, sofern wir von den exakten Arbeiten W. D. Langs[82–88] und Brydones[19–20] absehen.

Es gilt also, das Vorkommen der Bryozoen in der oberen Kreide nach der Art des Auftretens zu charakterisieren und einen Überblick über die wichtigsten Faunenbezirke zu gewinnen. Wenn sich im Verlaufe der folgenden Untersuchungen dabei herausstellt, daß die Bryozoen in hohem Grade Faziesfossilien sind, die den bionomischen Verhältnissen entsprechend angepaßt sind und somit scheinbar nicht einmal den hauptsächlichsten Anforderungen genügen, die man an ein Leitfossil zu stellen gewohnt ist, so soll schon jetzt vorweggenommen sein, daß unabhängig von den äußeren Verhältnissen die Umwandlungen innerhalb der Bryozoenwelt genügend rasch fortschreiten, um einigermaßen sichere Anhaltspunkte für stratigraphische Zwecke zu gewährleisten. Es sei daran erinnert, daß einzelne hochspezialisierte Gruppen cheilostomer Bryozoen *(Cribrimorpha)* einen äußerst raschen Entwicklungsgang eingeschlagen haben, der stratigraphisch noch längst nicht genügend ausgewertet ist. Wenn auch im allgemeinen die durchaus berechtigte Tendenz besteht, die Gliederung mariner Schichten nach Möglichkeit mit Hilfe der Cephalopoden durchzuführen und man sich stets mit Recht vorwiegend der planktonischen Lebewelt für stratigraphische Zwecke bedienen wird, so darf jedoch ebensowenig versäumt werden, auch das sessile Benthos auf seine Eignung zu Gliederungszwecken eingehend zu prüfen, und das um so weniger, als gerade die doch so faziesempfind-

Figure 3. First page of Voigt's 1930 monograph on the cheilostomatous fauna of the Upper Cretaceous in Central Europe.

previous authors. He argued that especially the highly developed and specialized Cheilostomata could be used as stratigraphical tools. He, therefore, provided in his monograph short descriptions and images of all 533 species examined, including 104 new species. The monograph is based mainly on material from Voigt's own collection. A few imaged samples came from other collections, namely the collection of the PGL, the collection of the University of Halle-Wittenberg, and the Brandes Collection. Voigt used in the monograph the classification and terminology of Ferdinand Canu, Ray S. Bassler and William D. Lang (1878–1966). The magnification of the samples (15x) is consistent for Tables 1–37, while the last two plates contain images of some complete bryozoan colonies.

The greatest challenge for Voigt were the membranimorphs, i.e. encrusting Anasca with little or no frontal wall calcification. He classified 128 species, including 43 new species, provisionally within the genus *Membranipora* de Blainville, 1830, but divided them into several groups of similar species in order to create more clarity within this taxon. For example, he created the group of *Membranipora elliptica* (von Hagenow, 1839) on p. 419 including the three species *M. elliptica*, *M. pellicula* Brydone, 1912 and *M. hannoverana* Voigt, 1924d.[5] For some of the species, Voigt indicated a second genus of membranimorph species in brackets, e.g. *M.* (*Callopora*) *polytaxis* Voigt, 1930.[6] The partitioning of the membranimorph species into various genera was just in the early stages of its development in 1930 (and is still in progress). The species with a second genus in brackets are now included within the second genus, or assigned to a different genus altogether.

The full title of the monograph already suggests that a second part was initially intended dealing with the cyclostome fauna. Although Voigt indicated that he was already working on the second part, it remained unfinished and has never been issued. During the 1930s Voigt was mainly occupied with the Geiseltal excavations and worked little on bryozoans. After World War II and the destruction of the material that might have been used for the second part of the monograph, and probably also his notes, Voigt completely abandoned the plan to write this sequel.

Only three further publications on Bryozoa appeared until 1942. In 1932 he authored an article on bryozoans for an encyclopaedia. Voigt showed in 1939 that Dollo's law of irreversibility is valid for bryozoans by examining the spines of several cheilostome taxa and their differentiation in time. The same year Voigt was appointed non-tenured Professor at the University of Hamburg and executive director at the GSI after Roland Brinkmann (1898–1995) had to leave Germany temporarily, due to his political views that were critical of the ruling National Socialists. Voigt and his collection left Halle in springtime.

After his call-up to military service in autumn 1939, Voigt could finish only one more paper on bryozoans that was published in 1942 (the address indicates that Voigt was "currently in battle"). Voigt compared material he received from Bassler with the original material of Reuss (1872). He proved that part of the material described by Reuss (1872), which should have been from the Cenomanian of Dresden-Plauen, is in fact identical with

Danian material from the Vincentown Limesand in New Jersey, USA. As Reuss did not collect the material himself, Voigt concluded that the data on the provenance of the Reuss material must have been wrong as it clearly differs from bryozoan material in Dresden-Plauen of Cenomanian age.

4. Publications by Ehrhard Voigt on bryozoans between 1923–1942

Voigt, E. 1923. Über einige neue und wenig bekannte Bryozoen der Gattung *Floridina* aus dem Danien von Faxe. *Meddelelser fra Dansk geologisk Forening* **6**, 1–9.

Voigt, E. 1924a. Über eine ctenostome Bryozoe aus dem Granulatensenon von Gr. Bülten bei Peine. *Paläontologische Zeitschrift* **6**, 1–2.

Voigt, E. 1924b. Über neue Bryozoen aus Daniengeschieben Anhalts. *Paläontologische Zeitschrift* **6**: 3–13.

Voigt, E. 1924c. Beiträge zur Kenntnis der Bryozoenfauna der subherzynen Kreidemulde. *Paläontologische Zeitschrift* **6**, 93–173.

Voigt, E. 1924d. Beiträge zur Kenntnis der Bryozoenfauna der subherzynen Kreidemulde. (Fortsetzung aus Heft 2). *Paläontologische Zeitschrift* **6**, 191–247.

Voigt, E. 1925a. Über das Vorkommen von Bryozoen in Diluvialgeschieben und die Grundzüge ihrer Systernatik. *Zeitschrift für Geschiebeforschung* **1**, 13–28.

Voigt, E. 1925b. Neue cribimorphe Bryozoen aus der Familie der Pelmatoporidae in Kreidegeschieben Anhalts. *Zeitschrift für Geschiebeforschung* **1**, 97–104.

Voigt, E. 1928a. Neue artikulierte cheilostome Bryozoen aus einem Kreidegeschiebe obersenonen Alters von Cöthen in Anhalt. *Zeitschrift für Geschiebeforschung* **4**, 105–114.

Voigt, E 1928b. Bryozoen aus dem Gosauvorkommen am Taubensee bei Kössen in den Nordtiroler Kalkalpen. *Centralblatt für Mineralogie, Geologie und Paläontologie (B)* **7**, 443–448.

Voigt, E. 1929a. Die Bryozoengattung *Diplosolen* in der Schreibkreide von Rügen. *Mitteilungen aus dem Naturwissenschaftlichen Verein für Neu-Vorpommern und Rügen in Greifswald* **52/56**, 1–8.

Voigt, E. 1929b. Über fossile Bryozoen und ihr Vorkommen in heimischen Diluvialgeschieben. *Berichte des Naturwissenschaftlichen Vereines zu Dessau* **1**, 25–26.

Hucke, K. and Voigt, E. 1929. Beiträge zur Kenntnis der Fauna des norddeutschen Septarientones. *Zeitschrift der Deutschen Geologischen Gesellschaft* **81**, 159–168.

Voigt, E. 1930. Morphologische und stratigraphische Untersuchungen über die Bryozoenfauna der oberen Kreide. *Leopoldina: Berichte der Kaiserlich-Deutschen Akademie der Naturforscher zu Halle* **6**, 379–579.

Voigt, E. 1932. Bryozoa (Paläontologie). *Handwörterbuch der Naturwissenschaften* **2** (2nd edition), 280–286.

Voigt, E. 1939. Über die Dornenspezialisation bei cheilostomen Bryozoen und die Nichtumkehrbarkeit der Entwicklung. *Paläontologische Zeitschrift* **21**, 87–107.

Voigt, E. 1942. Kreidebryozoen aus New Jersey (U.S.A.) unter A. E. Reuss' Originalen zu seiner Monographie der Bryozoen und Foraminiferen des Unteren Pläners (1872) in H. B. Geinitz: "Das Elbthalgebirge in Sachsen". *Zeitschrift der Deutschen Geologischen Gesellschaft* **94**, 326–338.

5. Operation Gomorrah and the first years after the war

The loss of the first Voigt Collection goes hand in hand with one of the turning points in World War II. From 24 (Voigt's 38th birthday) to 30 July 1943, the Allies carried out intense air raids codenamed 'Operation Gomorrah' on Hamburg. The northern German city was one of the industrial and military centres of the Third Reich and, therefore a perfect strategic target to weaken the Nazis. The strongest raids during the operation occurred during the night of 27 July. Over 700 aircraft of the Royal Air Force dropped over 2,000 tons of bombs on a small area in the eastern city centre. A heat wave and an extreme drought resulted in the creation of a huge firestorm that lasted several hours and reached temperatures of over 800˚C. An area of over 21 km^2 was incinerated, over 16,000 buildings were consumed, and more than 30,000 people died. The GSI, located Lübeckerthor 22 in the district St Georg (Figure 4), was within the area affected by the firestorm. The building and all collections, including the first Voigt Collection, books and documents were completely destroyed (Wüstenhagen *et al*. 1998).

Figure 4. The building of the GSI between 1908 (then: Mineralogisch-Geologisches Institut, *Institute of Mineralogy and Geology) and 1943 on Lübeckerthor 22. Courtesy of the Geologisches Landesamt Hamburg.*

Figure 5. The GSI was lodged in this building (the "toppled commode") on Esplanade 1 after World War II until a new building was constructed in 1960. From Wüstenhagen et al. (1998). Courtesy of the Geologisches Landesamt Hamburg.

Voigt worked as a military geologist from the beginning of World War II, at first on the western front and from 1941 until the end of the war on the eastern front in Czechoslovakia and the Baltic States. He received leave to see the damage caused by the firestorm and returned for a couple of weeks to Hamburg. He could do little, however, and found only a few samples in the ruins that have either been blackened with soot or amalgamated. Voigt soon returned to the eastern front, where he remained until the end of the war. Not even during the harsh times of war did he lose his passion for bryozoans. He used his free time to study the Cenomanian fauna of Predboj while in Czechoslovakia, and collected in 1942/3 several hundred specimens from the Kukersite layers of Ordovician age in Estonia and northwestern Russia. These samples, which became the first samples of the second Voigt Collection, were later studied by Toots (1952a, b). They remained at the University of Hamburg after the relocation of the second Voigt Collection to Frankfurt in 2005.

The Soviet army captured Voigt's Division in 1945, before the end of the war, and

Figure 6. The young Voigt family, Ellinor and Ehrhard Voigt with their three children Irmgard, Wolfgang, and Werner in Hamburg in 1951. Courtesy of Wolfgang Voigt.

Voigt became a prisoner of war in the Soviet Union. When Voigt returned home to Hamburg after one and a half years of captivity in late 1946, his colleagues had already started reconstructing the GSI in a building not affected by the war in the western city centre. The building was situated on Esplanade 1 (Figure 5) and nicknamed "*umgestürzte Kommode*" ("toppled commode"). Soon after his return, Voigt married on 22 May 1947 Ellinor Bucerius (1911–2005), who had lost her first husband Curt Arpe in 1941. Ellinor and Ehrhard's three children were born in 1948 (Werner, linguist) and 1950 (Irmgard, graphic designer, and Wolfgang, architect). The family (Figure 6) lived on the outskirts of Hamburg, but moved into an apartment closer to the institute in 1955.

Voigt put much of his energy and free time during the first years after the war into the reconstruction of the institute and the re-establishment of a new, even larger collection than the one destroyed in 1943. One of Voigt's major interests was the search for material of the species lost in 1943. He was able to recollect material from many of the sites previously studied and also revised several of the 182 new species he had described between 1923 and 1930. One of the greatest successes with regard to compensating for lost material was the purchase of the famous collection of Hermann Brandes (see Section 7).[7] Because the building on Esplanade 1 was too small for the institute and the steadily growing collections, Voigt helped organizing the construction of a new building, von-Melle-Park 11, where the GSI would finally move in 1960.

6. The rediscovery of type material from Voigt's early publications

One of the most important tasks regarding the (second) Voigt Collection is the digitisation of at least the most important parts of the collection[8] and the preparation of a type catalogue including all holotypes and neotypes first described by Voigt and co-authors. This type catalogue will not only include the types now lodged in Frankfurt, but also the ones that remained in Hamburg, lists of the types lost in 1943, and lists of types described by Voigt and co-authors lodged at other institutions. The work will also include images of all of the types not lost. A multi-national team is currently working on the project and taking images of the type material described by Voigt.

During this work, three type specimens from Voigt (1924d) and Voigt (1930) have so far been rediscovered. The first type reappeared while I was searching the Brandes Collection on 20 September 2013. On a handwritten list accompanying the collection, I was surprised to see a note indicating a box that should contain the type specimen of

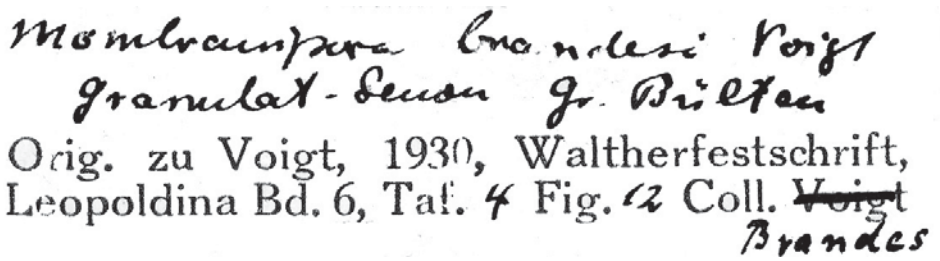


Figure 7. Original label of the holotype of Membranipora brandesi *indicating that it is the original specimen depicted in Voigt (1930).*

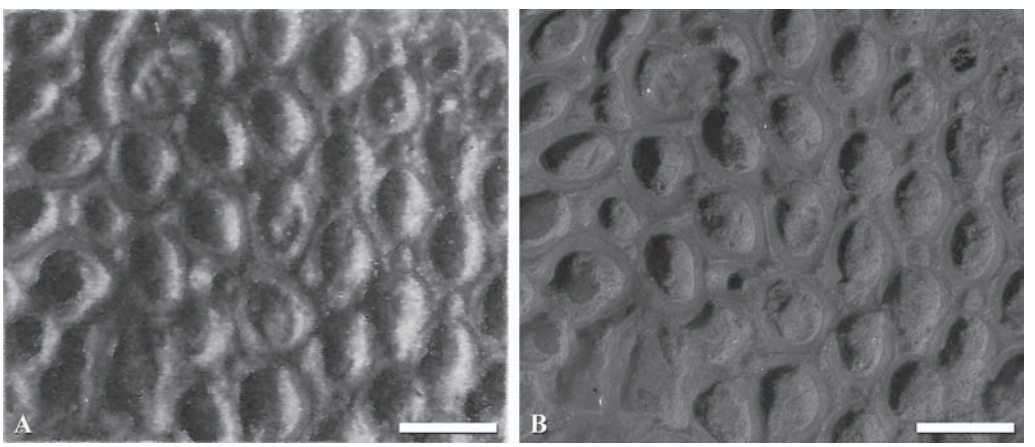


Figure 8. A. Image provided by Voigt (1930) on Pl. 4, Fig. 12 of Membranipora brandesi *from the Late Santonian of Ilsede-Groß Bülten, Lower Saxony, Germany. Scale bar: 500 µm. B. Detail of the specimen of* M. brandesi *from the Brandes Collection showing the same part of the colony. Scale bar: 500 µm.*

Membranipora brandesi Voigt, 1930 (Figure 7). I compared the specimen with the original specimen depicted by Voigt (1930) on Pl. 4, Fig. 12. Without any doubt they are identical (Figure 8). The species encrusts the inner surface of a shell and the type specimen is broken into four fragments, but might have already been broken when Voigt originally described the species. Most of the colony, including the part figured by Voigt, is on one fragment. Voigt included *M. brandesi* in his monograph with 12 other species within the heterogeneous group of the membranimorph bryozoans that do not belong to any of the other groups. As Voigt did not mention any other specimens of this species, the newly discovered specimen is presumed to be the unique holotype of *Membranipora brandesi* Voigt, 1930.

Another two type specimens were rediscovered shortly later at the beginning of November. Angela Ehling from the *Bundesanstalt für Geowissenschaften und Rohstoffe* (BGR; Federal survey for geosciences and resources) in Berlin provided images of all Voigt material included within the original catalogue of the BGR Berlin (Fenner 2006). Among the examined material, one type specimen of *Conopeum congestum* Voigt, 1924d

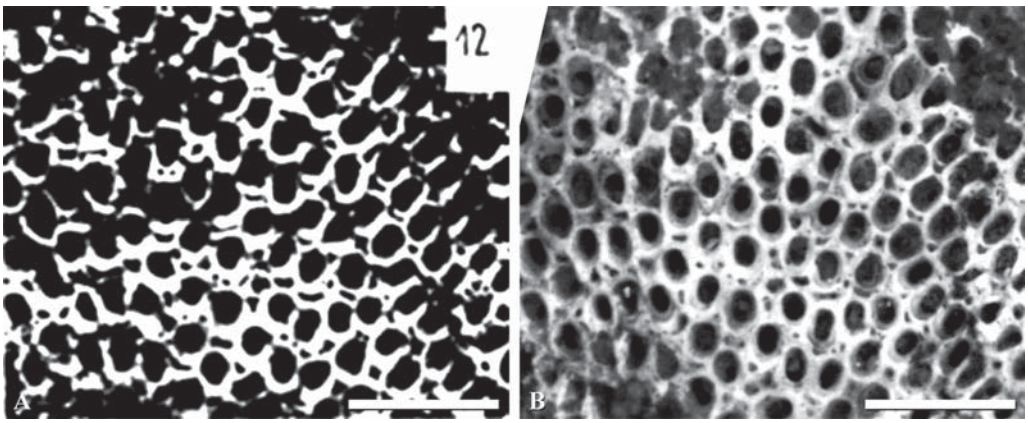


Figure 9. A. Image provided by Voigt (1924d) on Pl. VI, Fig. 12 of Conopeum congestum *from the Santonian of the Salzberg near Quedlinburg, Saxony-Anhalt, Germany. Scale bar: 1 mm. B. Detail of the specimen of* C. congestum *in the collections of the BGR (X 11128) showing the same part of the colony. Scale bar: 1 mm.*

(Figure 9; figured by Voigt on Pl. VI, Fig. 12)[9] and ten specimens of *Ogiva promonturiorum* Voigt, 1924d including two specimens figured by Voigt on Pl. VII, Fig. 23 (Figure 10) were located. These specimens belonged to the PGL material from the Subhercynian Cretaceous Basin and its surroundings. The PGL was dissolved on 1 April 1939 and after a varied history most of the material of the former PGL has belonged to the BGR Berlin since 1990. Another specimen from the PGL material should be an original of *Membraniporidra huckeana* (Voigt, 1924b), which was depicted in Voigt (1930) on Pl. 5, Fig. 6. A comparison of the images showed, however, that these specimens are not

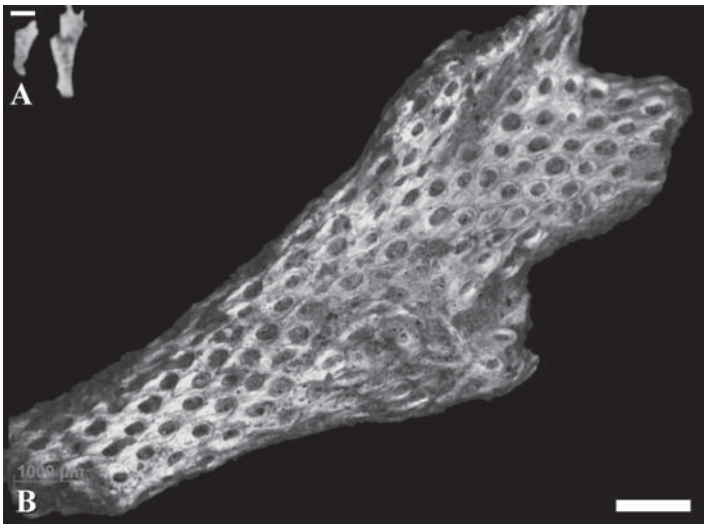


Figure 10. A. Image provided by Voigt (1924d) on Pl. VII, Fig. 23 of Ogiva promonturiorum *showing two specimens from the Santonian of the Salzberg near Quedlinburg, Saxony-Anhalt, Germany, both of which have been recovered. Scale bar: 5 mm. B. One of the specimens in the collections of the BGR (X 11129), which proves from the shape of the colony to be the right specimen imaged on Pl. VII, Fig. 23. Scale bar: 1 mm.*

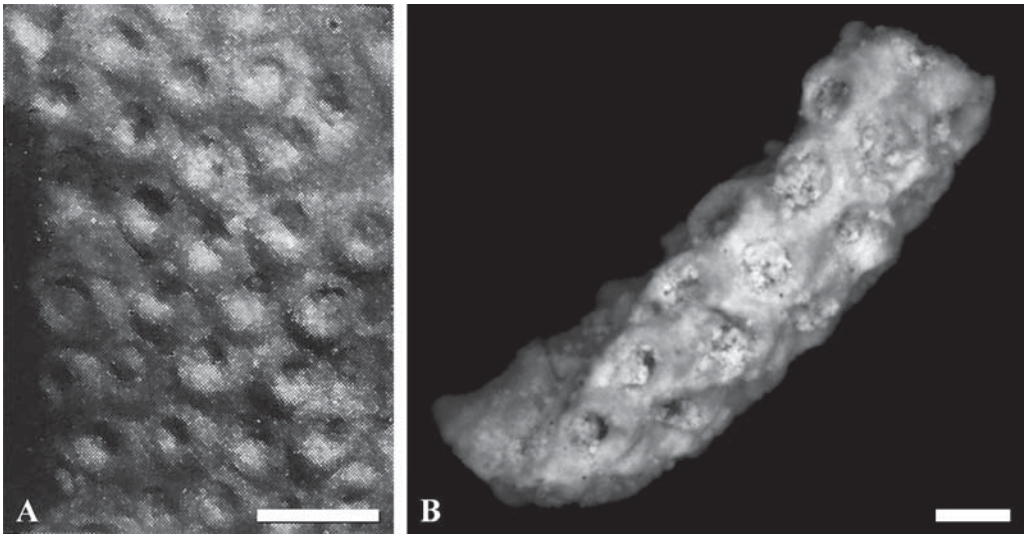


Figure 11. A. Image provided by Voigt (1930) on Pl. 5, Fig. 6 of Membraniporidra huckeana *from a glacial drift deposit of Danian age from Köthen, Saxony-Anhalt, Germany. Scale bar: 500 µm. B. The specimen from the BGR Berlin (X 9454) that should be the original of* M. huckeana *from Voigt (1930) proves to be not identical. Furthermore, Voigt (1930) does not mention that the specimen figured should belong to the PGL collections. Scale bar: 1 mm.*

identical (Figure 11). It remains unclear so far what has happened with the other type material from the PGL. Voigt (1924a, c, d, 1930) provided images for 22 species from PGL material, among which are 13 newly erected species[10] (including the invalid species *Vinella cretacea* Voigt, 1924a).

Voigt (1957) reported that the Marsson Collection of the PGL, which included the material from Marsson (1887), was destroyed in World War II. Fenner (2006), however, indicates 17 samples from Marsson (1887), including also type material for six species, meaning that at least some of the material from that collection could be recovered. Voigt had, therefore, probably been misinformed about the fate of his own material too. Angela Ehling found that part of the collection now at the BGR Berlin was transported to Leningrad (now St Petersburg) after the Second World War, but was recovered several years later. Of course, some losses will have occurred during the relocations. Part of the collections went after the return of the material to the *Museum für Naturkunde* (Museum of natural sciences) in Berlin. So, we have several possible scenarios as to what might have happened to the material of the Marsson Collection and from Voigt (1924a, c, d, 1930), which has not been rediscovered yet. Further research to unravel the fate of the missing material of the PGL is currently in progress. A revision of the rediscovered species so far, including new images of all three species, will be the topic of a separate paper currently in preparation.

7. The bryozoan collection of Hermann Brandes (1855–1940)

The rediscovered type specimen of *M. brandesi* belonged to the bryozoan collection of Hermann Brandes and the species was named in honour of this remarkable man. Although the Brandes Collection (Figure 12) is a very well documented collection containing several thousand specimens of bryozoans from a small region in NW Germany and the island of Rügen, it is relatively unknown among bryozoologists to date. The collection represents a nearly complete fauna of the Cretaceous from a handful of outcrops in the region between Braunschweig, Hildesheim and Peine in Lower Saxony. Most of these outcrops are no longer accessible and have completely been destroyed. Many species, including several of the species erected by Voigt before World War II from this region, are, therefore, only documented in the Brandes Collection. But who was the man behind this collection?

Figure 12. Drawer with specimens from the Brandes Collection in small boxes and a list indicating which specimens are in the boxes at the Senckenberg Institute in Frankfurt.

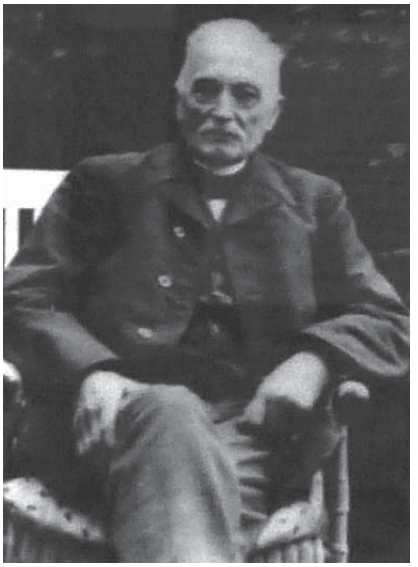


Figure 13. Hermann Brandes in Hoheneggelsen.
Photograph courtesy of the Heimatverein Hoheneggelsen.

Hermann Heinrich Brandes (Figure 13) was born on 31 March 1855 as the second child of Wilhelm Heinrich Brandes and Caroline Wilhelmine Elisabeth Brandes, née Vornkahland. He lived in Mölme, a small village 40 km SE of Hannover. As a young man he suffered from severe typhoid fever for a long time, which forced him to give up his job as an administrator. Brandes appears to have lived on private means thereafter. In 1903 he bought a house in the nearby village of Hoheneggelsen, where he lived until his death. He never married and had no children (Söding 1968).

Brandes had wide interests and the only four publications that can with certainty be assigned to him deal with the cultivation of sugar beet (1884), halophytes (1913), the Upper Jurassic of Hoheneggelsen (1914), and the history of the peasantry in the Hildesheim region (1934). For the latter work he was named honorary citizen of the village Hoheneggelsen. The street around the corner of his house now bears the name of Hermann Brandes. Most relevant for us is his interest in geology and palaeontology. Brandes studied neither geology nor palaeontology at a university, but was self-taught. He examined the geology of his home region and visited every well drilling, house excavation, and other possibility to undertake geological research (Rose 2010). Brandes drew geological profiles and collected all types of fossils, including ammonites, bivalves, brachiopods, bryozoans, cephalopods, foraminiferans, sponges and many others. These he classified by reading books and corresponding with palaeontologists.

Contemporaneous geologists and palaeontologists soon started to visit Brandes to examine his collection. Brandes joined the *Deutsche Geologische Gesellschaft* (DGG, Geological Society of Germany) on 4 December 1889 at the suggestion of three famous German geologists of the time.[11] He also became a member and corresponding member

of several other geological societies during the following years. Many researchers admired his collection and also his comprehensive geological knowledge of his home region. Thus, several papers on material from the Brandes Collection appeared during the 1890s to 1930s and many authors not only used fossils from his collection, but also profited from first-hand information provided by Brandes on the geology of the examined outcrops, and included profiles by Brandes in their works. The most comprehensive work on the Brandes Collection appeared in 1920 by Georg Beck and includes many fossil lists. Unfortunately, bryozoans were not considered by Beck.

Voigt first heard of the Brandes Collection and that it contains bryozoans while working on the first part of his 1924 monograph on bryozoans from the Subhercynian Cretaceous Basin, and he was definitely impressed by this "comprehensive collection".[12] He, however, did not include any images of Brandes' material in his 1924 monograph. The only other pre-World War II work of Voigt examining material from the Brandes Collection was his enormous 1930 monograph, and this included three images of Brandes' specimens. The rediscovered type specimen of *M. brandesi* was imaged on Pl. 4, Fig.12, and the type(s) of *Pelmatopora grandiporosa* on Pl. 31, Figs. 13–14, the latter material not having been found as yet.

Voigt was not the first to examine bryozoans in the Brandes Collection. Voigt stated that a person named Hustedt from Berlin had worked on a monograph of the cyclostomes from the Brandes Collection, but died before the publication appeared (Voigt 1924c: p. 94). This was most probably the geography teacher and rector, Wilhelm Hustedt (1860–1907), who worked at a school in Berlin, as he is the only member of the DGG with this name at the beginning of the 20th century. The only other source I could find indicating that a person named Hustedt, a name completely unknown to the bryozoan community, was indeed interested in bryozoans are short reports in a journal on several works dealing with bryozoans in 1905.[13] Brandes must have told Voigt about Hustedt, but it is doubtful whether Voigt ever saw the manuscript of Hustedt's work. Voigt (1924c) dedicated to Hustedt the cyclostome *Fasciculipora hustedti*, stating that Hustedt intended to name it *F. hennigi* according to labels at the PGL.

Hermann Brandes died on 8 December 1940 and was buried in Hoheneggelsen, where the *Heimatverein* (local history club) still takes care of the grave of their honorary citizen. Shortly before his death, he contacted the *Ilseder Hütte* (Iron works of Ilsede) to sell his collection. They first wanted to have a catalogue of the fossils, however, in order to decide whether to buy the collection. Dr Anton Schrammen (1869–1953), a dentist, who published several publications on sponges, offered to produce the requested lists if he could keep the sponges from the collection. Meanwhile, the mineralogist Hermann Rose (1883–1976), born in Hoheneggelsen and a colleague of Voigt, organized that the University of Hamburg should buy the collection to compensate their loss of 1943. In the autumn of 1948 the collection left for Hamburg, where it was lodged in the GSI (Rose 2010).

It took another twenty years before the Brandes Collection, especially the bryozoans, became the subjects of short-lived attention. Several publications by Ferdinand Flor, Gero

Hillmer and Ehrhard Voigt appeared in the years 1968 to 1973 (see list below). The collection, however, soon slid into obscurity again and a comprehensive work on the collection has never been undertaken. Voigt himself became occupied with different projects and collected and described material from new localities, for example the famous Rauen quarry in Mülheim an der Ruhr. This may explain why he probably never discovered that one of the types he had described as a young man was still among the specimens of the Brandes Collection.

Nowadays, most of the Brandes Collection is lodged at the University of Hamburg. Adolf von Koenen (1837–1915), who wrote a monograph on Jurassic ammonites from northern Germany in 1902, took some duplicates of the ammonites from the Brandes Collection to the University of Göttingen. The bryozoan and brachiopod collections were left together and went with most of the Voigt Collection to the Senckenberg Institute in 2005. The samples are lodged in the bryozoology section, sorted by locality and species in small boxes. Lists, probably indicating the specimens in the boxes are attached.

8. Literature describing bryozoans from the Brandes Collection

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Notes

1. The species is mentioned as *Floridina variabilis*, Voigt in Voigt (1923) because Voigt also described it in Voigt 1924b, where it is mentioned as new species. The first issue of the sixth volume of *Paläontologische Zeitschrift* including the papers Voigt 1924a, b was scheduled to appear in 1923 before Voigt's publication on the Danish material, but the issue was delayed until January 1924.
2. Voigt already expressed doubts about the affinity of *Vinella cretacea* to the Ctenostomata the

same year (Voigt 1924d) and regarded the species as possible tangled roots of *Alcyonaria* Dana, 1846.

3. Although Voigt hoped to provide images of the species in a later work, this never happened. The collection of Ehrhard Voigt, however, contains several specimens of *D. cava*, which can be used for a re-examination of the species.
4. By using the German word *Baltikum* ("Baltic"), Voigt was not referring to the states Estonia, Latvia, and Lithuania, which would be the common use of the word, and also not to the whole region around the Baltic Sea, but to Denmark and southern Sweden only.
5. Bassler (1935) designated *Cellopora elliptica* von Hagenow, 1839 as the type species of the genus *Marginaria* Roemer, 1841. Almost sixty years after Voigt established the group of *M. elliptica* in his monograph, he assigned *M. pellicula* and *M. hannoverana* to the genus *Marginaria* (Voigt 1989).
6. Note that the use of parentheses between the generic name and the specific name is now used according to the International Code of Zoological Nomenclature for names of subgenera.
7. Voigt (1979: p. 188) writes: "*Dadurch konnte der Verlust der ersten Sammlung Voigt während des Zweiten Weltkrieges, [...], weitgehend ausgeglichen werden, obwohl die uber 600 verlorenen Typen zur Cheilostomen-Monographie (Voigt 1930) unersetzlich sind*." ("Thus [the purchase of the Brandes Collection], the loss of the first Voigt Collection during World War II [...] could be largely compensated, although the loss of over 600 types of the Cheilostomata-monograph (Voigt 1930) is irreparable.")
8. The whole collection consists of over 300,000 specimens. The target is to digitize ~40,000 of these specimens, including the *c*. 3,000 types and originals and over 35,000 specimens in Franke cells that have been regarded as very important by Voigt himself.
9. The description to Pl. VI, Fig. 12 uses the name "*Conopeum varians* n. sp." for this species. This has later been withdrawn by Voigt (1926).
10. The 13 species and the material for these species of the PGL that has been imaged by Voigt are as follows (an asterisk indicates that Voigt provided additional images of this species from his own collection in the original publication; for the species of the genus *Fasciculipora* d'Orbigny, 1846, the additional images are drawings): *Conopeum congestum* Voigt , 1924d (Pl. VI, Fig. 12), *Diplosolen germanicus* Voigt, 1924c (Pl. IV, Fig. 21)*, *Elea nodulifera* Voigt, 1924c (Pl. IV, Fig. 9)*, *Escharicellaria polymorpha* Voigt, 1924d (Pl. VIII, Fig. 16)*, *Fasciculipora constricta* Voigt, 1924c (Pl. III, Figs. 9–10)*, *Fasciculipora granulosa* Voigt, 1924c (Pl. III, Fig. 7)*, *Fasciculipora hustedti* Voigt, 1924c (Pl. III, Figs. 3–5)*, *Lichenopora bueltenensis* Voigt, 1924c (Pl. V, Figs. 14–16), *Ogiva promonturiorum* Voigt , 1924d (Pl. VII, Figs. 23–24)*, *Onychocella lamellosa* Voigt, 1924d (Pl. VII, Fig. 7)*, *Onychocella schroederi* Voigt, 1924d (Pl. VII, Figs. 3–5), *Spiropora ingens* Voigt, 1924c (Pl. IV, Fig. 17)*, and *Vinella cretacea* Voigt, 1924a (Fig. 1).
11. In (1889): 2. Protokoll der Dezember-Sitzung. *Zeitschrift der Deutschen Geologischen Gesellschaft*, **41**, 784.
12. Voigt (1924c). On p. 94 he writes: "Zu spät leider ist mir die umfassende Sammlung des Herrn H. Brandes in Hoheneggelsen (Prov. Hannover) bekannt geworden, welche über ein bedeutendes Bryozoenmaterial des nordwestdeutschen Kreidegebietes verfügt, [...]" ("Too late, I became acquainted with the comprehensive collection of Mr. H. Brandes from Hoheneggelsen (Prov. Hannover), which contains important bryozoan material from the northwestern Cretaceous area of Germany, [...]")

13. 9 short summaries of works on bryozoans, especially by Ferdinand Canu, are provided by Hustedt in the journal *Neues Jahrbuch für Mineralogie, Geologie und Paläontologie*, Jahrgang 1905, II. Band on pp. 141–5, 485f. However, the first name of Hustedt is not mentioned.