

# THE DISTRIBUTION WITHIN DENMARK OF THE HIGHER PLANTS

RESULTS OF THE  
TOPOGRAPHIC-BOTANICAL INVESTIGATION

I. A BRIEF HISTORICAL  
SURVEY OF THE INVESTIGATION

WITH ONE PLATE

BY

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KØBENHAVN

HOVEDKOMMISSIONÆR: ANDR. FRED. HØST & SØN, KGL. HOF-BOGHANDEL

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In 1904 the then existing "Botaniske Forening i København" (the later "Dansk Botanisk Forening") commenced a detailed investigation of the distribution of Denmark's higher plants within the boundaries of the country. Truly, even before that time we had a fair knowledge of the distribution of the various species, but still there were large tracts of the country, especially of Jutland, which highly needed a closer investigation in this respect. The plan of investigation, which had been elaborated on the initiative of the author of this account, was submitted at a general meeting by the committee of the society, and was accepted at a subsequent extraordinary general meeting after some discussion, more particularly as to the suitability of extending the investigation to the lower plants, but also in some degree as to how much ecology the investigation was to include. As the latter was in great part to be based on the observations of mere amateur botanists, the committee insisted that the investigation should be as simple as possible; consequently it was proposed that it should only be floristic and not ecological, and that it should only comprise flowering plants (and vascular cryptogams), but not the lower plants. When put to the vote this view proved absolutely prevalent, and the plan of investigation acquired the form set forth in the *Botanisk Tidsskrift* 26. Bd. pp. XXVI—XXX 1904.<sup>1)</sup>

Attention shall here be called to certain points of this programme. It was proposed that the investigation should only comprise the so-called higher plants, and should be made by botanists and persons interested in botany all over the country; that the country should be divided into a number of areas of about equal size; these so-called "districts" were to number 47. As regards the smaller islands, the boundaries between the districts were to be formed by the sea or sounds, while for the larger islands they were to be coincident with the boundaries of "Herreder"<sup>2)</sup>, counties, parishes, and, more rarely, with streams and railroads, the principle of utilising the boundaries most easily accessible to the local investigators having everywhere been applied. On a map deposited among the archives of the investigation the boundaries have been exactly drawn, and they are further stated in the description of the districts that accompanies the programme. The purpose of dividing the country into

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<sup>1)</sup> *Botan. Tidsskr.* Bd. 26. 1, 1904 pp. XXVI. Topografisk botanisk Undersøgelse af Danmark iværksat af den botaniske Forening i København.

<sup>2)</sup> Administrative areas comprising several parishes.

districts was to get a means by which to collect the many notes into definite groups, and thus make them more easily available. Corresponding divisions have been established in other countries where similar investigations have been made, e. g. in Finland, Great Britain and Ireland, certain parts of Germany, etc.

The investigator undertakes to procure a list of the species of plants occurring within his district, or in certain parts of it, and when he thinks his list is as complete as he is able to make it, he will send it to the leaders of the investigation; these leaders insert the information in a large card-catalogue, in which each species has two or three pages (folio) divided into 47 columns corresponding to the 47 districts. When in 1920 northern South-Jutland was restored to Denmark, the investigation was extended to this part also, which was divided into six districts. Thus the number of districts was increased to 53, and as moreover it proved more convenient in the course of the investigations to divide some of the largest districts into two, the number was increased to nearly 60. (Pl. I).

In addition to the large card-catalogue, consisting of 12 fairly thick folio volumes, skeleton maps were prepared, on which the contours of the country and the boundaries of the districts were marked, and which were intended to be filled in during the working up of the material.

Lists of the species the distribution of which it was especially desirable to trace, were then sent to those who offered to join in the investigation, together with a sample showing how to fill out the printed forms that were distributed, particularly during the first period of the investigation. A printed list of all the higher plants in Denmark with their principal synonyms,<sup>1)</sup> which could be obtained very cheap, was later added, and a couple of times in the course of the investigation special inquiry forms were sent out, thus relating partly to anemones and pasque-flowers, partly to trees and shrubs, the latter forms to the owners or keepers of almost all Danish forests.

To obtain greater accuracy in the determination of the species, the participators in the work were requested to send in for determination to the Botanical Museum those species as to which they were in doubt, and this request was largely complied with, so that the Danish herbarium of the Museum was greatly increased.

The programme was sent out in the spring of 1904, and at once met with exceptional sympathy, so that the first annual report, which was submitted at the general meeting of the Botanical Society in February, 1905, could enumerate 116 investigators, more than half of whom were teachers in country places, whereas professional botanists and members of the Society had kept aloof, only 27 of the investigators being members of the Society. Later on this state of things was, however, considerably altered.

After issuing the programme for the investigation, the Botanical Society had

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<sup>1)</sup> MORTENSEN, M. L. og OSTENFELD, C. H. Alfabetisk Fortegnelse over Danmarks Karplanter med Synonymer. Trykt som Manuskript. København 1905. 96 pp.

appointed a "Committee" to take charge of the investigation, which Committee, being permanent during the investigation and the working out of its results, was not to change its composition more than absolutely necessary. The Committee was formed of mag. sc. A. MENTZ, stud. mag. M. L. MORTENSEN, and the author of the present article, with the latter as president and M. L. MORTENSEN as secretary.

In the first few years all the work of the investigation was performed gratuitously, but in 1912 the Society succeeded in obtaining a state grant, which made it possible to work in those tracts where few or no voluntary investigators had offered their services, as also to commence the registration of the numerous lists sent in during the past years, and finally to insert in the card-catalogue all the information obtained from the Danish herbarium of the Botanical Museum as well as the immense number of specific statements which had in the course of time been published in the *Botanisk Tidsskrift* or elsewhere. Obviously it could not be expected that all this work should be performed without some remuneration. The state grant amounted to the considerable sum of 26,000 Kr., apportioned in two triennial and two biennial grants, 9,000 Kr. of which were granted for investigations in the recovered southern part of Jutland, as the investigation in this part of the country had to be made exclusively by investigators sent out specially for the purpose; the direct expenditure on this count was more than 4000 Kr.

On December 3rd, 1911, the energetic and assiduous secretary of the Committee, mag. sc. M. L. MORTENSEN died. The Committee thus lost one of its workers, and as Dr. phil. A. MENTZ now lived at Viborg, only the president remained. To escape from this untenable state of affairs, a new committee was appointed, which, apart from the president, who remained the same, consisted of Professor in the Royal Agricultural College A. OPPERMANN, Assistant Keeper of the Botanical Museum Dr. OVE PAULSEN, and Professor in the University C. RAUNKJÆR, which members have retained their place on the committee up to the present day. In 1927 Professor in the Royal Agricultural College Dr. A. MENTZ and Dr. KNUD JESSEN were further appointed members of the Committee; the latter has acted as secretary for the Committee since 1912.

The progress of the investigation, more particularly the names of the investigators, the lists received from the various districts, etc., have been recorded in a series of brief reports, nineteen in all, all of which have been published in the *Botanisk Tidsskrift* from volume 26 to and including volume 38<sup>1)</sup>, and in 1926 KNUD

<sup>1)</sup> *Botan. Tidsskr.* Bd. **26**. 3. 1905. 1. Beretning for 1904 med Lister over Deltagere pp. LXXVI—LXXX. Bd. **27**. 2. 1906. 2. Beretning (for 1905) med ny Liste over Deltagere pp. XLIV—XLIX. Bd. **28**. 1. 1907. 3. Beretn. (for 1906) med ny Liste pp. VII—IX. 4. Beretn. (for 1907) *Ibid.* 3. 1908. pp. XLI—XLII. Bd. **29**. 1. 1908. 5. Beretn. pp. 84—90. Liste over Distrikterne og deres Undersøgelse. *Ibid.* 2. 1909. 6. Beretn. (for 1908) pp. 194—195. Bd. **30**. 2. 1910. 7. Beretn. (for 1909) pp. 165—166. Bd. **31**. 2. 1911. 8. Beretn. (for 1910) pp. 153—156. Bd. **33**. 1. 1912. 9. Beretn. (for 1911) pp. 61—63. *Ibid.* 2. 1913. 10. Beretn. (for 1912) pp. 159—160. Bd. **34**. 2. (1915). 11. Beretn. (for 1913—14) pp. 71—78 med Oversigt over Undersøgelsen i de enkelte Distrikter. *Ibid.* 5. 1916. 12. Beretn. (for 1915) pp. 249—250. Bd. **36**. 1. 1917. 13. Beretn. (for 1916) pp. 34—35. *Ibid.* 3. 1918. 14. Beretn. (for 1917) pp. 184—187. *Ibid.* 5.

JESSEN worked out a survey of the distribution of the vascular plants in Denmark based upon the material of the Topographic-Botanical Investigation, containing also a description of the boundaries of the districts and mentioning the investigators of each district<sup>1)</sup>; cfr. p. 9.

At the close of the investigation the Committee has in its possession:

1) the large card-catalogue, in which have been inserted for each species within each district a) the localities from which specimens are kept in the collection of the Botanical Museum, b) the localities based on the lists received, and c) the localities based on the published information — each of these three categories being marked in its special colour ink.

2) The numerous original lists from the investigators.

3) A card-index containing for each species all the localities cited in the literature and mentioned under c), and containing the titles of all the treatises from which the localities have been quoted.

4) The maps on which the distribution of the species are to be inserted as the working out of the material proceeds.

All this very valuable original material has, after the use, been presented to the Danish Collection of the Botanical Museum, which in return will undertake to bring the list of localities mentioned under a) up to date.

It is a matter of course that during the investigation, carried on now for nearly 25 years, several applications have been made to the Committee for permission to utilise parts of the results of the investigation, and such requests have, as a rule, been complied with. This has, of course, especially been the case with requests from this country, but also from our neighbouring country, Sweden, we have received and replied to such inquiries. This is e. g. the case with some few species studied by the late Professor GUNNAR ANDERSSON, with several aquatic plants studied by Professor G. SAMUELSSON at the "Riksmuseet", and with the very brief statements concerning Denmark appearing in the "Skandinaviens Flora", now in course of publication, by OTTO R. HOLMBERG.

Further, the State Experimental Station for Forestry has repeatedly made use of our material; this applies both to the leader, Professor, Dr. A. OPPERMAN, and the laboratory assistant Dr. C. H. BORNEBUSCH. Finally, the present author has used the material, thus in 1911 for a paper on the Danish species of anemones and pasque-flowers, published in the commemorative publication in honour of Professor EUG. WARMING,<sup>2)</sup> and which was intended to serve as a preliminary paradigm of 1919. 15. Beretn. (for 1918) pp. 321—322. Bd. 37. 1—2. 1920. 16. Beretn. (for 1919) pp. 80—81. Ibid. 5. 1922. 17. Beretn. (for 1920—21) pp. 431—438. Bd. 38. 2. 1923. 18. Beretn. (for 1922) pp. 145—146. Ibid. 3. 1924. pp. 183—186 med Slutord.

<sup>1)</sup> JESSEN, KNUD. Oversigt over Karplanternes Udbredelse i Danmark. Udarbejdet paa Grundlag af den topografisk-botaniske Undersøgelses Materiale. Med et Forord af Komitèen for den topografisk-botaniske Undersøgelse af Danmark. Botan. Tidsskr. Bd. 39, 1926, pp. 137—210, 1 Kort.

<sup>2)</sup> OSTENFELD, C. H.: Anemone- og Kobjælde-Arternes Udbredelse i Danmark, pp. 241—263. 1 Fig. og 2 Kort. Biologiske Arbejder tilegnede Eug. Warming, 3. Nov. 1911. København 1911.

what the investigation might bring to light. To make this paper as complete as possible even at that early stage of the investigation, a great number of post-cards were sent out, asking various questions which were to be answered.

After the many inquiry forms concerning the occurrence of our trees and shrubs had been sent out, and several replies had been received, I worked out two treatises, one on our elm-trees and the other on our species of lime-trees, both of which were published in the Dansk Skovforenings Tidsskrift, and based, at any rate partially, on the results of the Topographic-Botanical Investigation.<sup>1)</sup>

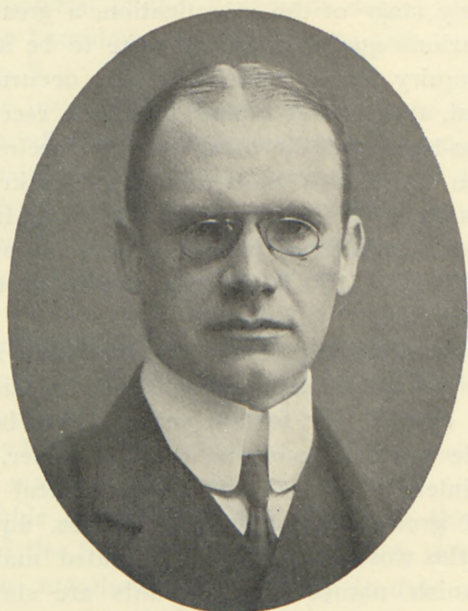
In Dr. KNUD JESSEN's and cand. pharm. J. LIND's comprehensive work, *Det danske Markudkrudts Historie*, 1923,<sup>2)</sup> diligent use has been made of the data procured by the investigation.

Now, however, the actual working out of the very large material is approaching, for which purpose some aid has been obtained from the Carlsberg Foundation, and this work will naturally extend over several years. It has been planned to publish the treatises at indefinite intervals and in no fixed order, all the more so since some of the papers are intended to deal with a systematical group (family or order), others with a biological group (e. g. trees and shrubs, aquatic plants etc.). It is, however, desirable that the works should be elaborated mainly on the same lines. First the Latin and Danish names of the plants are stated, although it is not intended to enter into a detailed explanation of synonyms and popular names. A more summary view of the distribution in foreign countries is then given, and finally follows the main point, i. e. a record of the distribution of the species within this country. This record is to be rather detailed and, where the distribution presents points of interest, to be accompanied by a map. In cases where probable reasons for the occurrence can be given (e. g. as regards seaside plants, heath plants, calcicolous plants, etc.), these are to be stated, and further, where practicable, a statement as to the prehistoric occurrence of the species in this country and the adjacent countries, based on finds of fossils, is to be added. This work requires an extensive knowledge of the literature, more especially of the floristic literature of the neighbouring countries. Finally, various biological data and remarks concerning the variability of the species and the occurrence and distribution of the varieties will be added.

<sup>1)</sup> OSTENFELD, C. H.: Bemærkninger om danske Træers og Buskes Systematik og Udbredelse. I. Vore Ælme-Arter. Dansk Skovforenings Tidsskrift 1918, pp. 421 et. fl.

Ibid. II. Vore Lindearter, 1920, pp. 164—181, med et Kort.

<sup>2)</sup> JESSEN, KNUD og LIND, JENS: *Det danske Markudkrudts Historie*. Vidensk. Selsk. naturh. og mathem. Afd. 8. Række VIII, 1922—23.



1909

*C. H. Ostensfeld.*

After this "Historical Survey of the Investigation" had been sent to the press, Professor C. H. OSTENFELD has died. For the work at publication of the material of the Topographic-Botanical Investigation his death means an irreparable loss. It was on the initiative of Professor OSTENFELD that the Topographic-Botanical Investigation was started, and he always took the greatest interest in it. He has done an exceedingly great amount of work for the investigation, particularly during the first years, not only in the planning of the whole investigation, but also in the arrangement of the material sent in, the identification of the plants received, replying to inquiries, etc. Even if during the latest years he did not participate in the daily work, he was to the last the leader in the arrangement of all essential matters. And during the publication now commenced of the material of the Topographic-Botanical Investigation his deep insight into all questions relative to the Danish flora will be painfully missed.

*The Committee of the Topographic-Botanical Investigation.*



## APPENDIX

### List of the 57 Topographical Districts and of the Botanical Investigators of each District.<sup>1)</sup>

(Cfr. Plate I).

As the basis for this division into districts has been employed the latest edition of MANSÅ's map of Denmark (scale 1:160.000 (Bornholm 1:80.000)). For practical reasons the parochial divisions have as a rule been employed; where the civic boundaries or other boundary lines have exceptionally been used, this is expressly stated.

The condition of the soil within the various districts has been briefly characterised, i. e. it is stated whether clay or sand constitutes the surface of the soil; stretches of bogs and fens as well as littoral meadows are only mentioned quite exceptionally, since such are to be found nearly all over the country.

The Committee takes the opportunity to express its warmest thanks to the numerous collaborators who have worked out lists from their particular areas and thus contributed so essentially to enlarge our knowledge of the Danish flora.

**District 1.** Horns Herred<sup>2)</sup>. In the northern part mainly blown sand; in the south and southwest raised sea floor and fluvio-glacial sand. — C. FERDINANDSEN and Ö. WINGE (the region round Frederikshavn), M. L. MORTENSEN (the whole district), C. H. OSTENFELD (the region round Frederikshavn), V. SCHMIDT (Dvergetved, Tolne, etc.).

**District 2.** Vennebjerg Herred and the northern part of Börglum Herred north of the highway from Assenbæk bridge to where it intersects the railroad, which is then followed southwards to the boundary of the county. Predominantly sandy raised sea floor and fluvio-glacial sand; in the west, dunes. — JOHNS. GRÖNTVED (the whole district), H. JEPSEN (Börglum Herred), P. J. LUND (the region round Hjörriug), J. TH. MIKKELSEN (the region round Hjörriug), OVE PAULSEN (Börglum Kloster, Lönstrup), C. M. RÖMER (the parishes of Vrejlev, Ugilt, Ilbro, and Povlstrup).

**District 3.** Læsö. Sandy raised sea floor and blown sand. — C. H. OSTENFELD and J. HARTZ, K. WIINSTEDT.

**District 4.** Dronninglund Herred and Kær Herred as far as the railway line Aalborg-Hjörriug. Mainly fluvio-glacial sand and sandy raised ocean floor. — C. M. KNUDSEN (desultory notes), MORTEN NIELSEN (the parish of Lendum and surroundings), OVE PAULSEN (the southeastern part), A. CHR. THOMSEN (Skæve, Voer, and Hellevad parishes), K. WIINSTEDT (Jydske Aas).

**District 5.** Hvetbo Herred, the southern corner of Börglum Herred, the western part of Kær Herred and East Hanherred. Hereto Gjöl, Egholm, and Öland. To the west, dunes;

<sup>1)</sup> In addition some few flora lists, elaborated before the Topographic-Botanical Investigation commenced its work, but later handed over to its archives, have been included.

<sup>2)</sup> See footnote 2, p. 3.

otherwise chiefly sandy raised sea floor, on which occur large stretches of bog, e. g. Store Vildmose and others; fluvio-glacial sand is especially found to the westward. — P. FEDDERSEN (coast and dune flora from Bredebjerg to Rødhuse, and Lundergaard bog; Hune parish), L. K. LARSEN (Aaby parish), P. PETERSEN (East Hanherred).

**District 6.** West Hanherred and Hillerslev Herred. The main part raised sandy ocean floor with blown sand; bordering the Limfjord are large tracts of meadowy embanked land. To the west, moraine clay (near Thisted) and fluvio-glacial sand. — J. GANDRUP (the parish of Kollerup, Kettrup, and Klim Bjerg), POUL LARSEN (Hillerslev Herred), P. PETERSEN (the region round Svinklöv), G. THOMSEN (Öslös).

**District 7.** Hundborg, Hassing, and Refs Herreder, except the northern part of the isthmus at Harboøre, which belongs to district 16. Hereto Jegindö. To the east, chiefly moraine clay, in the centre, fluvio-glacial sand, to the west, dunes. — N. GRÖNKJÆR (northern Thy), F. MICHELSEN (the region round Boddum), J. A. WEILE (southern Thy).

**District 8.** Mors and Agersö. Chiefly moraine clay. — A. NIELSEN (the parish of Dragstrup and surroundings), JOH. TÖNBORG (E. and W. Assels, Vejerslev, Blidstrup, Örding, and Lørslev parishes).

**District 9.** Nørre, Hindborg, Harre, and Rødding Herreder in Salling, and the island of Fur. Mainly moraine clay, some fluvio-glacial sand, particularly towards the north and west. — JOHS. GRÖNTVED (Fur), NIELS JUL (Salling), JENS LIND (Salling).

**District 10.** Slet, Aars (except the portion that belongs to the civic divisions of Gislum and Rinds Herreder), Gislum, and Rinds Herreder. Hereto Livö. By far the greater part of the district is made up of fluvio-glacial sand, but moraine clay occurs in patches; in the north raised sea floor. — JOHS. GRÖNTVED (southern part), J. JEPPESEN (the region round Ranum), KAY PETERSEN (W. Himmerland), K. WINSTEDT (Livö).

**District 11.** Fleskum, Hornum, Hellum, and Hindsted Herreder and the part of Aars Herred that does not belong to district 10. Mainly fluvio-glacial sand, moraine clay in patches, which occur especially to the eastward towards a zone of raised sea floor, on which occurs the bog Lille Vildmose. — F. FEYEMANN (desultory notes), K. FRIDERICHSEN (the region round Gudumlund), H. C. L. HANSEN (the southern part), H. HÖJGAARD and Mrs. M. HÖJGAARD (the parishes of Hæsum, Estrup, and Ö. Hornum), M. F. KLENÖ (Hellum and Hindsted Herreder), K. LARSEN (the parish of Mov), A. LINDBERG (desultory notes), F. MICHELSEN (the northern part), P. M. PEDERSEN (the southern part), K. WINSTEDT (the regions round Mov, Nibe, etc.).

**District 12.** Anholt. Dunes resting on sandy raised ocean floor; to the west, hills of fluvio-glacial sand. — (Local floras by I. P. JACOBSEN and OVE PAULSEN).

**District 13a.** Galten, Rougsö, and S. Hald Herreder. To the west chiefly moraine clay; the eastern fourth mainly fluvio-glacial sand. — H. HAMMER (the parish of Voldum), H. JENSEN (the region round Randers), KNUD JESSEN (the parish of Ölst), POUL LARSEN (the eastern part), JENS LIND (the region round Randers), C. H. OSTENFELD (the region round Randers).

**District 13b.** Onsild, Gjerlev, N. Hald, and Stövring Herreder. To the north, fluvio-glacial sand; to the south and east, moraine clay; farthest eastward meadows on sandy raised sea floor. — H. JENSEN (the region round Randers), KNUD JESSEN (large parts of the district), JENS LIND (the region round Randers), C. H. OSTENFELD (the region round Randers), C. SCHWENSEN, (Trudsholm).

**District 14.** S. Lyng, Middelsom, Houlbjerg, Lysgaard, N. Lyng, and Hids Herreder. To the north and west principally fluvio-glacial sand and sandy heath plains; the southern and eastern parts predominantly moraine clay. — JOHS. GRÖNTVED and KNUD JESSEN (the Gudena valley between Kongens Bro and Tange), S. HANSEN (Bækkelund and the surrounding area), H. JENSEN (the region round Randers), KNUD JESSEN (the southwestern part), JENS LIND (the region round Randers and Viborg), A. MENTZ (various areas), C. H. OSTEN-

FELD (the region round Randers), KR. PEDERSEN, (the region round Viborg), K. WIINSTEDT (the southern part).

**District 15.** Fjends and Ginding Herreder and the eastern part of Hjerm Herred as far as the highroad Holstebro-Struer. The northeastern corner principally fluvio-glacial sand; to the west, south of Venö Bay, moraine clay; otherwise sandy heath plains. — POUL LARSEN (various notes), JENS LIND (Fjends Herred), A. LINDBERG (Holstebro, Mejrup, and Borbjerg), Mrs. A. OLESEN (the parishes of Struer and Gimsing), K. WIINSTEDT (the region round Holstebro, Struer, and Flyndersö).

**District 16.** The northernmost part of the isthmus at Harboøre, Vandfuld and Skodborg Herreder, the western part of Hjerm Herred, and Ulfborg Herred except Timring parish. To the north, moraine clay and, at Harboøre, sandy raised sea floor; the southern third mainly old-diluvial fluvio-glacial sand with patches of moraine clay; in the middle of the area, from Holstebro and spreading westward, sandy heath plains. — JUL. LASSEN (the region round Bovbjerg), J. N. NYGAARD (N. Nissum parish), Mrs. A. OLESEN (Humlum, Resen, Ölby, and Fovsing parishes), K. WIINSTEDT (the whole district).

**District 17.** Hind, Bölling, and Nörre Herreder, Timring parish. Mainly old-diluvial fluvio-glacial sand-plateaus; along Skjern Aa, sandy heath plains and meadows; farthest westward, dunes. — C. FERDINANDSEN and Ö. WINGE (Borris Heath), Miss J. GRÜNER (the region round Söndervig), CARSTEN OLSEN (the whole district), CHR. RASMUSSEN (the region round Tarm).

**District 18.** Hammerum Herred. Sandy heath plains and old-diluvial plateaus of fluvio-glacial sand with patches of moraine clay, occurring chiefly in the region east of Herning towards Holstebro. — POUL LARSEN (the whole district), TROJEL (the region round Herning), K. WIINSTEDT (the northwestern part).

**District 19.** Nörre Vang Herred as far as the road from Sandvad inn through Hvejsel to Elgaard, and further the western part of Tyrsting-Vrads Herreder to the highway Aasted bridge—N. Snede—Christianshede. Predominantly sandy heath plains and old-diluvial sandy plateaus ("Bakkeöer"); farthest eastward young-diluvial fluvio-glacial sand and moraine clay. — P. ALSTED (Hvejsel, Törring, Hammer, Vester, and Thyregod parishes), A. BJERREGAARD (the parish of Hvejsel), A. BRINK (the parish of Brande), I. P. KRISTOFFERSEN (Ringgive and S. Omme parishes), P. JENSEN (Törring), KNUD JESSEN (the region round Filskov), A. and J. JUUL (Aale parish), POUL LARSEN (the S. Omme plain), G. THANING (Ö. Nykirke parish).

**District 20.** The eastern part of Tyrsting-Vrads Herreder and the parishes of Silkeborg and Linaa in the Silkeborg jurisdiction. To the southeast, moraine clay, otherwise chiefly fluvio-glacial sand. — C. FERDINANDSEN (the region round Ry and Vissing), J. HARTZ (the region round Ry), A. HOLM (Tyrsting-Vrads Herreder and the parish of Ry), A. and J. JUUL (Fövling parish and the Matstrup woods), KAY PETERSEN (Himmelbjerget), K. WIINSTEDT (the region round Bryrup).

**District 21.** Gjern Herred except the part that belongs to the Silkeborg jurisdiction, further Sabro, W. Lisbjerg, Hasle, Framlev, Ning, and Hjelmlev Herreder, and the northern part of Hads Herred which belongs to the civic Ning Herred. Almost exclusively moraine clay. — POUL LARSEN (the whole district).

**District 22a.** Mols and E. Lisbjerg Herreder, and Feldballe parish of Sønder Herred. Further Hjelm. Predominantly moraine clay; to the east much fluvio-glacial sand. — H. JÖRGENSEN (Todbjerg, Mejlby, Hjortshøj, Sködstrup, and Hornslet parishes), A. LANGE (Hjelm), POUL LARSEN (the whole district), A. NIELSEN (Draaby), OVE PAULSEN (the region round Skramsö), K. WIINSTEDT (the peninsula at Æbeltoft, Mols, and the region round Kalö).

**District 22b.** Nörre and Sønder Herreder except the parish of Feldballe. Principally fluvio-glacial sand; to the east, patches of moraine clay. — SVEND ANDERSEN (northeastern Djursland), AUG. KROGH (the region round Grenaa), POUL LARSEN (the whole district).

**District 23.** Samsö, Thunö, and the islands east of Samsö. Moraine clay and fluvio-glacial sand, sandy raised sea floor, more particularly in the isthmus between the northern and the southern part of the island. — JUL. LASSEN (Samsö and the smaller islands), A. LANGE (Thunö).

**District 24.** Hads Herred (except the northwestern part), Vor, Nim, Bjerge, and Hatting Herreder, Nörre Vang Herred (except the portion that belongs to district 19, and the area south of Vejle). Predominantly moraine clay. — N. J. ANDERSEN (the southern part), J. C. E. CHRISTIANSEN (Endelave), J. FISCHER (Bjerge Herred), C. H. OSTENFELD (Juelsminde), KAY PETERSEN (Odder), P. M. PEDERSEN (Hads Herred), K. WIINSTEDT (the whole district).

**District 25.** The portion of Nörre Vang Herred that lies south of Vejle, further Elbo, Holmans, N. Tyrstrup, Brusik, Törrild, Jerlev, and Andst Herreder. Moraine clay with scattered areas of fluvio-glacial sand; to the west, small stretches of heath plain. — N. J. ANDERSEN (the northeastern part), ALBERT JENSEN (Jelling parish), K. JESSEN (the northwestern part), H. C. KLINGE (the region round Kolding), L. KRING (W. Nebel, Jordrup, and Smidstrup), A. LANGE (the region round Hejls), POUL LARSEN (the northwestern corner), B. MAIGAARD (the parishes of Almind, Bramdrup, Nebel, and Vamdrup), K. NIELSEN (the parishes of Bramdrup, Eltang, and Taulov), C. H. OSTENFELD (the region round Brejning), J. P. J. RAVN (the region round Vonsild), J. M. THOU (N. Tyrstrup Herred), Miss S. THIRSLUND (the parishes of Harte, Bramdrup, Taulov, S. Vilstrup, and Eltang), K. WIINSTEDT (Munkebjerg, Trelde Næs, the region round Randböl and the region round Fredericia on the basis of F. IRMINGER's herbarium).

**District 26.** Slaugs and Östre Horne Herreder, and the portion of Gjørding and Skads Herreder (viz. the northeastern parts) that does not belong to district 27, and Varde suburban parish. Mainly old-diluvial plateaus of fluvio-glacial sand with scattered clayey patches and sandy heath plains. — R. ASTRUP (Læborg and surroundings), M. P. CHRISTIANSEN (the region round Vejen and Bække), O. GELERT (the flora of the region round Ribe about 1890), A. HOLM (the parish of Ölgod), K. JESSEN (Billund and surroundings), POUL LARSEN (Nörholm), P. J. LUND (the region round Varde), Mrs. I. MØMMSEN (Malt, Folding, and Brörup parishes), J. K. NIELSEN (the region round Grindsted), K. WIINSTEDT (the region round Vorbasse).

**District 27.** Vester Horne Herred (except Varde suburban parish), the southwestern parts of Skads and Gjørding Herreder to and including the parishes of Alslev, Bröndum, Skads, V. Nykirke, Sneum, Hundrup, and Jernved, and Ribe archdeaconry. Further Fanö and Manö. Along the coast as far as Skallingen and on the islands, blown sand; in Hjerting Bay, on the islands, and along the coast south of Esbjerg, littoral meadows (marsh); otherwise old-diluvial sandy plateaus with scattered areas of clay, especially round Esbjerg. — O. GELERT (the region round Ribe about the year 1890), JOHS. GRÖNTVED (the region round Esbjerg), K. JESSEN (the region round Ribe), POUL LARSEN (the western part), P. J. LUND (the region round Varde, etc.), OVE PAULSEN (Vejrs and surroundings, Oxböl), P. M. PEDERSEN (the region round Esbjerg).

**District 28.** Vends and Baag Herreder. Hereto Brandsö, Baagö, and Fænö. Predominantly moraine clay with fluvio-glacial sand, more especially in the hilly parts to the southeast. — A. ANDERSEN (the flora of northern Funen), SVEND ANDERSEN (the region round Assens, Helnæs, etc.), M. P. CHRISTIANSEN (Gamborg and the surrounding area), O. HAGERUP (the coast of Little Belt between Fænö and Wedellsborg), L. KRING (Barlöse-Kerte), A. LANGE (the region round Assens; Baagö and Brandsö), K. WIINSTEDT (the region round Assens; notes from F. IRMINGER's herbarium).

**District 29.** Skovby, Skam, Lunde, and Odense Herreder, with Viggelsö. Predominantly moraine clay, especially in the north; scattered areas of fluvio-glacial sand, especially in the southern part; to the north, raised or embanked sea floor. — A. ANDERSEN (the flora of

northern Funen), SVEND ANDERSEN (the southern part), A. CLAUSEN (Odense and the surrounding area), OTTO MÖLLER (the northeastern part), K. WIINSTEDT (Æbelö).

**District 30.** Aasum and Bjerger Herreder. Moraine clay; east of Odense, heath plains; to the north, raised sea floor or embanked land. — A. ANDERSEN (the flora of northern Funen), J. GANDRUP (Romsö in Great Belt), H. C. L. HANSEN (the region round Kjerteminde), M. L. MORTENSEN (the whole district), OTTO MÖLLER (Hindsholm).

**District 31.** Vinding and Gudme Herreder, including Vresen. Almost exclusively moraine clay. — SÖREN HANSEN (HALLAR) (the region round Nyborg), M. L. MORTENSEN (the parish of Flödstrup), TROJEL (the region round Nyborg).

**District 32.** Salling and Sunds Herreder. Further Strynö, Lyö, Taasinge, and the other islets. Predominantly moraine clay; fluvio-glacial sand is especially found in the hilly territory to the westward. — A. EDM. ANDERSEN (the region round Faaborg), SVEND ANDERSEN (Salling Herred etc.), S. HANSEN (Helnæs), A. JOHANSEN (the region round Svendborg), P. M. PEDERSEN (the region round Svendborg; further Taasinge and Thurö), P. A. J. PETERSEN (Avernakö), N. SÖRENSEN (southern Funen, Taasinge, and Thurö), K. WIINSTEDT (the region round Svendborg; Taasinge and Thurö).

**District 33.** Ærö Herred. Moraine clay and small stretches of embanked land. SVEND ANDERSEN (Ærö). Further manuscripts by NOLTE (1825) and KJÆRBÖLLING (about 1840).

**District 34.** Nörre and Sönder Herred in Langeland. Moraine clay, patches of sand, small areas of embanked land (south of Rudköbing). — SVEND ANDERSEN (southern Langeland), M. L. MORTENSEN (the southern part), K. MOURITS-ANDERSEN (the whole district).

**District 35.** Western Lolland as far as the railway line Bandholm—Maribo—Rödby and a line that runs from Rödby southwards to Lille Brundrag, following the boundaries of the parishes. Further Vejrö, Fæmö, Askö, Fejö, etc. Moraine clay, littoral meadows, and embanked land at Nakskov and Rödby Fjords. — C. CHRISTENSEN (Albuen, Slotö, Barneholm), LUDVIG SAUNTE (the whole district), A. HOLM and TROJEL (brief lists).

**District 36.** Eastern Lolland; further Lilleö, Majbölle Ö, and Kejlsö in Guldborg Sound, and Vigsö. Moraine clay, embanked meadowy tracts along the coast south of Rödby. — C. CHRISTENSEN (the eastern part), V. DANÖ (Central Lolland), L. KRING (the southern east coast), C. H. OSTENFELD (the region round Guldborg, and Vigsö), LUDVIG SAUNTE (the whole district).

**District 37.** Falster; further Flatö and Kalvö. Moraine clay, embanked ocean floor at Bötö in the south and at Vaalse in the north. — M. P. CHRISTIANSEN (Dyrefod), L. KRING (the whole district), C. H. OSTENFELD (eastern and northern Falster), TROJEL (desultory notes).

**District 38.** Möen; further Farö, Bogö, Tærö, Langö, and Nyord. Mainly moraine clay, chalk in the Möens Klint. — A. P. ANDERSEN (Bogö), M. P. CHRISTIANSEN (Bogö), Miss J. GRÜNER (Ulfshale), O. HAGERUP (Möen), NILAUS JENSEN (Bogö), K. WIINSTEDT (Möens Klint).

**District 39a.** Hammer Herred, Baarse Herred (except Rönnede), and Næstved in Tybjerg Herred. Chiefly moraine clay; some fluvio-glacial sand, especially to the southwestward. — M. P. CHRISTIANSEN (Masnedö and Kalvö), VIGGO DANÖ (the region round Vordingborg), JOHS. GRÖNTVED (Knudshoved), K. JESSEN (Köng bog), C. H. OSTENFELD (the Jungshoved peninsula), K. WIINSTEDT (Knudshoved, Vordingborg, Kallehave, Holmegaard bog, Jungshoved).

**District 39b.** Stevns and Faxe Herreder with Rönnede. Mainly moraine clay; chalk cliffs at Stevns. — EILER HÖEG (the region round Fakse-Haslev), A. LANGE (Stevns), A. E. THOMSEN (Fakse—Stevns Herreder), K. WIINSTEDT (Köge Sönakke).

**District 40.** Within the county of Præstö: Bjeverskov Herred and Tybjerg Herred (except Næstved); within the county of Copenhagen: Tune and Ramsö Herreder; Ringsted Herred in the county of Sorö. Chiefly moraine clay. — H. P. ERNSTSEN (desultory notes), J. HARTZ (the region round Köge), C. JENSEN (the region round Skjoldnæsholm), Miss R. SIMONSEN (the region round Slimminge), K. WIINSTEDT (Jægerkroen etc.).

**District 41.** The county of Sorö except Ringsted Herred; hereto Sprogö, Agersö, Omö, and Egholm. Mainly moraine clay; fluvio-glacial sand is especially found north of Sorö. — E. GRAM (the parishes of Stillinge, Hejninge, and the Slagelse suburban parish), JOH. HANSEN (Nordruplund wood), EILER HÖEG (the region round Herlufsholm), A. LANGE (desultory notes), H. LARSEN (Hindholm and surroundings), SEVERIN PETERSEN (the hills at Vaarby brooke), C. H. OSTENFELD (the region round Sorö), CHR. RASMUSSEN (Krummerup parish, Hindholm, and Tase), TROJEL (the region round Sorö).

**District 42.** The county of Holbæk: Löve, Arts, and Skippinge Herreder, Tudse Herred (except Tudse Næs east of Gislinge brooke), and the part of Alsted Herred that does not belong to the county of Sorö. Further Sejrö, Nexelö, and Musholm. Moraine clay, but much fluvio-glacial sand in a belt running northwest-southeast; raised sea floor and embanked land at Lammefjord, Saltbæk Vig, Kalundborg and Reersö. — SVEND ANDERSEN (Refsnæs), C. CHRISTENSEN (Lille Vrøj), H. P. ERNSTSEN (the whole district), E. GRAM (Görlev, Bakkenstrup, Kirkehelsing, Drösselbjerg, Finderup, Gjerslev, and Havrebjerg parishes), JOHNS. HANSEN (Terlöse, Skjellebjerg, and Nidlöse parishes), JOHNS. KEIDING (the region round Brejninge-Bjergsted, and Nexelö), M. J. MATHIASSEN (the parishes of Kirkehelsing and Drösselbjerg; Musholm), L. G. MÖLLER (the region round Nexelö Bay), Miss R. SIMONSEN (the region round Nidlöse), K. WIINSTEDT (Sejrö and the region round Kalundborg).

**District 43.** Odsherred, Tudse Næs, and further Hesselö. Mainly moraine clay and fluvio-glacial sand; large areas of raised and embanked, predominantly sandy sea floor in the north and west and at Lammefjord and Sidinge Fjord. — H. ANDERSEN (desultory notes), SVEND ANDERSEN (Odsherred), H. P. ERNSTSEN (Odsherred), K. JESSEN (Hesselö), HAKON JÖRGENSEN (the region round Rörvig), A. LANGE (the region round Nyköbing), JUL. LASSEN (the region round Rörvig), P. J. LUND (Tudse Næs), L. G. MÖLLER (the southwestern corner), K. WIINSTEDT (the northern part).

**District 44.** Merlöse Herred in the county of Holbæk; Voldborg Herred in the county of Copenhagen; Horns Herred in the county of Frederiksborg; Eskildsö and Ovrö. The northern part of Horns Herred, mainly fluvio-glacial sand and sandy raised sea floor; otherwise chiefly moraine clay. — J. CLAUSEN (the region round Töllöse), H. P. ERNSTSEN (the western part), EILER HÖEG (Horns Herred), C. JENSEN (the region round Hvalsö), P. J. LUND (the region round Holbæk), C. G. PONTOPPIDAN (Ovrö), K. WIINSTEDT (Horns Herred).

**District 45a.** The remaining part of the county of Copenhagen (i. e. Sokkelund, Smörum, and Sömme Herreder), and Ölstykke Herred in the county of Frederiksborg. Predominantly moraine clay. — A. LANGE (the whole district), Miss K. RAVNKILDE (Hareskoven), K. WIINSTEDT (desultory notes).

**District 45b.** The county of Frederiksborg except Ölstykke and Horns Herreder. Moraine clay and much fluvio-glacial sand, the latter especially in the northern part; blown sand occurs north of Frederiksværk. — C. CHRISTENSEN (the region round Asserbo), L. KRING (the region round Hilleröd-Tisvilde), A. LANGE (the southwestern part), K. MOURITS-ANDERSEN (the northwestern part), Miss K. RAUNKILDE (the region round Hilleröd, Hornbæk, Hellebæk, and Villingebæk), K. WIINSTEDT (Bregneröd Overdrev and other areas).

**District 46.** The city of Copenhagen (including the incorporated districts as far as Tuborg, Ueterslev, Brønshøj, Harrestrup brooke; Amager and Saltholm. Moraine clay and sandy miry littoral meadows on raised sea floor. — SVEND ANDERSEN (Copenhagen), C. CHRISTENSEN (Saltholm), N. GRAM (Prövestenen), J. GRÖNTVED (Amager Fælled), J. GRÖNTVED and K. JESSEN (Copenhagen), A. LANGE (various notes), M. LÜHRSS (Copenhagen and the surrounding region), OTTO MÖLLER (Copenhagen), A. SCHLÆFFER (Amager and Saltholm), K. WIINSTEDT (Saltholm).

**District 47.** Bornholm and Ærteholmene. Fluvio-glacial sand in the central part of the island; the broad marginal zones consist predominantly of moraine clay; granite is exposed

along the northern and northeastern coasts and to the north and east occasionally in the interior of the island; in the south, dunes. — SOFUS FRANCK (Ærteholmene and the southern part of Bornholm), Miss ELLEN HANSEN (Bornholm), A. LANGE (the northern part), H. MORTENSEN and C. ZAHRTMANN (Bornholm), H. MÖLLER (Bornholm), C. H. OSTENFELD (Bornholm), KAY PETERSEN (the northern part).

**District 48.** The eastern part of the county of Haderslev as far as the eastern trunk line, and the part of the county of Aabenraa that is bounded by the same trunk line as far as Rödekro and the railway from this place to Aabenraa; Aarö and Barsö. To the west a narrow zone consisting mainly of fluvio-glacial sand and sandy heath plains; east thereof predominantly moraine clay. — SVEND ANDERSEN (St. Jörgens Gaard north of Aabenraa), POUL LARSEN (the whole district).

**District 49.** The western part of the county of Haderslev and the part of the county of Tönder that lies east of the western trunk line; the southern boundary is formed by the railway Bredebro—Lögumkloster—Hovslund. Chiefly old-diluvial moraine clay and fluvio-glacial sand, and heath plains; the sandy soil is most extensively distributed towards the south and west. — C. A. JÖRGENSEN and MÖLHOLM HANSEN (Laurup and Tövring Coppices, Gram wood), A. LANGE (the whole district), P. M. PEDERSEN (the northwestern part), P. A. J. PETERSEN (Toftlund parish and surroundings).

**District 50.** The county of Tönder west of the western trunk line, including Römö. Marsh, old-diluvial fluvio-glacial sand, and heath plains; near Tönder, moraine clay; on Römö, blown sand, marsh, and sandy beach. — SVEND ANDERSEN (the area Tönder—Höjer), P. M. PEDERSEN (the whole district), K. WIINSTEDET (Römö).

**District 51.** The portions of Tönder and Aabenraa counties that lie between the western and the eastern trunk lines and between the railway Bredebro—Lögumkloster—Hovslund and the frontier. Predominantly sandy heath plains; old-diluvial moraine clay and fluvio-glacial sand, especially to the westward, north of Tönder. — SVEND ANDERSEN (the region round Tönder; Terkelsböl), C. CHRISTENSEN (the whole district).

**District 52.** The remaining part of Aabenraa and Tönder counties east of the eastern trunk line, and Sundeved. To the east and north, moraine clay; to the southwest, fluvio-glacial sand and sandy heath plain. — SVEND ANDERSEN (Graasten, the north side of Vemmingbund, Aabenraa), C. H. OSTENFELD (Dybböl, the region round Sønderhav), K. WIINSTEDET (the whole district).

**District 53.** Als. Moraine clay. — SVEND ANDERSEN (Sønderborg, Hörup Hav, Augustenborg), M. P. CHRISTIANSEN (the whole district), BENGT E. DAHL (Als Nørreskov), JOHS. GRÖNTVED (the south coast of Als), JOHANNES IVERSEN (Als).

*The Committee of the Topographic-Botanical Investigation.*



Map showing the districts of the Topographic-Botanical Investigation of Denmark, the towns and the greater villages. Each district is marked with its number.