

ANTHROPOLOGICAL RESEARCH IN THE NETHERLANDS

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BOLK and his collaborators BOEKE, BARGE and VAN DEN BROEK, from a painting by MARTIN MONNIKENDAM, 1925. In the background bust of PETRUS CAMPER.

ANTHROPOLOGICAL RESEARCH IN THE NETHERLANDS

HISTORICAL SURVEY

AT THE REQUEST OF THE COMMITTEE FOR THE PHYSICAL- ANTHRO-
POLOGICAL INVESTIGATION OF THE DUTCH POPULATION OF THE
KONINKLIJKE NEDERLANDSCHE AKADEMIE VAN WETENSCHAPPEN

BY

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To the memory of LOUIS BOLK.

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PREFACE.

The genesis of this treatise has a history of its own. The general meeting of the *Hollandsche Maatschappij der Wetenschappen*, held on May 23, 1908, allowed a grant to Dr. J. SASSE Azn. for the composition of a bibliography of the Anthropography in the Netherlands. A report from the professors BOLK, MAC GILLAVRY, NIEUWENHUIS and VAN WIJHE had supported this decision.

SASSE, who had already contributed to anthropology with various articles on the classification of races, now had to pay attention mainly to the history of this branch of science. From SASSE's obituary by TEN KATE (p. 56) it is apparent how much he enjoyed writing such a historical study.

Evidently the *Hollandsche Maatschappij* had made a particularly good choice by requesting SASSE to do this work but it is to be regretted that, owing to the high conception of his task, he planned the work so elaborately that it was not completed when he died in 1915. Had TEN KATE's firm belief, that after SASSE's death the work one day would be completed, been fulfilled, this study would have remained unwritten. TEN KATE had good reasons to expect that SASSE's work would again be taken in hand since BOLK had promised that he would see to its continuation. For this purpose BOLK appealed to KLEIWEG DE ZWAAN who declared to be willing either to charge somebody with the writing of a historical survey of the anthropology in the Netherlands or to do it himself. When in 1925, at the instance of BOLK, the *Koninklijke Akademie van Wetenschappen* at Amsterdam brought into being the Committee for the Physical-anthropological investigation of the Dutch population¹⁾, a sub-committee was at the same time formed for the history of the anthropology. This sub-committee felt itself called upon in the first place to compose a historical survey. In order that the committee as a whole should be able to yield fertile work, it was found necessary to consider the field of study, particularly also with regard to what had already been achieved. It is, therefore, due to the trouble taken by this committee that in the thesis of Dr. D. J. H. NIJESSEN (3²⁾) a remark is found referring to "The review of anthropological Research in Holland, shortly to be issued". However, this review has never been published, but the above-mentioned work by NIJESSEN contains an interesting chapter "Historical and geographical survey", while his communication to the Dutch Physical and Medical congress of 1927 (2) as

1) P. 131.

2) These figures refer to the bibliography; in those cases where an author is represented in the bibliography with one work only the figure is left out. This was also done when the subject refers to all articles of the author inserted in the bibliography.

well as his paper in the *Revue anthropologique* (4) may be regarded as preliminary communications concerning the historical study on which he was engaged but could not continue, owing to his departure to the Indies.

The work was once more taken in hand in 1934. I wish to express my sincere thanks to the committee of the Academy for the confidence placed in me by this charge. The treatise was accomplished in the department of "Volkenkunde" of the KONINKLIJK KOLONIAAL INSTITUUT at Amsterdam. I am particularly indebted to the Institute for the great hospitality shown to me. Frequently I had to appeal to the library officials of this institution. They have always assisted me in my work with the greatest courtesy.

Frequent applications were also made to the University library of Amsterdam, and for their highly appreciated assistance special acknowledgment should be made to Dr. J. BERG and to Mr. P. OOSTERBAAN.

In arranging the material, a choice had to be made between a division either according to anthropological subjects or as near as possible chronologically, period after period. The former division appeared to have this drawback that several investigators have dealt with more than one field of anthropology, which would make it necessary to mention them again and again in different chapters. This might offer difficulties to the reader who wishes to form an opinion on the significance of these investigators and to get an insight into their activity in anthropology. For this reason a chronological discussion has been preferred, although the author wishes to stress that the anthropology of the Netherlands rather than the Dutch anthropologists has to form the actual subject of this study. For the rest the works of the living contemporaries have been grouped in the last chapters as far as possible according to the subjects.

If we wish to get an insight into what has been published in former times in the field of anthropology, we are struck by the fact that not everything announcing itself under the name of "anthropology" actually dealt with this subject, at any rate according to our present-day views. For example, the library of the *Nederlandsche Maatschappij tot Bevordering der Geneeskunst* possesses a book by A. KYPER which is entitled: *Anthropologia corporis humani contentorum* ¹⁾, but deals exclusively with anatomy and physiology. Much later (1851/55) was published C. PRUYS VAN DER HOEVEN's "Anthropologisch onderzoek" ²⁾, consisting of the following four parts: study of pathological anthropology, study of historical anthropology, study of clinical anthropology, and study of Christian anthropology. It is to be regretted that PRUYS VAN DER HOEVEN did not exactly tell his readers what he actually meant by anthropology; even after reading the book we are left in doubt in this respect. In order to illustrate this, a paragraph may be taken here from each part: "Pulmonary sufferers", "Import of tea, coffee, tobacco", "The Consultation", and "Hope". That

1) Leiden, 1660.

2) This book, published at Leiden, has been several times reprinted.

even contemporaries could not obtain a clear notion of what was meant by "anthropology" from this work, is apparent from a little book in epistolary form by GOBEE¹⁾. In the eighth letter, dealing with "anthropology", we read as a complaint the following quotation from a German rhyme: "Mir wird von alle dem so dumm, als ging mir ein Mülrad im Kopf herum".

A little later we find a paper by A. H. ISRAELS²⁾, which, indeed, gives the impression of a strong similarity of views with PRUYS VAN DER HOEVEN, but in which it is said that the author accepts RUDOLPHI's definition of "anthropology": "the study of that which distinguishes man as a peculiar being from all the rest in nature and characterizes him as such". The purport of ISRAELS' discussion was for the rest a plea for synthesis of the various branches of medical sciences.

There is some reason to pay attention to the above-mentioned meaning attached to the word "anthropology" when we bear in mind that almost simultaneously with PRUYS VAN DER HOEVEN's book a work was published by SURINGAR under the title: "De opvoeding der zintuigen"³⁾. This contains a chapter on anthropology in which is found the definition: "natural history of the human race" and "difference between men and men, particularly between different tribes". SURINGAR also used the term "physical anthropology" and said that this part of anthropology had to be founded on anatomy, physiology and psychology, while measuring and weighing ought to form an important part of the methods of investigation. This conception of anthropology was shared by LUBACH (8) who in addition translated "anthropology" as "menschkunde"⁴⁾, adding the warning that this should not be mixed up with knowledge of the human mind.

The science of races was called ethnology by LUBACH and this term became of practical importance when the "Committee for Ethnology" of the Maatschappij tot Bevordering der Geneeskunst was formed, which was to deal mainly with the study of the anthropological composition of the Dutch population.

Yet we should not keep too much to a word for, although in the middle of the 19th century a scholar like PRUYS VAN DER HOEVEN suggested a definition strongly deviating from that of the present day, this does not alter the fact that long before that time scientific contributions had been written, which according to their nature certainly belonged to the domain of anthropology, as this science is nowadays conceived. Besides, it is only fair to

1) 1855. Brieven over Geneeskunde. Deventer, Willerdink. These letters as well as the book by PRUYS VAN DER HOEVEN have been discussed by K. M. GILTAY in Tijdschr. Ned. Mij. t. b. d. Geneesk. 1853.

2) 1853. Eenige opmerkingen over anthropologie. Nederl. Weekblad voor Geneeskundigen. August 13 and 20. In the same volume W. EGELING raised objections to this article.

3) 1855. Amsterdam. Gebhard & Co.

4) "Knowledge of man".

point out that among those earlier workers VAN DER HOEVEN (20), even a brother of PRUYS VAN DER HOEVEN, divided anthropology into two principal divisions, one of which had to comprise the distinctions between man and animals, while the other, called "comparative anthropology", referred to the "difference between men and men". Evidently VAN DER HOEVEN's conception, as well as those of SURINGAR and LUBACH are already more in agreement with that of the present day.

In 1924 a study was published by KLEIWEG DE ZWAAN (3), which also deals mainly with the interpretation of the word "anthropology". He reminds us that ARISTOTLE meant by anthropologists philosophers who were interested in the nature and disposition of man. At the beginning of the 16th century anthropology comprised the science concerning the mental nature of man. After the 16th century anthropology was practically synonymous with descriptive anatomy (KERCKRING, COWPER, MAGNUS and consequently also the above-mentioned KYPER). FICHTE and SCHULTZE, however, published as "anthropology" works of a generally psychological and pedagogical nature.

At a meeting of ministers at 's-Hertogenbosch on September 16, 1935, Prof. Dr. G. SEVENSTER gave a report on: "The anthropology of the gospels". From this it becomes apparent that in theological circles till the present day "anthropology" has a peculiar — at any rate for anthropologists unusual — meaning and probably can be interpreted most satisfactorily by "menschbeschouwing" ¹⁾, the physical being weighed against the psychical. The meaning of "anthropology" as it is used in psychiatry ²⁾ is probably again somewhat different, while also philosophy has its own interpretation of anthropology ³⁾.

The following chapters are intended to give a review of the anthropology of the Netherlands and of the achievements in this field of science by the Dutch. Neither in former days nor at the present time can there be said to be a worker who is exclusively an anthropologist. The anthropology of the Netherlands is undoubtedly greatly indebted to physicians ⁴⁾ who in addition to their practice were interested in research, in this case anthropological problems. For the greater part the anthropology of Holland has been built up by scholars who indeed had a scientific status but who could not or did not wish to regard anthropology as their sole field of investigation. There is no doubt that among both these categories of investigators there have been noted personalities, even to such a degree that of some of them may be said that they have done pioneer work, also in the field of anthropology.

As a matter of course this study is only meant to give an idea of their

¹⁾ "Study of man".

²⁾ H. C. RÜMKE. *Psychiatrie als geestes- en natuurwetenschap*. Oration 1937, Utrecht.

³⁾ In the University of Groningen there is a private lecturer for "philosophic anthropology".

⁴⁾ *De Nederlandsche arts als anthropoloog* (NIJESSEN 2).

anthropological work, while that on other subjects will be hardly mentioned. Some publications, therefore, will not be completely discussed; only those parts which deal with anthropology will be mentioned. In general no mention will be made either of the studies of Dutch investigators on foreign races. Merely conclusions or remarks of a more general character will be made concerning these studies, if there is any reason for doing so, e.g. with respect to evolution and methods, in order to do justice as far as possible to the views of the Dutch scholars on these subjects. This has the advantage on the one hand that there will be a greater connection between these points and on the other hand that, should a review of the anthropology of the Dutch East Indies be written, this may be confined to the actual classification of races and the mention of the anthropological societies of that country.

In some anthropological publications material relating to foreign races and peoples is compared with that of Holland. However, often it could not be stated from which element of the Dutch population the examined material had been obtained. It is evident that such studies contribute only to a certain extent to the anthropology of the Netherlands. In case of a physiological examination of foreign races in tropical surroundings, compared with Dutch people, we are besides faced by the difficulty that the Dutch have been examined in to them unusual (tropical) surroundings.

For this reason publications in which the Dutch population has been used as material for comparison will be left undiscussed in the following pages ¹⁾. And since we wish to confine the subject to Dutch people under normal conditions, it will be hardly necessary to say that all studies will remain undiscussed which are based on observations of pathological cases, among which also those on criminal anthropology.

Judging by the title, we might expect that P. A. THIELE's "Nederlandsche bibliographie van Land- en Volkenkunde" ²⁾ would contain a predecessor of this survey. However, the book by THIELE contains very little concerning the anthropology of the Netherlands.

¹⁾ Such studies were published by C. U. ARIËNS KAPPERS, J. H. F. KOHLBRUGGE, F. H. G. VAN LOON, J. P. KLEIWEG DE ZWAAN and others.

²⁾ 1884 Amsterdam.

INTRODUCTION.

In the 12th century it was a custom in Friesland to weigh new-born babies before the altar in church (LEVELT). This custom has existed for several centuries, for we read that in the 16th century in Bergen op Zoom the weighing took place at the altar of "theilig cruys". According to the weight of the child an offering to God was made in the shape of wine, wax, wheat, flax or money. For the anthropologist it is to be regretted that the weight of these children has not been recorded. Nowadays the weighing of the new-born is a usual custom and the weight is registered, but in the anthropological literature these data are still seldom found.

It is a well-known fact that VESALIUS (1514—1564) stated the existence of racial differences ¹⁾, but before the time that in Holland and also abroad there was an actual anthropological literature, still another person came to the foreground whose name deserves to be mentioned. It is BERNHARD SIEGFRIED ALBINUS who already dissected corpses of foreign races (NIJESSEN ²⁾) and whose *Index supellectilis anatomicae* (1725) J. SASSE (11) has discussed. This made ALBINUS a pioneer in the field of craniometry, although his skull measurements had no anthropological aim. His interest in anthropology cannot be denied and is apparent from the fact that in 1743 he conferred the doctoral degree upon J. B. VON FISCHER, born at Riga, who wrote a thesis on skulls of a European, a Negro and a Mongolian. Although ALBINUS was one of the instructors of CAMPER, yet there is no indication that the interest taken in anthropology by the pupil was due to a special influence of the master.

The material examined by ALBINUS, mainly from foreign races, supports the belief that the earliest students of anthropology were not urged by an interest in men of their own surroundings, the Dutch. It was indeed a long time before the Dutch were used as material for anthropological research. Also those who came after ALBINUS seemed to be chiefly interested in foreign material. In the following pages there will be many opportunities to point this out, but we should not lose sight of the fact that, when in the latter half of the 18th century the scientific world begins to show a more regular interest in anthropology, at the same time it pays attention to the problem of evolution, which has nothing to do with interest in the exotic. Often the same scholars were dealing with this problem as well as with the study of foreign races. May we, therefore, assume that at that time arose a special desire for knowledge of "Man"? Historical development

¹⁾ KLEIWEG DE ZWAAN (3).

²⁾ *Mensch en Maatschappij*, 1927.

gives an answer in the affirmative, though it may seem strange that originally it was tried to satisfy this desire for knowledge of ourselves, of what is characteristic of us, by studying what is foreign to our race. It should be remembered that men of a foreign race as a rule were not compared with the Dutch but with some specimen from the animal world. Here the problem of evolution crops up immediately and consequently we may say that originally the study of man has been approximated not so much by means of classification of races, so by comparison of men with other kinds of men, as by descent. So the general study has preceded the special one: the question concerning "man" was primary to that dealing with "the Dutch". When a Negro was examined, the actual attention was not drawn to the qualities of the foreigner but the fundamental question asked was: is this Negro also a man?

More closely related to the anthropology in particular of the Netherlands there is another question which simultaneously called for attention: who were the first inhabitants of the Netherlands and what is their possible relationship to the present population? Considering the time when these studies appeared and the scarcity of anthropological material from the earliest times which the Dutch soil appears to contain, it is not surprising that the scholars who were interested in these problems were not anthropologists. Nevertheless some of them may be mentioned here, such as J. VAN LIER¹⁾, L. OFFERHAUS²⁾ and E. M. ENGELBERTS³⁾. Their studies as well as those of their predecessors CLUVERIUS (1616) and ALTINGH (1697) usually had as a starting-point the megalithic tombs of which PICARDT (Drentsche Oudheden) had said that they were built by giants. The writings of TACITUS served as the principal historical authority. As will be apparent in a later chapter, the first half of the 19th century still produced many studies of a similar kind.

¹⁾ Oudheidkundige brieven. Vosmaar 1760.

²⁾ Korte schets van de volken die weleer 't gezegend Nederland bevolkt en bewoond hebben. Verh. Holl. Mij. Vol. VI, 1761.

³⁾ De aloude staat en geschiedenissen der Vereenigde Nederlanden, 1784—1799.

CHAPTER I.

Petrus Camper *)
1722—1789.

CAMPER is commonly considered the founder of anthropology in Holland. Owing to the fact that he had no real predecessors and the importance of his work as well as that of his personality, he may fully claim this title.

CAMPER's interest in anthropology has to be attributed to two circumstances: 1. his talent for drawing, which made him try to realize the essential distinction in features between representatives of different races, and 2. his frequent travelling abroad (1748, 1749, 1752 and several times after retiring from his professorship at Groningen in 1773). These journeys, where his ability to express himself fluently in foreign languages was very useful to him, also led to his getting into touch with eminent contemporaries of European fame, such as HUNTER, BUFFON and GOETHE, among whom in particular BUFFON was interested in anthropology. With GOETHE CAMPER corresponded about the intermaxillary bone, the absence of which in man was at the time (see also KOOLS) considered a mark of profound difference between men and animals. At Franeker CAMPER was the host, among others, of SOEMMERING.

As an illustration of CAMPER's capacity for a sharp anthropological distinction, MULDER said that CAMPER by the shape of the head could distinguish the inhabitants of Koudum, Hindeloopen and Molkwerum from those of the neighbouring het Bildt. Indeed het Bildt has to be regarded as a settlement of emigrants from the province of Holland in Friesland¹⁾, which would explain the difference.

*) BAUER, S. De levens van gedenkwaardige mannen en vrouwen uit de 18e eeuw, gevolgd naar het Hoogduitsch, met eenige Hollandsche levens vermeerderd.

CAMPER, A. G. Levensschets van PETRUS CAMPER. Leeuwarden 1791.

DANIËLS, C. E. Het leven en de verdiensten van PETRUS CAMPER, Prov. Utrechtsch Genootschap 1880.

HALBERTSMA, J. H. 1857. Familie Camper. Manuscript. Provinciale Bibliotheek Leeuwarden.

HARTING, P. 1878. Schets van het leven van PETRUS CAMPER. Album der natuur.

MULDER, J. 1808. Oratio de meritis PETRI CAMPER in anatomiam comparatam.

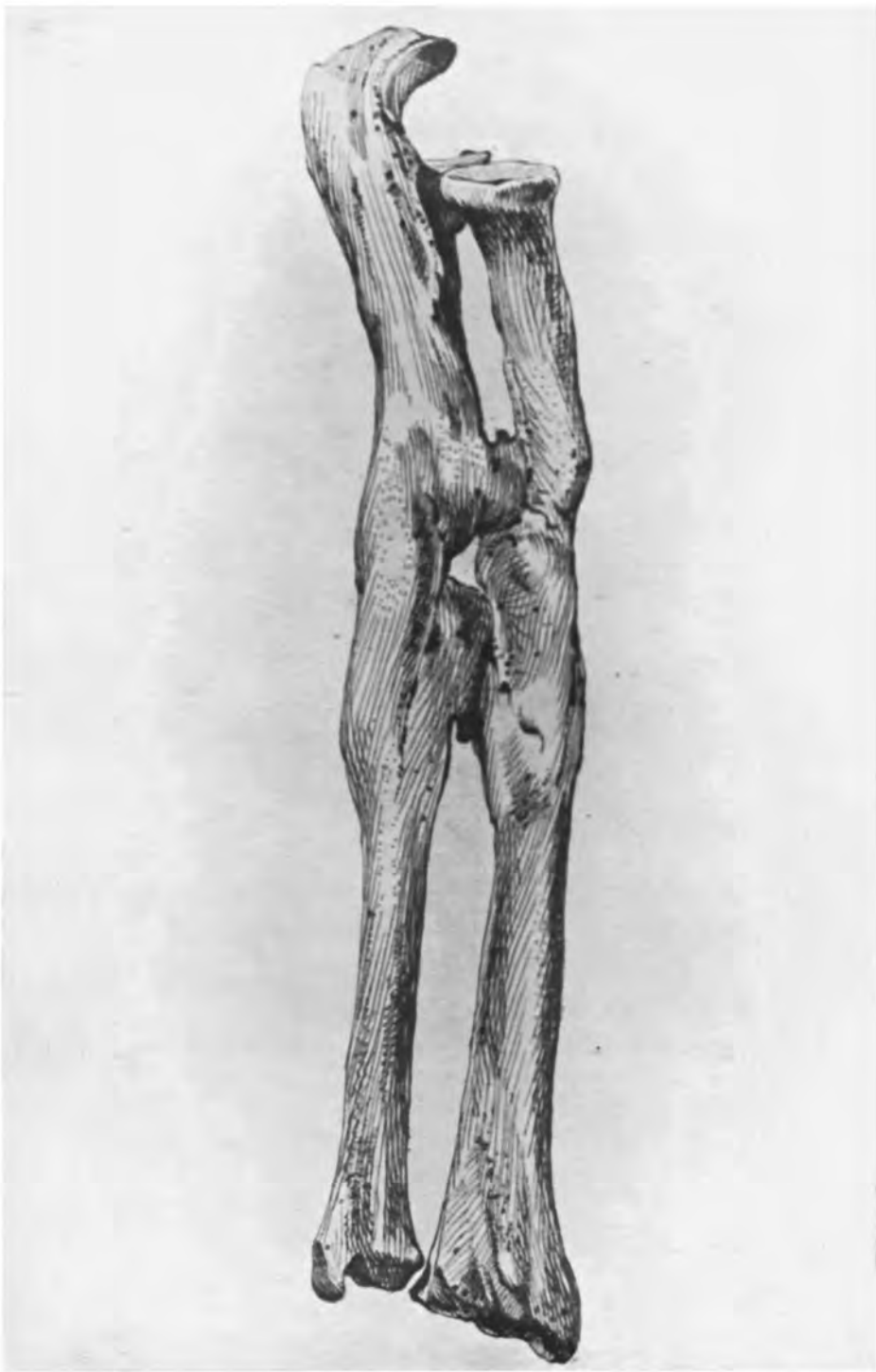
NUYENS, B. W. TH. Dagboeken over 3 Engelsche reizen van CAMPER. Opusculum of the Nederl. Tijdschr. v. Geneesk. 1938.

NIJËSSSEN, D. J. H. 1927. PETRUS CAMPER en zijn tijdgenooten. Mensch en Maatschappij. Vol. 3.

VOSMAER, G. C. I. 1881. Het leven en de verdiensten van P. CAMPER, Nederl. Spectator.

See also: Catalogue de manuscrits de PIERRE CAMPER et de lettres inédites, écrites par lui ou à lui adressées. Published by Fred. Muller & Co. Amsterdam for the Maatschappij t.b.d. Geneeskunst in 1881.

¹⁾ VAN DEN BROEK. 1934 in R. SCHUILING. Nederland. Handboek der Aardrijkskunde, Zwolle 6th ed.



2. *hæfelden Osteographia, Tab. 45. fig. 1*

Amico Lno
D. Hovius
D.
N. Camper
Amstel. 1754

A drawing made by CAMPER for HOVIUS, at present in the possession of the Anatomical Laboratory of the University of Amsterdam.

The anthropological contributions by CAMPER deal with three different subjects: his study on the colour of the skin, his view concerning evolution, and his suggestion to introduce special measurements to be taken on the skull and angles, the most familiar of which is the "facial angle".

Representative of his time, as this was briefly sketched in the introduction with regard to anthropology, CAMPER selected for objects of observation — at any rate in so far as he did not deal with other sciences — specimens of foreign races and apes, in particular anthropoids (2, 3, 4, 6, 8).

NIJESSEN¹⁾ mentions that already in 1758 CAMPER dissected the corpse of a Negro for the first time and that the number²⁾ of anthropoids examined by him was so large that the 18th century for that reason has been called "the age of the orang-utan".

CAMPER's researches on the colour of the skin (1) caused him to regard "the reticulum" (the Malpighian layer) as the seat of the pigment, but still more important is his opinion on the intensity of pigmentation. CAMPER assumed a close connection between the colour of the skin and the influence of external conditions, namely the sunshine. Although it might take generations, according to CAMPER it may be expected that in the end Negroes, of whom he also said that they are born white, on migration to Europe lose pigment. White men should even be considered "white Moors". If the pigmentation of the pudenda and the expression "zwart van magerte"³⁾ had not prevented this nestor of anthropology, he would probably have stated that the colour of the skin exclusively depends on the influence of the sun. Now, however, he also ascribes significance to food and air, though he does not know how they react: "evenwel kunnen zij geen bijzonder soort voortbrengen, maar wel een verandering. Zwarte, minder zwarte en blanke menschen zijn geen onderscheidene soorten, maar veranderingen"⁴⁾. Since CAMPER evidently surmised that the diversity in the colour of the skin is not based on absolute differences but on non-hereditary modifications, it loses a considerable part of its value as a racial characteristic. Moreover, since the expression "white Moors" shows that by the side of pigmentation no other racial characteristics seemed to be admitted, one might be inclined to say that at the time of CAMPER prospects were not too promising for the classification of races! It is true, CAMPER has denied this conception by introducing his "facial angle", which will be discussed more in detail, but yet his views on the colour of the skin led him to the conviction that Negroes are so closely related to white men that they cannot be a cross between men and orang-utans, as at the time was

1) Mensch en Maatschappij 1927.

2) According to DANIELS this amounted to eight between 1770 and '80. However, he adds that CAMPER already began the examination of orang-utans in 1757.

3) Literally: "black with leanness".

4) "However, they cannot produce a particular species, but a modification. Black, less black and white men are not different species, but modifications."

commonly accepted, neither could they have originated by "education" of these "monsters". This error CAMPER wanted to eradicate for ever. He was namely convinced that coloured races are men and that man, owing his existence to the Creator, has his monophyletic origin in ADAM, of whom it does not matter whether he was white or black.

His studies on the colour of the skin consequently led CAMPER to form an idea of the influence of external conditions on the physical properties. Evidently he makes a distinction between two groups: influences offered by nature and such as are caused by man. He accepted the first as an explanation of anatomical characteristics, but he rejected the second and thus took up a point of view which was the very opposite of that of BUFFON and other contemporaries. For example, he thought that VESALIUS had been wrong in attributing the dolichocephaly of the Dutch to the custom of the mothers who put the children to sleep lying on their sides. Instead of this human interference CAMPER suggested as an explanation the narrow pelvis which is frequent in this country ¹). He asked why for racial characteristics of the skull artificial deformation should be taken into account, if there is no need to do so in case of other peculiarities, such as the narrow jaws and wide hips, the latter of which, according to CAMPER, give a wobbling gait to the Dutch. Meanwhile he had to admit that the shape of the head may be modified by bandages and that physical exercises improve the form of face and limbs.

The influence of food was, according to him, less artificial and he ascribed it to this reason that the straight hair of the people from Munster and Drente in the end begins to curl when they live at Amsterdam.

While CAMPER's studies of the colour of the skin had already frequently led him to the problem of evolution, naturally his investigations of anthropoids (2, 4, 6, 8) did so even more. Repeated examinations of orang-utans convinced him that there are profound differences between this animal and man, such as the difference in appearance, size and manner of movement. Besides, he pointed out that the orang-utan can neither lie on his back, grasp and sit in a human way, or speak. The last point has once been the subject of a premeditated anatomical examination, in order to find out whether perhaps the orang-utan, like man, was provided with organs of speech and only could not speak because he had not been taught to do so. This view, which was supported for example by MONBODDO, has been refuted by CAMPER's study (3).

With regard to the problem of evolution CAMPER arrived at the conclusion that all vertebrates show a great physical similarity, which is also shared by man, but in his opinion this does not at all imply a genetic relationship.

¹) It should be remarked that CAMPER (5) found the skulls of Dutch people to be comparatively narrower at birth than at a later age. This greater breadth at a later age was attributed by him to "weakness" (rhachitis?).

CAMPER's great contribution to anthropology is most commonly remembered by means of his facial angle (5). He had been struck by the fact that people of "many nations" distinguish themselves by a difference in protrusion of the upper jaw, in breadth of the face and squareness of the lower jaw. In order to form these differences, particularly for the sake of painters, into a system of lines and angles, he drew a line connecting the lower boundary of the nose with the external opening of the ear, the "horizontal line", and the "linea facialis", the tangent to upper incisor and frontal bone. The angle between these lines is the "facial angle". Besides this angle CAMPER attached value to the position of the condyles with regard to the centre of the longitudinal projection of the skull or the head on the horizontal line. The highest and lowest points of the skull with regard to the horizontal line are moreover used as supports for a number of lines, by means of which some proportions may be determined. This shows that CAMPER's directions rather referred to indices than to absolute measurements, which probably may be explained by the fact that they were mainly given for the plastic arts. It is characteristic that this part of his works discusses Negroes, Kalmucks, inhabitants of Siam and Celebes, and Mongolians, but "Europeans" are only mentioned for comparison. For this purpose CAMPER usually took Greeks, sometimes Apollo mentioned by name. He also examined the proportions of face and skull for different ages and enlarged on physical beauty. In one of his articles (7) there is also a remark found on the difference in the angulus pubis of a Negro, a woman from Celebes and a European. Pelvic measurements were already given in 1751 by PAULUS DE WIND in an article titled: "Het geklemd hoofd geredt" ¹).

On the subject of the facial angle CAMPER has given a lecture in Paris (DANIËLS). A note from his hand has been preserved: "1779, 19 Juli, Parijs. Académie royale des Sciences..... Daarna las ik over het karakter en verschil in de troniën der natiën" and "26 July, Académie royale des Sciences. Ik teekende de faciale lijn van Europeanen, Neger en Aap. Na eenige discussie met DAUBENTON scheen de geheele vergadering zeer vergenoegd en verbaasd over mijn redevoering" ²).

Is there perhaps some connection between the self-sufficiency somewhat evident in these words and the fact that there are so many portraits of CAMPER? He will hardly have expected that one of them after a century and a half would become the starting-point of an investigation by the biogenealogist of the "Nederlandsch Instituut voor Erfelijkheidsonderzoek bij den Mensch en voor Rassenbiologie" ³). It is possibly also due to CAMPER's qualities of character that he has left no school behind him: at the end of his life there was nobody to continue his work without interruption.

¹) J. KWAST. Een beschrijving van Moriori-bekkens. Thesis. Amsterdam 1908.

²) "Then I read on the nature and difference in the physiognomies of the nations" and "....., I drew the facial line of Europeans, Negro and Ape. After some discussion with DAUBENTON the whole assembly seemed very pleased and surprised about my speech".

³) VAN BEMMELEN (6).

Application of the facial angle by Dutch scholars of later times will be discussed further on. First some of CAMPER's contemporaries have to be mentioned, who, starting from historical data, were particularly interested in the composition of the Dutch population. Among them VAN CRUISELBERGEN investigated which elements of the population in the course of time had settled in Zeeland. In his paper there is an interesting supposition that after their raids in Zeeland the Danes and Norsemen were indeed for the greater part expelled but yet, by means of fusion, have added a component to the population of Zeeland.

LE FRANQC VAN BERKHEY, M.D. wrote a large work on the "Natuurlijke Historie van Holland". The fifth chapter of the third part has this remarkable heading: "handelende over de eerste afdeeling van het Rijk der dieren of het eenige heerschende dierlijke wezen den Mensch"¹⁾. The author explains that man, with regard to his material existence, should be reckoned among the animals. In the animal kingdom he then distinguishes "heerschende en onderworpen wezens"²⁾; the first group consists exclusively of man.

LE FRANQC VAN BERKHEY freely used historical data in order to enlarge on the origin of the population of the Netherlands. He considers admixture of Roman elements possible, a view which may be accepted, although it is seldom met with in the literature. The regional discussion of the Netherlands hardly contains anything of anthropological importance, but there is yet a chapter on the fertility of the Dutch. His conclusion is that a part of the country is more fertile according to its healthier conditions. As a criterium for the healthfulness of an area can also be taken the number of persons in it whose age exceeds 100 years (between 1755 and 1773 at the Hague 39!)

It may also be mentioned that LE FRANQC VAN BERKHEY considers the head-gear to influence the shape of the head.

R. PALUDANUS, L.L.D. communicated the finding of a church-yard between Wieringen and Wieringerwaard. The fragments of skeletons brought to the surface, were measured by CORNELIS HOEFMAN Jansz., lecturer in anatomy, obstetrics and surgery at Alkmaar, who took for a standard the reproductions of ALBINUS (p. 6). Since tradition would have it that giants had settled there (cf. "hunebedden"), HOEFMAN states emphatically that the bones could not have belonged to men who were taller than the recent inhabitants. PALUDANUS estimates the age of this church-yard at the 14th and at the very earliest at the 13th century. In connection with the oldest adventures of mankind in which the scholars were interested at the time, particularly also with regard to the problem of the origin of man, the following quotation may be taken from the book of PALUDANUS: "Het is niet meer zoo gesteld, als met de eerste bewoners

¹⁾ "on the first division of the Animal Kingdom or the only dominating animal creature, Man".

²⁾ "dominating and subjected creatures".

der aarde, toen God om bijzondere redenen den Vader aan den zoon, en dezen weder aan zijn nakroost, omstandigheden deed verhalen, welke naderhand moesten geboekt worden" ¹⁾).

Towards the end of the 18th century some treatises deserve attention, since the authors would later be considered to belong to the evolutionists. They are VAN SCHELLE and SCHRAGE. The first, in an extensive defence of vegetarianism, places the orang-utan among mankind. He could conceive that this view would not be generally accepted, but those who reject it would at any rate be compelled to consider the orang-utan as an intermediate form between the other animals and man.

SCHRAGE will be most clearly understood if we quote some passages. "Laaten wij dan, ondanks onze aanminnelijke vooringenomenheid, de vernederende waarheid erkennen, dat het dierlijk gestel van beide menschen en beesten gelijk zij" ²⁾. The points in which they differ are due to "konst-oefening" ³⁾ of man. SCHRAGE claims the soul for man, but it should not be inferred "dat onze geest, ons verstand, ons oordeel, ons geheugen, onze zintuigen, ons vindingsvermogen, onze krachten, die der andere tamme of wilde beesten overtreft". And further: "Denk niet, dat ik den mensch tot beesten heb willen vernederen; noch de beesten tot menschen verheffen: ik heb hieromtrent alleen den Natuurstaat des menschedoms trachten te schetzen; dat is den mensch tot eenen mensch te vormen. Vleit zulks de eigenliefde van veelen niet; dat zij dan hun bekoorlijk vooroordeel koesteren; ik benijd het niet: Men leeft zooveel te gelukkiger, naarmate men zich gelukkiger schat" ⁴⁾).

The work of DE VOS deals with general anthropology and has for a title two questions: "Welke zijn de voornaamste Hoofdtrekken, en welke de Natuurlijke en Zedelijke oorzaken der onderscheidene Geartheid, of van het verschillend Karakter, 't welk het eene Volk van het andere onderscheidt? — Is het gepast dat de Leeraars der Zedekunde, in het geven van voorschriften voor de publike zeden, op dat verschil acht slaan? Zoo ja, in hoeverre?" ⁵⁾. From the answers to the questions it becomes apparent that

¹⁾ "Matters are no longer as they were with the earliest inhabitants of the earth, when God for special reasons made the father relate to the son and the latter again to his progeny the events which afterwards had to be written down."

²⁾ "Let us then, in spite of our charming prepossession, admit the humiliating truth that the animal system of both man and beast is identical".

³⁾ "artificial measures".

⁴⁾ "that our mind, our intellect, our judgment, our memory, our senses, our ingenuity, our powers exceed those of the other tame or wild animals." And further: "Do not think that I have wanted either to degrade men to animals or to raise the animals to men: I have only tried to describe the natural state of mankind, that is to form man to a man. If that does not flatter the self-love of many, they may cherish their charming prejudice. I do not envy them. We live more happily according as we consider ourselves happier."

⁵⁾ "Which are the principal features and which the Natural and Moral causes of the distinction in Nature or of the different Character which distinguishes one Nation from the other? Is it advisable that the Teachers of Morality, when dictating rules for the public Morals, take this difference into consideration? If so, to what extent?"

DE VOS entirely denies internal somatic racial characteristics and restricts the external ones to colour of the skin, shape of the cranial bones, and peculiarities of the hair. He called attention to the variability. By the side of the few mentioned characteristics of a physical-anthropological nature, DE VOS also distinguished differences in degree of the mind.

A study on the mind of the Dutch people was published in his time by OCKERSE. This book betrays sharp observation, contains many pointed remarks, and the description of character given in it has still retained its value in our days. OCKERSE awards a higher place to the character of the individual than to what he calls the national character. The mind is dependent upon hereditary qualities but is influenced by the climate. To this the phlegm of the Dutch should be due. It seems somewhat strange that not as results of but as influences on the mind are mentioned: "a spirit of freedom", a "spirit of commerce and industry", the desire for the formal in Religion, a morality of their own, etc. OCKERSE depicted the Dutch as having little imagination, but intellectually well developed, tending to the exact ¹⁾, which is manifest even in the science of language by the choice of orthography and grammar. In the moral decline at the end of the 18th century, the Dutch, who need stronger stimuli for their pleasure, differ from the more light-hearted French. Reading OCKERSE's work in the years of depression after 1929, when we find a desire for "planning", we are struck by his remark: "Overdreven zucht tot orde is in dit land de bron van eindeloze wanordes en verwarringen geweest" ²⁾).

Gerardus

Vrolik *)

1775—1859

The thesis of VROLIK (1) has hardly anything to do with anthropology. It argues that the build of man makes his upward gait and stature necessary. His study on the pelvis (2) is more important; the drawings in the attached atlas were made by VROLIK's son. The author raises the question whether racial differences of the pelvic bones depend on the organs of reproduction or on other causes. He concludes that here a number of causes cooperate which are mutually connected. It is again characteristic that for comparison with the foreign pelvis material is taken from "Europeans", and yet, is that so surprising for that time, considering that the present-day anthropologist often still has to be satisfied with a comparison with "the Dutch"?

Deviation in form from the European pelvis is always regarded by VROLIK as an animal characteristic and what applies to the shape of the pelvis also holds good, according to him, for other properties, even mental qualities. He says, for example, that by improving their education much might be attained with Negroes but that it is their animal nature which

¹⁾ In this connection it might be remarked that NOBEL prizes have been granted to Dutch scholars always in connection with merits in the field of exact sciences.

²⁾ "Exaggerated love of order in this country has been the source of endless disorder and confusion."

*) Obituary by J. VAN DER HOEVEN. Jaarboek Kon. Akad. van Wetensch. Amsterdam 1859.

See also: MULLER, FRED. Catalogue 1860. Amsterdam.

prevents them from reaching the development of the European. VROLIK regarded the Javanese as much more highly developed than the Negroes or Bushwomen, also on the ground of his relation to a Supreme Being and his talent for music. When immediately afterwards he describes the Javanese pelvis, it seems more or less a confirmation of the preceding statement that the pelvis also seems to show a higher level of development! This peculiar view on the relationship between physical and mental qualities can probably be partly explained by the success achieved in many circles by GALL's craniology, on which subject VROLIK lectured for a mixed audience (VAN DER HOEVEN).

On the pelvis of a Mestizo VROLIK also tried to trace the influence of cross-breeding.

For us VROLIK's name lives on in the anatomical museum founded by him, now forming part of the anatomical collections of the University of Amsterdam ¹⁾. His contemporary S. J. BRUGMANS has made a similar contribution to the museum at Leiden. In the panegyric by VAN DER BOON MERSCH ²⁾ on BRUGMANS we read that the collection at Leiden "was arranged chiefly with an anthropological purpose" and besides, in order to test GALL's theory, contained skulls of various nations. BRUGMANS also studied the influence of soil and climate upon man "en hoe daardoor de verscheidenheid der menschensoorten en volken geboren en gewijzigd wordt" ³⁾. CAPADOSE, to whom we also owe a panegyric on the Leiden anatomist ⁴⁾, wrote that BRUGMANS at Munster was struck by the peculiar gait of the peasants, which he considered ape-like. This impression was, in his opinion, corroborated by anatomical examination of the leg of a Westphalian peasant.

Consequently there was during the transition from the 18th to the 19th century a strongly pronounced tendency to regard all which seemed strange or deviating as animal-like and to characterize it in particular as ape-like. In the 19th century this view would still be met with, although in a weakened form and on a better comparative-anatomical foundation.

¹⁾ The catalogue of the collection VROLIK has been composed by DUSSEAU but, according to the preface, the part dealing with anthropology has to be attributed to W. VROLIK.

²⁾ Prize essay. *Werken Holl. Mij. van fraaie Kunsten en Wetenschappen*. Vol. VII, part. 2, 1825.

³⁾ "and how in that way the diversity of kinds of men and peoples is born and modified."

⁴⁾ Published immediately after that of VAN DER BOON MERSCH in *Werken Holl. Mij. van fraaie Kunsten en Wetenschappen*.

CHAPTER II.

Jacob Elisa

Doornik *)
1777—1837.

In DOORNIK we find the true natural philosopher, a man who, with regard to his scientific views, was far ahead of his time and had the courage to stand up for his opinion. It is indeed a pleasure to read his works which excel in acuteness of argument. Unusually well-read, he does full justice even to opponents.

It is not surprising that a medical practice could not form the centre of the life of such a man as DOORNIK and when he retires "is het echter meer de hartstocht van het weten, die hem beheerscht, dan de liefde voor den arbeid in het laboratorium der natuur" ¹⁾ (VAN BAREN): DOORNIK was not interested in practical natural-scientific research but preferred to indulge in philosophic contemplations.

In particular the problem of evolution fascinated DOORNIK (3²⁾, 4³⁾). In his arguments he proves himself to be a broadminded man. For example, he realized the fact that geology raises questions which make the time of history seem very small and he is convinced that mankind is much older than history, a conception which at his time was hardly common. Enlarging upon the Biblical story of creation, he says that the age of mankind should not be derived from ADAM (Genesis 2), because he is not identical with the first man in Genesis 1. DOORNIK considers ADAM the first husbandman ⁴⁾, created from the dust by JEHOVAH, whereas Genesis 1 relates the creation of man by ELOHIM after his likeness. That ADAM could not have been the first man is also apparent from Genesis 4, while Genesis 6 should refer to two races of men: sons of ELOHIM and sons of ADAM, from the interbreeding of whom titans were born. However, from this argument it should by no means be inferred that DOORNIK wanted to consider the Bible as starting-point for his scientific hypotheses. With the greatest respect he speaks of "the Hebrew myth".

Nature which surrounded him, supplemented by what can be derived from cultural history, was insufficient to DOORNIK as a source of study.

*) BAREN, J. VAN. 1909. Een vergeten Nederlander. Jaarboek voor geschiedenis en oudheidkunde van Leiden en Rijnland, Vol. 6.

HARTING, P. 1871. Iets over J. E. DOORNIK en zijn aandeel aan de ontwikkelings-hypothese. Versl. en meded. Kon. Akad. v. Wetensch. Amsterdam, afd. Natuurkunde V, reeks 2.

¹⁾ "It is the desire for knowledge which urges him rather than love for the work in the laboratory of nature".

²⁾ Discussed in Alg. Vaderl. Letteroef. 1808. The same volume mentions the panegyric by DOORNIK on J. R. DEIMAN after his death.

³⁾ Discussed in Alg. Vaderl. Letteroef. 1816.

⁴⁾ Dutch: akkerbouwer.



J. E. DOORNIK (1777—1837).

He wished to obtain knowledge of the natural history of man. The recognition of a natural history of man implied DOORNIK's conviction that the first men had been different from later types and this original form he tried to visualise. For this purpose he desired to make use of natural-historical data which, in his opinion, would be found particularly in the history of the earth, for from the creation of man onwards there should be a close relationship between man's natural development and the story of the earth. Concerning our knowledge of the earth, DOORNIK warns us that: "De Natuur verdeelt de aarde in physische strecken, de mensch, integendeel, in geographische deelen" ¹).

Consequently DOORNIK raised the question how the origin of man should be conceived. According to him, man should be regarded physically as being on a level with the animals, but differing from them by his disposition to "anthropogenesis", i.e. by the possibility in man of development into a "rational being". To discover at what point this development begins is the aim of DOORNIK's researches. What he thought of its course has been laid down in this statement: "Als Dier werd hij geboren van de Natuur, als Mensch gaf de mensch zigzelve het aanwezen" ²).

Except, therefore, that the capacity to develop as such is inherent in man, DOORNIK thought that conditions had to be favourable and for that reason the place where man has lived in his primary state could not be the same as that of the oldest civilization. Consequently he prefers to think that the origin of man could not have been in Asia, because an old civilization has existed there, and he is not at all sure that there may not have been a still older civilization or that civilization could not have its origin in more than one place. The latter consideration, added to the diversity of races of men and his objections to the view that Africa, America and the Eastern South-Sea Islands had been populated from Asia, made him suppose that the various "tribes of men" had originated autochthonally, so not out of one another, not in the same place and not necessarily at the same time, a suggestion which, according to HARTING, had not yet occurred to others.

Working out this hypothesis of descent, which is analogous to the conception of METHERIE for the animals, DOORNIK is inclined to think that there are six original "tribes", whose place of origin he supposes to depend on the manner in which the crust of the earth was raised from the oceans in the form of islands. Each of these tribes would have adapted itself to its surroundings and have possessed the capacity to modify its qualities in case of removal or change of the external conditions.

This division into six "tribes" should be distinguished from the arrangement into five "classes", with increasing degrees of development, which

¹) "Nature divides the earth into physical regions, man on the other hand into geographical parts."

²) "As animal he was born from Nature, as Man he gave himself being."

DOORNIK applies to the population of the earth. This arrangement is a reflexion of the degrees of development of the above-mentioned "anthropogenesis". The lowest class comprises e.g. "Wild hordes of Americans"; they have remained at the starting-point of human development. The second class, in which the African Negroes, and the third in which the Moors have been included, possess intellect, in contrast with the first, while the fourth class, containing the Russians and Japanese, and the fifth, exclusively represented by the Europeans¹⁾, have obtained not only intellect but also reason.

While a distinction has to be made between the nature of the differences between the six tribes and that between the five classes, DOORNIK considered the differences of the races, out of which, according to him, the classes were composed, to be still of another nature: this racial difference should be regarded as permanent and hereditary.

In evolution DOORNIK saw a tendency towards higher development. Man should be at the head of the organized world, among other things by his capacity to live in all continents. Among men the white race should be farthest away from the original form. He explained this also by the fact that each characteristic should tend to return to its starting-point. The white colour of the skin is, according to DOORNIK, sensitive to external conditions, which promotes a change in the direction of black. This might point to the fact that originally man has been black. It should be remarked here that DOORNIK considered man as having originated several times, but monogenetically. He had arrived at this conclusion since the mutual fertility of mankind in all varieties had forced him to regard all men as "beings of the same species". DOORNIK derived the original men, who in his opinion could speak, though it could not yet be called a language, from the orang-utan. He did not exclude the possibility that an intermediate form between man and this animal might be found one day, but probably not in the form of a fossil, for, though a priori he considered discoveries of prehistoric men possible, on the other hand he thought that these expectations should be abandoned, so many explorations in this direction being made in vain.

Among the physical characteristics of man DOORNIK also considered the peculiarities of the skull and the brain most important, for comparison of man with animals as well as of men. This is probably the reason why he took such interest (1, 2, 5) in GALL's theory, which also formed the subject of some of his lectures. But DOORNIK also paid attention to the facial angle of CAMPER, whose system he praised and supplemented by a formula to express the relative development of the cerebrum at the expense of the senses of smell and taste. He himself described skulls of a Negro, a Dutchman, a Hindoo, a Chinese, an American, and of representatives of various islands of the Dutch East-Indian Archipelago. The form of the skull was considered by him the result of principles of development inherent

¹⁾ Evidently DOORNIK did not include the Russians among the Europeans.

in the skull itself as well as of the influence of the shape of the brain.

He regretted that GALL was not better acquainted with KANT's philosophy.

After what has been said here concerning DOORNIK's studies, it is not surprising that he did not accept GALL's theory without criticism, and actually he only agreed with GALL in regarding the shape of the skull as a reflexion of that of the brain, and in assuming for the functions of the power of thought, a certain organization which renders man susceptible to various forms of thought and to emotions and tendencies. Referring to the nature of the differences of DOORNIK's classification, we may quote in this connection: "De verschillende bouw der schedels onder de hoofdklassen der volken is niet toevallig maar staat in verband met de verschillende ontwikkelingsgraden van den menschelijken geest" ¹⁾.

However, according to DOORNIK, the dissecting-knife is not the right instrument for the separation of psychical elements. Otherwise "zoude men de erfzonde ontleedkundig kunnen bewijzen" ²⁾. Elsewhere he says that we must not try to obtain the knowledge of "sensual man" and of "moral man" from one and the same source. As a physical being, man has to be regarded on the same level as the animals, "dewijl hij uit kragt van deezen dierlijken aanleg dier is, en dus aan dezelfde natuurwetten onderworpen als alle dieren" ³⁾. These laws do not apply to "moral man". On the contrary, DOORNIK supports the theory of "moral freedom", which opposes the conception that e.g. bloodthirstiness, envy or avarice should be controlled by physical organs. He could not believe that for an individual, whose part of the brain for bloodthirstiness as well as that for kindness is specially developed, the prevalence of one quality over the other should depend on a struggle of physical nature.

DOORNIK entirely rejected the problem of the seat of the soul: material substrate of the soul was to him a contradiction in terms.

The treatise written by DOORNIK on life was afterwards highly praised by HARTING; contemporaries had hardly any attention for DOORNIK's studies. At present, after more than a century, it seems inconceivable, that the books of LAVATER and GALL had a far greater success at the time than those of DOORNIK, the lasting value of which cannot be denied. Moreover, his writings did not only excel in sagacious argument, but the contents also must have had a certain revolutionary spirit for those days. Yet, among the contemporaries it was only CRULL and the Haarlem physician BAKKER, afterwards professor at Groningen, who ventured to refute DOORNIK's views.

BAKKER (1) assumed that original man, according to the Bible represented

¹⁾ "The varying structure of the skull in the principal classes of the peoples is not incidental but is connected with the different degrees of development of the human mind".

²⁾ "the original sin might be proved anatomically".

³⁾ "since, owing to this animal disposition, he is animal and consequently subject to the same laws of nature as all animals."

by one single tribe, had already reached a fairly high degree of development and possessed a white skin. Of the descendants those who came to live in unfavourable conditions degenerated; they became black. BAKKER's theory, therefore, regards the primitive peoples as degenerates. Among them the Negro is not the most primitive type and, though, like some other races, he shows more resemblance with the apes than white men, this does not point to relationship. Very likely there is a connection between this view and BAKKER's opinion that the Ethiopian race on change of conditions would not need a long time to reach the same level of civilization as the European. Opposed to the degenerated races are those who have been gradually progressing. Western Asia being surrounded by areas of ancient civilizations, which may be regarded as off-shoots of a still older one, BAKKER is inclined to consider this region as the seat of the latter, where also man must have had his origin.

Against DOORNIK's theory of descent BAKKER pointed to the absence of a link between orang-utan and man. He considered heredity of acquired qualities as a settled question, taking it for an adaptation which became more strongly marked according as the external conditions were more constant.

It is characteristic of the time that BAKKER as a practising physician wrote in Dutch, but afterwards as a professor in Latin (2). From these later writings need only be mentioned that in the problem of evolution he shared CUVIER's views and that in the human embryo he recognized adult forms of animals which were lower according as the embryo was younger.

The flourishing of Groningen University at that time with regard to anthropology, which was mentioned by SASSE (12), was also assisted by Professor MULDER, formerly at Franeker, who among other things gave a eulogy on CAMPER. He added an angle to CAMPER's system, formed by CAMPER's facial line and the line connecting the basilar process of the occipital bone with the root of the nose. MULDER has conferred the doctoral degree on CRULL, who states in his thesis that bones are subject to the influence of muscular functions and relates that MULDER on the edge of the orbit of Jews found a depression of the temporal muscle which corresponds with an elevation within the socket of the eye¹). MULDER accounted for this phenomenon by the special use made by Jews of this muscle in speaking and laughing. For the rest the actual subject of CRULL's thesis is a critical survey of various anthropological methods of measurement. Here we are interested in those methods which have been evolved by Dutchmen. CAMPER's system had drawn great attention and given rise to criticism. However, the objections raised by BLUMENBACH against the facial angle were admitted by CAMPER himself and were for the greater part modified by his further directions.

¹) BAKKER (1) said about this observation of MULDER that BRUGMANS had been able to confirm it with one Jew but missed the phenomenon in others, finding it, however, in several Dutchmen, who had been born in hot climates.

CRULL appreciated BLUMENBACH's *norma verticalis*, suggesting some lines in it, and attached greater value to it than to CAMPER's facial angle, but yet he preferred CAMPER's complete system to BLUMENBACH's directions. He agreed with CUVIER that CAMPER's facial angle can only be used for men and apes and not for the other animals.

GALL had also raised objections to CAMPER's method, but CRULL, who was not greatly attracted by GALL's theories, does not say which. He did say, however, that GALL on a visit to CAMPER and MULDER admitted that his own craniology was not very reliable.

Finally faced by the choice of an anthropological method of measuring, CRULL declares to prefer a combination of the directions of CAMPER, MULDER and DOORNIK. Discussing DOORNIK, CRULL objected to his theory of descent, referring also to the absence of the intermaxillary bone in man.

This part of the skeleton more in particular forms the subject of a thesis by KOOLS, likewise written under the guidance of MULDER. Together with CAMPER and BLUMENBACH, KOOLS considers the absence of the intermaxillary bone in man as an established fact for, although with children and sometimes with adults a suture is found behind the incisors, yet the other boundaries are wanting. On the other hand, the absence of this portion of bone should not necessarily be considered a typical difference between men and animals, since there are also animals which do not possess it. However, before admitting the complete absence of the intermaxillary bone in animals, the condition of the other sutures should be examined.

In a summary of the anthropological contributions in the beginning of the 19th century should yet be mentioned the writings of WESTENDORP and STUART, although, both being ministers, they regarded the problems from their own point of view. WESTENDORP, who had a living at Losdorp (Gr.), wrote two elaborate treatises on the builders of the megalithic tombs, the mere mention of which may suffice in this study. STUART wrote a work in six volumes, illustrated with great imagination by KUIJPER, on all peoples of the earth, with the exception of Europe¹⁾ and consequently also of the Dutch people. A few points may be mentioned from the introduction, where STUART states his views on general problems. That he did not approach the subject without hesitation is apparent from these words: "..... wijl de Volkomene Menschenennis, ofschoon zij de eigenlijke oefening van den Mensch mag heeten, het bijzondere eigene voorwerp der Alwetendheid zelve is"²⁾. It also seems as if he anticipated an evolutionary theory

¹⁾ In the preface the author intends to discuss Europe at the end, but the last volume does not contain this subject. Still, according to obtained information, the work is complete in six volumes. Besides, STUART did not die until 1826 and was then occupied with a historical study (N. SWART, 1828. *Mijne herinneringen van MARTINUS STUART*). Evidently he gave up the discussion of Europe when he got so far.

²⁾ ".....since the Complete Knowledge of Men, though it may be called the actual training of Man, is the particular characteristic production of the Omniscient."

making its way, against which, so to speak, he wanted to defend himself in advance. In CAMPER, therefore, STUART particularly praised his objections to the relationship between men and apes. He thinks that all men belong to one species, in which, under the influence of external conditions, races have originated, the mixing of which might lead to sterility.

The present writer has not succeeded in discovering the full name of the author who wrote his articles under the signature R.P. While rejecting even the possibility of descent, he tried to show that yet the transition from animals to men is a gradual one. His argument mentions "ambiguous creatures" who would not be "real men" and "men-shaped animals", obviously not referring to anthropoids. It becomes evident that he wanted to regard primitive man as neither man nor animal.

To the early evolutionists is sometimes reckoned also MOLL, whose publications are, however, of little importance.

While at that time already ideas are found containing something of later evolutionary theories, there are even indications in the direction of the later fetalization theory. In this connection should be mentioned a little book by POLMAN, in which the author attributes the fact that man reaches a "more exalted destiny" to his slow development. POLMAN mainly intended to object to the conception that the slow development of man should be an inferior quality.

CHAPTER III.

From the biographies of VAN DER HOEVEN, we get the impression that among his colleagues, professors in Leiden University, he has been a conspicuous figure. In many respects a parallel may be drawn between CAMPER and VAN DER HOEVEN. Both were attracted by anthropology; both had a particular gift for drawing, which they utilized in their studies; both expressed themselves with ease in foreign languages, among which, with regard to VAN DER HOEVEN, should be also reckoned Swedish, Danish and Italian and even some knowledge of Russian and Spanish; both liked to go abroad, this giving them an opportunity to become acquainted with famous scholars. Among the acquaintances of VAN DER HOEVEN, for example, were CUVIER and SOEMMERING, on whom he wrote obituaries, and further LATREILLE, SPENCER, LEVERRIER, MILNE EDWARDS, and NILSSON, one of whose books he translated¹⁾. Moreover, both CAMPER and VAN DER HOEVEN had a position in the magistracy, and finally in later years the family of the VAN DER HOEVENS, though more particularly the branch of PRUYS VAN DER HOEVEN, the brother of our Leiden professor, also drew the attention of the biogenealogist van BEMMELEN²⁾.

Jan van
der Hoeven*)
1801—1868

VAN DER HOEVEN has been depicted as an honest man with a great veneration for his masters and a warm interest in his pupils. Yet, in spite of the respect he commanded, he was not popular, probably because he held rigidly to his principles and perhaps showed too much that he was hurt by the little appreciation from the side of the government. It is true, the Dutch government had, by granting honours, not lagged behind those of Sweden and Baden, but assistance for his teaching and necessities for his researches were not supplied.

WELCKER dedicated his "Von Wachstum und Bau" to VAN DER HOEVEN as a posthumous tribute, for which VAN DER HOEVEN had given permission before his death.

Of the more general anthropological problems it was particularly that of descent which interested VAN DER HOEVEN (4, 5, 6, 8, 10, 12, 15, 22). He

*) GROSHAUS, G. TH. F. 1870. Lebensbericht von Prof. JAN VAN DER HOEVEN. Handelingen Maatschappij der Nederlandsche Letterkunde.

HARTING, P. 1868. Levensbericht J. VAN DER HOEVEN. Jaarboek Kon. Akad. v. Wetensch. Amsterdam.

SALVARDA, M. 1868. Levensschets van J. VAN DER HOEVEN, Ned. Tijdschr. v. Geneesk.

WELCKER, H. 1868. Nekrologie auf J. VAN DER HOEVEN. Arch. für Anthropologie, Bnd. 3.

1) Ontwikkelingsgeschiedenis des menschelijken geslachts.

2) p. 133.

formulated his point of view in this respect in two theses: I. All species of animals seem to approach by degrees to man; II. Man, though in particular respects surpassed by some animals, exceeds all in harmonious development of the whole and parts, thus being what he is.

In regard to the first thesis it should be said that he adjudged to this gradual development an extension in time, representing man as the youngest in the series, without stating his age in an absolute sense.

VAN DER HOEVEN considered all men to belong to one single species, which probably had originated only once. In this supposition he was guided by the consideration that the acceptance of a multiple origin, owing to the general spreading of man, would make it necessary to admit many centres of origin. In the last resort he expected the decision in this matter from the side of the historians and not from that of natural science, certainly not in so far as this would have to be founded upon findings of fossil men.

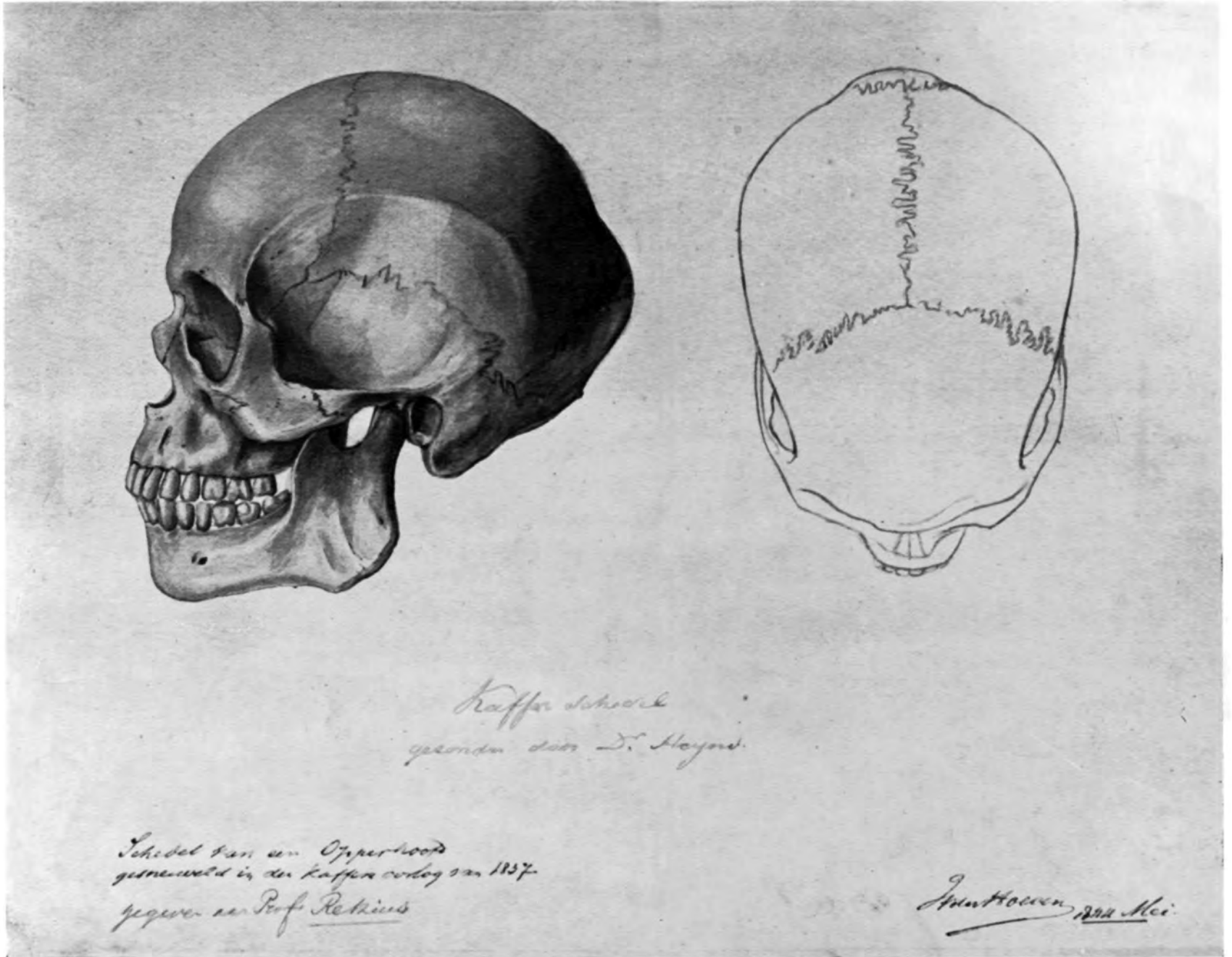
Races were, according to VAN DER HOEVEN, permanent subforms of the species. Otherwise than with the animals, in man the individual difference — he thought here in particular of the body length — might exceed the average racial difference. Racial differences should be perceptible already before birth in the head.

In 1842 VAN DER HOEVEN had expressed his views on the relationship between faith and science. Unprejudiced natural research was recommended by him; he had no fear that this would lead to a conflict with what is taught in the Bible: "Hetgeen langs één weg Waarheid gebleken is, kan niet in strijd zijn met andere, even zekere waarheden" ¹⁾. However, a short work by Mrs. CHAMBERS ²⁾ and the rise of Darwinism led VAN DER HOEVEN in a later period of his life to make serious opposition. When it was opportune, he quoted from DARWIN's works and he did not deny the English philosopher the belief in a first creation, but it is very doubtful whether DARWIN's conception indeed agreed to VAN DER HOEVEN's representation. Anyway, he rejected the theory of descent, owing to his religious convictions. Previously (3) he had declared that he would rather have anthropology served by carefully collecting and describing data than by building up hypotheses and the use of speculative explanations.

The acknowledgment of VAN DER HOEVEN's merit as an anthropologist by those who came after him is mainly connected with his *Catalogus craniorum diversarum gentium* (13), an accurate work containing measurements of 210 skulls from different races. In the introduction VAN DER HOEVEN said that he had not given most attention to the material of Europeans. This line of conduct was due to his experience that the individual differences are larger with Europeans than with less mixed races (4).

¹⁾ "What has appeared to be Truth in one way cannot be at variance with other, equally certain truths".

²⁾ Vestiges of the natural history of Creation. This little book has been published in Dutch under the title: *Sporen van de Natuurlijke Geschiedenis der Schepping*. It was translated by J. H. VAN DEN BROEK.



Drawing of a skull by VAN DER HOEVEN who presented it to RETZIUS.

Owing to the greater homogeneity, he did not consider it necessary to make extensive collections of foreign skulls, but he did feel the need of measurements of a standard collection of 20 European skulls (2, 3). The composition of this collection is remarkable: five Russians, five Germans, five Spaniards, an Italian, a Scot, an Englishman, an Irishman and a Pole. As is apparent from this list, not a single Dutchman was among them! The skeleton of a Dutchman was only considered interesting in Paris: indeed CUVIER possessed one in his collection, as VAN DER HOEVEN had convinced himself on the spot (1).

The skulls examined by VAN DER HOEVEN belonged to the collections of REINWARDT, of the Rijksmuseum der Natuurlijke Historie at Leiden and of the late BRUGMANS, the latter collection, as was mentioned in a previous chapter, being placed in the Anatomical Museum. For the examination of the skulls VAN DER HOEVEN invented twelve measurements (2); in order to be able to apply the method of CARUS, he evolved yet ten more measurements. Thus, utilizing the theory of CARUS, he could ascertain that Negroes, with less intellect and feeling than Europeans, possess an equally strong will but less "sense of hearing" (4). VAN DER HOEVEN also took special trouble over the study of the Negro skull because he wanted to refute TIEDEMANN's opinion that the Negro should not have a smaller skull capacity than the European. On the other hand the Leiden anatomist thought it advisable to make the remark that the Negro is a man. The manner in which he dealt with the difference of opinion with TIEDEMANN has afterwards been praised by WELCKER.

The descriptions of foreign skulls written by VAN DER HOEVEN are numerous: for example, the extensive studies on Negroes and Chinese and further the description of skull material from a Kaffir, a Hottentot, an Esthonian, a Magyar, an Avar (cast), from Guajiros, as well as skulls from Zuid-Beveland, the Caroline Islands, Oenalaschka and Kentucky (3, 4, 7, 9, 11, 16, 18, 21). Together with W. VROLIK, whose obituary VAN DER HOEVEN later was to write¹), he examined a skull found at Pompeii. As we see again, VAN DER HOEVEN was not yet interested in Dutch skulls: the material from Zuid-Beveland comprised only one specimen²), of which he stated that it was short and round. The study of the foreign skulls, the result of which need not be mentioned here, made him agree with WELCKER that pronounced dolichocephaly is accompanied by hypsicephaly and brachycephaly by platycephaly (Book review Ned. Tijdschr. voor Geneesk. 1865 II.). It should be remarked that VAN DER HOEVEN, who used to be satisfied with absolute measurements, in one paper (9) attaches value to the relative length. We are inclined to ascribe this to the influence of RETZIUS, the more so as in the same article the

¹) Jaarboek Kon. Akad. v. Wetensch. Amsterdam 1863/64.

²) This object is afterwards known in the literature as the skull of Nieuwland; for the cranial index different values have been given, all of them, however, exceeding 85.

contrast orthognathism-prognathism is discussed, RETZIUS' name being mentioned. In a laudatory review of the *Catalogus craniorum* by W. KOSTER it is regretted that VAN DER HOEVEN has not given the ortho- or prognathism of each skull. According to KOSTER, CAMPER's facial angle was not to be recommended in all respects; he invented an angle ¹⁾ derived from a trigonometrical form. He also projected an index as a standard for the relation between breadth and length of the face.

That VAN DER HOEVEN in his studies on foreign races mainly confined himself to skull research was rather sharply criticized by RAMAER.

In addition to descent and the distinction of races, VAN DER HOEVEN also paid attention to racial psychology (19). His contribution in this field with regard to the Dutch people contains only the remark that their character has been strongly influenced by the struggle for liberty of conscience and that in many respects the Dutch have been in the first ranks. In order to attain civilization it was, according to VAN DER HOEVEN, essential both for individuals and for peoples to have social contacts with others (3). For the rest, in his work on the character of peoples, the author only gives directions for the study of racial psychology, which on the whole he considers more important to students of history than to anthropologists. We can read in that paper that living in a separate house (Holland, England) betrays a different national character from that shown by living in part of a house (Germany, France), a statement which later would be more closely connected with physical anthropology ²⁾. That anthropology comparatively late got a place among the sciences was, according to VAN DER HOEVEN, due to its dependence on auxiliary sciences, which had to develop first (3). As such he did not consider philology (17).

Years afterwards the memory of this deserving anthropologist has been honoured by the foundation on July 3, 1935, of the "Prof. Dr. JAN VAN DER HOEVEN STICHTING VOOR THEORETISCHE BIOLOGIE VAN DIER EN MENSCH". The question might be raised, however, whether it is in accordance with the conception of VAN DER HOEVEN to mention the animal before man!

Like VAN DER HOEVEN, also SURINGAR ³⁾ has already been mentioned in the preface to this study in connection with his definition of anthropology which is verbally identical with what we find in RUDOLF MARTIN. Here we have to mention SURINGAR once more as a man whose statements much later obtain a remarkable significance. Some quotations from his works, such as: "Is niet de kindsheid van den mensch veel langduriger en zwakker dan die van de dieren?....., maar juist daarin ligt de voortreffelijkheid van den mensch opgesloten" and "De mensch moest eene veel langere kindsheid hebben, om de krachten van zijn ligchaam en van zijne ziel vol-

¹⁾ Application of this angle was recommended by VOGT and TOPINARD (TEN KATE (1)).

²⁾ SCHUURMANS STEKHOVEN, p. 118.

³⁾ An obituary of SURINGAR was published by P. H. SURINGAR in the *Ned. Tijdschr. v. Geneesk.* 1874 II.

komener te ontwikkelen" ¹⁾), are sufficient to recognize in SURINGAR a precursor of BOLK.

Professor SEBASTIAN may be considered as a man who made his contributions when flourishing of Groningen University with regard to anthropology was on the decline. This does not mean to imply that his studies had not reached a high scientific standard. On the contrary, we get the impression that we have to do with an excellent natural philosopher. In the first part of his book he tries to account for the very first beginning of life. He thought that this must have been embodied in the simplest organism, originated from "materia organica amorpha".

In the development of embryos of animals and men he saw the more complex forms originating from the simpler ones and from this he deduced the possibility that higher animals descend from lower ones. No doubt SEBASTIAN was an early evolutionist and by no means the least confirmed. In order to prove this may be given a quotation from Pars II, caput I (hominis historia naturalis) § 13 (eius locus in serie animalum): "Natura in formandis tum animalibus tum plantis semper a simplicissimis proficiscitur progrediens sensim ad magis et maxime composita corpora. Ab infimis autem animalculis et plantis maxime imperfectis natura quasi in duas et contrarias partes abit, quarum altera animalia complectitur imperfecta scilicet gelatinosa primum, et sic porro usque ad perfectissima et hominem; altera plantas comprehendit, simpliciores primum, perfectiores deinde et denique maxime perfectas".

Owing to their mutual fertility SEBASTIAN did not consider races as species, but as varieties with constant characteristics: for he was convinced that a Negro could not change into a European, neither the other way about. It should be remembered how far in this respect SEBASTIAN was in advance of CAMPER! On the ground of the diversity of races SEBASTIAN objected to the theory of the origin of man from one single couple, unless the influence of soil, air and light before the deluge had been different from that afterwards, a possibility which he does not entirely exclude, because it is also stated that at that time man reached a higher age. He also took into consideration that the deluge need not have been general on earth and that previously there may have been some spreading of man, so that besides NOAH and his family more people may have survived the deluge.

The book further gives a summary of races, mentioning characteristics with regard to length and breadth of skull and face, the distance between the orbits, and peculiarities of various kinds.

GERARD SANDIFORT, who was director of the Anatomical Museum at Leiden, published a pretentious work on the collections present at that museum. The illustrations, mainly of skulls, are partially from his own hand. They form the principal part of the work which in the text

¹⁾ "Is not the childhood of man much longer and weaker than that of the animals? but that is where the excellence of man lies" and "Man had to have a much longer childhood in order to develop the powers of his body and of his soul more completely".

contains little more than a summary of the objects, stating by whom they were obtained, and a table of measurements, among which occurs CAMPER's facial angle. EDUARD SANDIFORT's contribution to this catalogue of the Leiden Museum is particularly concerned with that part which deals with pathological anatomy.

Concerning the remains of men found in a "hunebed" and examined by SANDIFORT, a communication is made in a publication by JANSSEN, at the time curator of the Archeological Museum at Leiden.

Collecting their data from historical sources, VAN DEN BERGH L.L.D. and VAN LENNEP L.L.D. studied the composition of the population of the Netherlands; the former in particular traced the origin of the Frisians.

The mere mention of these works may suffice. Neither need there be said more of a book by VAN HEUSDE, in which some remarks may be found concerning the psychology of the Dutch. Undoubtedly SCHROEDER VAN DER KOLK also took a great interest in anthropology; however, he did not contribute anything of importance, founded on work of his own.

It may be considered sufficiently wellknown that the merits of the eminent DONDEERS actually are not to be found in the domain of anthropology. Yet, his name should be mentioned here, owing to his point of view with regard to the problem of evolution. DONDEERS wrote emphatically: "Elk dierlijk wezen wordt door de invloeden, waaraan het duurzaam is blootgesteld, in zijne organisatie zoodanig gewijzigd, dat het aan die invloeden harmonisch beantwoordt"¹), and he considered it possible that by consolidation of the modifications, due to external conditions, new species are formed. Like the animals, man would also be subject to the influence of external conditions but, in contrast with the animals, his reaction is of two kinds, for he does not only adapt himself in a natural way, by the formation of races, but by means of his intellect he "reduces the effect of severely cold weather and scorching heat". This remark may refer to the conception formed by DONDEERS of the origin of races, not however of the origin of man as such. Concerning the latter point he merely stated that the descent of man is monophyletic.

In the formation of species DONDEERS distinguished three important factors: "habit, training, heredity". "Habit" is connected with the obtaining of physiological properties and "training" with the obtaining of morphological ones.

The great Utrecht ophthalmologist has sometimes been mentioned among the predecessors of DARWIN; there may be still more reason to regard him as a successor of LAMARCK. As DARWIN would do later, DONDEERS accepted the "survival of the fittest", but DARWIN considered the fittest to be born

¹) "Every animal creature may by the influences to which it is constantly exposed be modified in its organization in such a way that it responds harmoniously to these influences".

as such, whereas DONDERS thought that the greater fitness is obtained during life.

Although ACKER STRATINGH was a physician at Groningen, he wrote his book on the population of the Netherlands entirely from a historical point of view, for which reason we need not discuss it any further. It should be admitted that at that time he objected to WESTENDORP's view, that the "hunebedden" have been built by the oldest known inhabitants of the Netherlands, because he considered the possibility that yet an older population may have lived there.

Whereas ACKER STRATINGH thus showed himself ahead of his time, KOOL evidently is a typical representative of it, at any rate in the choice of his material, and at the same time he may be regarded as a scholar who closes a period. KOOL examined 431 skulls, of which he drew up a list; in this summary, arranged according to the country of origin, was also alphabetically inserted material of thieves, lunatics, hunch-backed and murderers. However, the author pointed out that he did not wish to place thieves, lunatics, etc. on the same plane as peoples, and that it is not correct to deduce the characteristics of a race from the data of one single skull.

The number of Dutch skulls in the examined collection, partly from Museum VROLIK and partly from REINWARDT, did not even amount to ten; among the remainder were also found representatives of Dutch colonies.

KOOL made use of a craniometer invented by himself as well as of some measurements and proportions ¹⁾ he had devised. His conclusions contained some remarks on phenomena of growth. For example, he was struck by the fact that in ontogeny the frontal part of the human skull relatively increases less than that of an ape, which peculiarity, according to him, might be connected with the secondary dentition. Neither did it escape his attention that the similarity of man to a young orang-utan is stronger than that to an adult specimen. Further he was inclined to think that the cerebellum grows larger according as the cerebrum is smaller; this point was interesting to him in connection with the theory of CARUS who regarded the cerebellum as the seat of the passions.

KOOL thought that men at a low stage of development occur in regions where the fauna is poorly developed. He also thought that the size of the head depends, in addition to food and mode of life, on the degree of latitude. We should not omit mentioning here his remarks on the one hand that the degree of development may be determined from the absolute skull measurements and on the other hand that the largest measurements may also be found in the least developed individuals ²⁾. On the whole it should be stated that this work of KOOL forms a remarkable anthropological contribution, in which many subjects have been discussed.

¹⁾ The proportion should be calculated from the absolute measurements: KOOL did not give the results of his calculations.

²⁾ Cf. p. 95, POSTMA.

Paul Harting *)
1812—1885

HARTING, originally professor at Franeker, later at Utrecht, used an alternative method to that of his predecessors. Already his first contribution (1) to anthropology differed considerably from what we had to discuss so far: it dealt with the races of the Netherlands and gave a description of the population of Urk, whose purity had struck HARTING. Shortly afterwards ALLAN also inserted anthropological peculiarities in his treatise on Urk. Later (4) the discovery of skeletons at Wageningen formed the subject of a publication by HARTING, the conclusion of which was that the examined material was more dolichocephalic than the recent population. However, too little is known of the age of the described skeletal fragments to attach a further significance to this conclusion.

Neither could be determined the origin of a skeleton found at Stolwijk, the skull of which was compared by HARTING and KOSTER with different exotic material. What a revolution! HARTING's method was directly opposed to that of his predecessors: he examined the material from his own country¹⁾ and compared it with foreign material, even though he had to obtain the data of those skulls from foreign literature (DAVIS and THURNHAM). With such an altered view of the subject it is not surprising that HARTING worked according to other directions: he considered the examination of the skull important for anthropological investigation, but according to him it is incorrect to deduce the characteristics of a race from a single skull (6). A great number of objects should be examined and the investigation should not be limited to the determination of dolichocephaly or brachycephaly, for in every group of skulls indices may be found of any value, so that it is of importance to know the distribution. HARTING recommended to calculate averages and the extreme values as well. He also represented the indices in curves.

For the examination of the skull he had invented a cephalometer (6) based on the instrument which was used by hatters. When afterwards he found that the use of the apparatus took too much time, he used the hatters' instrument of ALLIÉ (9); this enabled him also to calculate the average plane surface of the circumference of the head.

From the above it is clear that HARTING was not satisfied with absolute measurements; the calculation of ratios was a rule for him, which he carried so far as to propose expressing various measurements in their ratios to the "modulus cephalicus", i.e. the height of the vertex above the line connecting the openings of the ear.

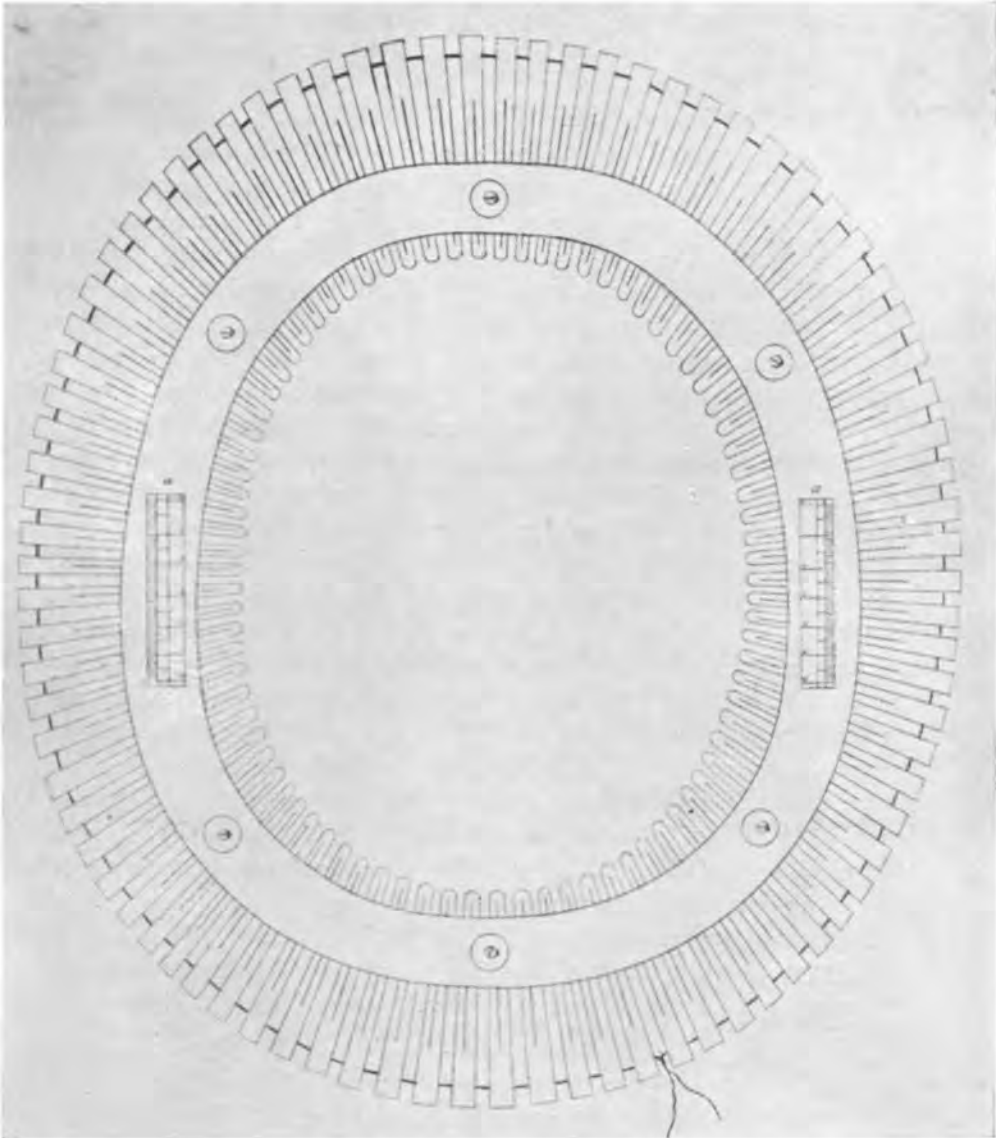
That in addition to skull and head measurements he also attached value

*) BALLOT, BUYS. 1887. P. HARTING, Berichten Mij. der Nederlandsche Letterkunde. HUBBRECHT, A. A. W. 1888. P. HARTING herdacht. Jaarboek Kon. Akad. van Wetensch. Amsterdam.

JONKMAN, H. J. 1886. Mannen van beteekenis in onze dagen. Haarlem.

¹⁾ However, HARTING also made a communication on two Aztecs (Album der Natuur 1857, which volume contains a publication by LUBACH on the same Aztecs) and one on Niam—Niams (Album der Natuur 1859).

to other data is apparent from his direction to measure in particular the distance from the os coccygium to the line connecting the openings of the ear. HARTING extended his researches to living men and consequently in this respect as well he was a pioneer.



Cephalometer according to HARTING.

He used the measurements of 1200 men, which the Utrecht hatter LEENARTS had at his disposal. After removing the data on foreigners from this material and taking into consideration a certain selection, HARTING obtained the average "index pilealis", from which he calculated 82 as the

average value of the cranial index. This figure is different from the results of other authors but we should not lose sight of two circumstances: in the first place the maximal length will as a rule in reality not lie in the same plane as the maximal breadth, and secondly the greatest length and the greatest breadth of the head are no good measurements for a hat, for in that case the hat would "drop over" the head. The measurements of LEENARTS, therefore, were not the greatest length and breadth of the head.

With regard to the connection between circumference of the head and intellectual development HARTING's point of view (13) was totally different from that of KOOL; the Utrecht professor denied such a connection completely, among other reasons because the height of the head is not expressed in the circumference. He also tried to answer the question raised by English hat manufacturers, whether the measurements of the head decrease, and arrived at a negative answer. Might not this question be due to a change of fashion, viz. to wearing the hat more or less deep (14)? We see that no subject was too insignificant for HARTING, but on the other hand may be said that he considered no subject too exalted. For example, HUBRECHT said of him that he was interested in abiogenesis which in his days was a burning question. And from this question dealing with the possibility of experimental formation of "life" from lifeless material, to that of the origin of life from other life, so to the problem of evolution, is only a step. It is remarkable that HARTING himself with regard to this problem shows a development. At first, when he had to found his view on LAMARCK's theories, he called evolution a "guess" (2), a point of which, according to HUBRECHT, he doubted whether science could bring the final conclusion; but after becoming acquainted with DARWIN's doctrine, he became an enthusiastic adherent (10, 11, 12). On reading HARTING's publications, we are captivated and get the impression of an excellent scientific worker and a broad-minded man. This is also apparent from his point of view with respect to the age of man (3, 5, 7¹): the existence of a prehistoric period was an established fact to him, human life in the diluvium he considered possible but not yet proved. As to his writings on heredity (8), we there find an interesting remark that hereditary qualities either manifest themselves immediately after birth or may remain latent for part or the whole of life.

That HARTING has been discussed in one and the same chapter as those who preceded him requires some justification. The most conclusive reason might be that he does not belong to the group of anthropologists whom we shall discuss in the next chapter. This is indeed the case, but it is no less true that in many respects HARTING has been a pioneer. So a figure by

¹) See also HARTING 1871. Iets over J. E. DOORNIK en zijn aandeel aan de ontwikkelingshypothese. Versl. en Mededeelingen Kon. Akad. v. Wetensch. Amsterdam. Afd. Natuurkunde, 2e reeks V.

himself? Not altogether: we should remember what has been said about his view on evolution, which changed during his life. A few words in this treatise may be devoted to the attitude assumed in Holland towards the rising Darwinism, and in this respect VAN DER HOEVEN and HARTING may be considered as counterparts.

HARTING is at the same time the man who for the time being closed the discussions on Darwinism. He personified the scientific victory of the new doctrine and he also caused a certain turn. The opposition which remained was of a different nature: now it was church circles rather than natural philosophy which took the lead. Later science again opposed DARWIN's theory on the ground of new discoveries and views.

It seems as if, in Holland at any rate, DARWIN owed his authority more to the formulation of his theory than to the doctrine itself: when scholars became acquainted with the contents in the form given to them by DARWIN, their opposition was soon broken. As long as they had at their disposal only the statements of his numerous predecessors, there were as many opponents. Sometimes even there was no need of action to cause reaction, but it seemed as if beforehand people defended themselves against a doctrine of which they felt that it was coming.

CHAPTER IV.

Committee for Statistics¹⁾, since 1850²⁾).

As an organ of the "Nederlandsche Maatschappij tot bevordering der Geneeskunst" the "Committee for Statistics" was founded, the program of which was published in 1850 by ZEEMAN. In the beginning other members of the Committee were BLOM, COSTER and ALI COHEN and after a short while also EGELING. They wanted more in particular to study the so-called medical statistics and described the object more closely as "de kennis van den tegenwoordigen physiologischen en pathologischen staat van het Nederlandsche volk"³⁾. In this treatise only such parts of the reports of this committee will be mentioned as may be considered of anthropological importance. They are almost exclusively studies on the body length, the data for which were collected at the examination of recruits. One of the first reports seems to have been that on recruits in Groningen, written by ALI COHEN in 1852, which — strangely enough — was afterwards not to be found.

In 1853⁴⁾ ZEEMAN communicated a report on Noord-Holland, containing examinations in the years 1821—1852. It appeared that 1829 yielded the smallest number of men disqualified owing to insufficient body length (< 157 c.M.), viz. 111 per 1000, and 1848 the largest number, viz. 222 per 1000, an increase with 100%! The average body length appeared to be inversely proportional to the number of recruits; ZEEMAN thought that the smaller number of men liable to military service during the years when comparatively few were rejected owing to insufficient body length was due to the death of the weakest (smallest) before the military age. EGELING, who studied this report further, saw a connection between on the one hand the body length and on the other the influence of the rye prices⁵⁾ and that of the annexation by France.

The report of the following year contained a discussion on the latest

¹⁾ All communications concerning the Committee for Statistics, the Committee for Ethnology and the mortality charts were published in the official organ of the Nederlandsche Maatschappij tot bevordering der Geneeskunst: originally the *Tijdschrift der Nederlandsche Maatschappij ter bevordering der Geneeskunst*, and since 1857 the *Nederlandsch Tijdschrift voor Geneeskunde*.

²⁾ Previously (during the first years of the existence of the Nederlandsche Maatschappij tot bevordering der Geneeskunst) this committee worked under the name of "Committee for Medical Statistics".

"the knowledge of the present physiological and pathological condition of the Dutch people."

⁴⁾ Published in 1854.

⁵⁾ cf. ZEEMAN, p. 35.

census; there we are struck by ZEEMAN's remark: "... zijn toch de tijden voorbij dat men premiën uitlooft tot aanmoediging van de vruchtbaarheid van het mensdom" ¹⁾).

Then there is an interesting report, published by ZEEMAN in 1857, on medical examinations in Groningen from 1852 to 1857. An investigation was made into the influence of the soil on the body length by dividing the province according to the kinds of soil into nine regions. Evidently a positive correlation existed between the fertility of the soil and the body length, while the variability of good and bad harvests was likewise reflected in the physical condition of the recruits.

A year later EGELING, with the assistance of DE MAN, HOMOET and GODEFROI, was the reporter of the Committee, now studying the medical examination of Noord-Holland and including in the investigation the islands of the Zuiderzee and the Wadden shallows. To mention some of the extreme statistics: of the Zaandam recruits 50 % were too small, of those from Marken 0 %! As an explanation of the small percentage of under-sized recruits on the islands, EGELING suggested the influence of the simple mode of life and the incorrupted morals; evidently he did not think of the body length as an anthropological characteristic. Did his suggestion: "to graft shoots from Marken on the Noord-Holland stem" presuppose the possibility that the islanders would transfer their high morality to the inhabitants of Noord-Holland? Or did he suppose that the body length of the Marken people is hereditary — and then in particular dominantly hereditary — in spite of the fact that he considered it dependent also on external conditions? In the report this is left an open question.

BOOGAARD was the reporter in 1859 on Zealand and Noord-Brabant. In these provinces, in contrast with Noord-Holland (1853), a larger draft was accompanied by less under-sized recruits. ZEEMAN's statement, however, that the number of disqualified (under-sized) men decreased, if at the time of their birth the rye had been cheap, was confirmed. ZEEMAN had made this observation during the investigation in Noord-Holland.

In 1861 ZEEMAN reported again on medical examinations in Groningen; in this report he could confirm his communications made in 1857 on the influence of the fertility of the soil.

In the year 1861 a change was made in the medical examinations with regard to the required body length: so far those had been passed fit for service who were taller than 1.57 m.; this limit was for the future fixed at 1.55 m., while the young men when they entered the service, and consequently probably also at the examination, were a year older than before the alteration of the law.

For some time the reporters of the Committee did not make communications, but in 1862 v. H. (probably A. W. M. VAN HASSELT), like-

¹⁾ "... the days are past when prizes were offered to encourage the fertility of mankind".

wise in the *Nederlandsch Tijdschrift voor Geneeskunde*, discussed an article on the principal causes of the insufficient length of French recruits by SISTACH, who had objected to the view of VILLERMÉ, that the body length is dependent on the welfare. SISTACH allowed only a small influence to the welfare but regarded the difference in body length as a racial characteristic. VAN H(ASSELT) now referred to ZEEMAN's reports and said that the influence of the rye prices on the body length had been "proved" by him.

When in 1868 the Committee was heard of again, ZEEMAN was once more the spokesman. His communication dealt with a comparison of the examination results in Zuid-Holland¹⁾ with those of Zeeland and he came to the conclusion that the population in the North is taller than in the South, but the possibility of an anthropological difference was not yet considered by him. However, this was different in a report made by him a year later on data from the government returns of the medical examinations from 1863—1867. After becoming acquainted with the view of a French statistician, whose name is not mentioned, he now wanted to investigate whether in the body length a racial factor may be found. For this purpose he made use of the study written by LUBACH (8) on the anthropological composition of the Dutch population. ZEEMAN's conclusion was that the race as well as the degree of prosperity exert their influence on the body length. It had become apparent that the Frisian race yielded a comparatively large number of under-sized recruits. On further investigation he regarded this phenomenon also as proof of the threatening decline of the Frisian population component. According to him, the Frisians were, so to speak, being overrun by the adjacent groups of the population.

It was not until 1890 that the annual meeting of the Maatschappij was again reminded of the Committee. This time no report had been made but a proposal by the section Oldambt to study the examination data from 1870 to 1890. In the explanatory statement besides the remark was made that since 1869 the average age in Holland had increased²⁾. The report according to this proposal was already made after a year by SCHELTEMA BEDUIN and discussed the physical and intellectual development of the recruits in the years 1863—1889. The intellectual development was deduced from the frequency of illiteracy. The length determinations indeed strongly indicated that the length of the Dutch increased during the period on which the observations were made, a phenomenon which was the more striking as between 1842 and 1861 the length of the recruits had become continuously smaller.

The report also contained some conclusions on the birth-rate in connection with the death-rate before the military age. It then became apparent that Noord-Brabant and Limburg had a lower death-rate of young people and

¹⁾ These results had been arranged in a table by POUS KOOLHAAS.

²⁾ In 1868 BOOGAARD had observed that the age of the inhabitants of Zeeland had increased in the 19th century, although it remained below that of the other provinces.



J. C. DE MAN (1818—1909).

a lower birth-rate than Zeeland and Zuid-Holland. Between 1843 and 1869 in Zeeland 1818 boys were born to 10000 inhabitants and in Noord-Brabant 1332, but in that time of 10000 male live births in Zeeland only 4989 reached the military age, in Drente 7079.

These few striking figures are merely an illustration: a more detailed discussion of this part of the report would lead us too far.

The interest taken in problems of a more demographic nature by the "Maatschappij tot bevordering der Geneeskunst" was also apparent from the assistance lent to the composition of a mortality chart. Since it was intended to state the ages at which death occurred, this may be mentioned here with a few words. The first to rouse activity in this field was not the "Committee for Statistics" but SCHICK. A chart had not been thought of in 1851, merely a statistic representation of the death-rate in Holland in connection with social and natural causes, among which were reckoned the kind of use made of the soil, geographical situation as well as geological and atmospheric influences. That the study of the death-rate might at the same time show anthropological differences was not taken into consideration.

A year afterwards DE MAN suggested the composition of a mortality chart. His idea was not immediately accepted but he did not give it up, for it may hardly be called a coincidence that in 1861 it was the section Zeeland which proposed at the annual meeting of the "Maatschappij" to compose a mortality chart of the whole of the Netherlands. The members carried the motion and requested DE MAN to make the necessary preparations. In the following year the latter gave directions for the collecting of the data.

In 1865 DE MAN reported that, thanks to the assistance of ZEEMAN and BOOGAARD, Zeeland had been finished and that the other provinces were progressing. In 1867 DE MAN could present the atlas, the costs of which amounted to f 3000.—, at the meeting of the "Maatschappij" in Middelburg. The first edition, according to the data of the years 1841—1860, was followed in 1880 by a second, in which the years 1861—1875 had been recorded. The latter edition, composed by VAN CAPELLE, TEIXEIRA DE MATTOS¹⁾ and STRATING TRESLING, evidently must be considered as a contribution of the "Committee for Statistics". The "Nederlandsch Tijdschrift voor Geneeskunde" had agreed to be answerable for half of the costs.

Jan Cornelis
de Man *)
1818—1909

*) DANIÉLS, C. E. 1909. In Memoriam J. C. DE MAN. Nederl. Tijdschr. v. Geneesk. GEYL, P. 1909. J. C. DE MAN. "Janus".

NAGTGLAS, F. 1891. Levensberichten van Zeeuwen. III.

NUYENS, B. W. TH. 1937. Brieven van Dr. J. C. DE MAN aan zijn vader. Nederl. Tijdschr. v. Geneesk.

SASSE, J. 1909. Ter nagedachtenis van Dr. J. C. DE MAN. Tijdschr. Kon. Aadr. Genootsch. 2e serie, deel XXVI.

¹⁾ A study on the death-rate of the Israelitic population of Amsterdam by TEIXEIRA DE MATTOS may be found in N.T.G., 1865, Part. II, p. 380.

These two editions of the mortality chart were all that were ever published; without being actually dissolved, the "Committee for Statistics" was no more heard of after 1891. However, of the remaining field of anthropology during the middle of the 19th century several studies should be mentioned.

DE HAAN, while discussing an article of the American MINOT, observed that we are not justified in attributing a higher degree of development to an organ according as it is further removed from the original form. Not only do we find in this statement a principle of the later fetalization theory, but DE HAAN had also observed that in adult man several embryonal conditions are maintained.

P. J. I. DE FREMERY, whose father N. C. DE FREMERY had also collected human skulls, described a skull found in 1852 on the beach at Domburg, probably of an elderly woman. For the measurements, the results of which are given in a table, he made use of HARTING's method. He came to the conclusion that it was a skull of the Nordic race, from which, according to him, it followed that the Norsemen, in contrast with the Romans, used to take their wives with them on their voyages.

Of the book in six volumes by HOFDIJK, which on the one hand is based on historical data, but on the other gives the impression of being written by an author who had a great imagination, only the first volume is interesting to us. We read there that the first population of the Netherlands must be fixed at c. 650 B.C., when in Drente lived a people characterized by a low, slanting forehead, a deep root of the nose, and a round skull. The author thought that the origin of this tribe dated five centuries before that time but he could not find out from where these people had come and where they had gone after their residence in the Netherlands.

A son of J. VAN DER HOEVEN Sr., who has been discussed in a previous chapter, described a skull found at Arentsberg in 1828, which was supposed to belong to a woman about twenty years of age. The other bones of the skeleton had been previously examined by G. SANDIFORT and G. VROLIK. VAN DER HOEVEN ¹⁾, who added a table of measurements, regarded the skull as Germanic from Frankish times. He admitted that Roman ornaments had been found in the grave, but these remained in use for a long while among the Franks. The author noticed a great similarity between this skull and that of a Hessian country woman from the collection of his father and observed in this connection that the Hessians as well as the first inhabitants of the surroundings of Arentsberg were Chats. On account of the high forehead of this skull, VAN DER HOEVEN pointed out that BLUMENBACH had been wrong in regarding the skulls of the population of Urk and Schokland as those of the first inhabitants of the Netherlands.

¹⁾ Dr. JAN VAN DER HOEVEN at Eefde possesses an article of this relation: *Ueber Form-Abweichungen und Varianten der Nasenbeine*. This article does not bear a date, neither does it mention the name of the review of which it is an off-print. It discusses some apes and several races of men, among whom there are no Dutchmen.

Now that in our days the wish has been expressed to make an anthropological investigation among the population of the Zuiderzee islands, before these by the planned impoldering will become mainland, a study by POLIJN BÜCHNER¹⁾ obtains a new aspect. He dealt with the population of Schokland between 1830 and 1859 and observed that these people, probably descendants of the Salians, had a strong bodily build and were further characterized by a broad face, sharp features, broad shoulders, and a "brown complexion". The women were found to be fairer and smaller, with wide hips and, like the men, with broad shoulders. The average age of the inhabitants of this island was 38 years; the birth-rate exceeded the death-rate by 25 %: the decrease of the population should be due to the excess of departures. His discussions of the increasing death-rate of infants and the fairly considerable decrease of the birth-rate are of less importance to us. Involuntarily we see a connection between the remark on the comparatively high moral level as well as the total absence of illegal births and the small number of still-born children: for the whole of the country of 20 births one was registered as still-born, on Schokland 1 out of 91! Insufficient development of the intellectual capacities was highly exceptional and the state of health was very satisfactory. According to POLIJN BÜCHNER this was due to the effect of the sea-air, the appropriate dress of the inhabitants and the regular mode of life.

From two publications by ZAAVER should be mentioned some directions on methods, mainly concerning measurements and indices of pelvis and skull. ZAAVER also mentioned KOSTER's angle. With reference to the preauricular sulcus, ZAAVER did not consider this sulcus as a racial characteristic: the sulcus, which gives attachment to the anterior iliosacral ligament, is found in all races, though in different frequencies and stages of development.

In studies on the psychology of the Dutch we are struck by the frequent repetitions of what is to be found in earlier writers. As long as the methods of investigation for this science had not changed, or rather were completely missing, this was not surprising. All those writings together might yield evidence that in a long period the nature of the Dutch population had not changed and consequently that constancy should be included among its qualities. That HALBERTSMA wrote an article on the national character of the Frisians must be due to his conviction that the psyche of the Frisians is different from that of the other Dutch people. It is remarkable that he repeatedly compared the Frisians with Englishmen and not with the Dutch.

In 1873 FRUIN and VISSERING published a psychological contribution; they were convinced that each people has a character of its own as the

¹⁾ SASSE mentioned a publication by POLIJN BÜCHNER on inbreeding on Schokland and at Katwijk. The article discussed here also deals with inbreeding on Schokland but does not mention Katwijk. POLIJN BÜCHNER has been a physician at Katwijk and he published an interesting little book on the first sea-bathing there; any writing about inbreeding at Katwijk, however, was not to be found.

result of endo- and exogenic factors. The main feature of the Dutch psyche, phlegm, was in their opinion connected with the love of liberty, and they thought that this phlegm makes one sensitive to and in need of strong stimuli, such as gambling and drink. Dutch art shows, according to the authors, a sober realism. Moreover, FRUIN and VISSERING found that the Dutch excel in charity and activity; the latter quality might be the result of the necessary struggle against the water. In this publication the psychology of the Jews was likewise discussed in a few words.

Concerning DE KONING's thesis, which contains a description of Chinese skulls, should only be said that the measurement of KOSTER's angle was taken in addition to the methods of WELCKER. Under a review by TEN KATE ¹⁾ of this thesis, in which he stated French craniometry to be the best, TOPINARD wrote an indignant postscript on the fact that DE KONING had made use of WELCKER's system; he spoke of a "fossil method of measuring the cranial index" and asked: "How is such a thing possible in 1880 in Holland?"

In 1823 a human lower jaw had been found between Maastricht and Smeermaas, on which publications appeared by several foreigners, such as CRAHAY ²⁾, SCHAAFFHAUSEN, HERING, DE QUATREFAGES, and LAGNEAU ³⁾. They regarded this skeletal fragment, which afterwards got lost, as belonging to the oldest inhabitants of Limburg; LAGNEAU suggested a connection with the Aurignacian period. In 1884 UBAGHS objected to this view on account of discoveries of skull fragments and various portions of skeletons in the same part of the country, of which he stated after examination that they originated from the Magdalenian period. According to him, the atheneum at Maastricht possessed a sacrum and a frontal bone, found in 1823.

In a society of military physicians BINNENDIJK proposed to make certain measurements on soldiers, a program which continued the work of the "Committee for Statistics" but, owing to its nature, was carried out by other people. Since soldiers, i.e. persons who had been passed as fit for service, formed the material for this investigation, there had been a fairly strong selection. The examiners did not confine themselves to the determination of the body length, but they paid attention as well to the body weight, the circumference of the chest, and the frontal and sagittal diameter of the chest. It was also intended to compare the results with those obtained by the investigation of other peoples.

The first conclusion arrived at by this investigation, which was carried out by ZWAARDEMAKER (1), was that the relationship between the length

¹⁾ Revue néerlandaise. Revue d'Anthropologie T III, 1880.

²⁾ Notice sur les ossements fossiles trouvés en 1823 en creusant le canal entre Maastricht et Hocht; Réunion générale de la Société des amis de sciences, lettres et arts. Messager des sciences et des arts, première livraison. Gand.

³⁾ Compte rendu de la 6e session du Congrès international d'anthropologie et d'archéologie préhistorique. Bruxelles 1872.

of the trunk and the body weight is closer than that between body length and body weight.

When ZWAARDEMAKER had once begun these anthropological studies, he seems to have taken more and more interest in them. That is apparent from his next publication (2). The author tried to find quantitative standards of the racial type. ZWAARDEMAKER indulged in all sorts of anthropometrical contemplations. For example, he investigated in how far the body weight and the form of the thorax may be regarded as a standard of muscular development. He expected to find a correlation between the length of the trunk and the size of the foot. It is of importance that he recommended for a statistical investigation to choose recruits from a part of the country where the population has strong characteristics from an anthropological point of view, and also that he suggested to make curves in order to get acquainted with the racial type.

In 1887 the anthropometrical data were for the first time collected in a card-index system; the pattern of the cards, designed by TIMMERMANS, was afterwards altered, the records of the eye-sight being left out. Tables have been made of the examinations during the years 1887—1891, of which a report has been given also by ZWAARDEMAKER (3), who made use of the theory of probabilities for his calculations. The examined soldiers have been arranged according to the provinces, and the data were supplemented with statements concerning the correlation between body length and circumference of the chest and about the thoracic index, by which was meant the relation between the sagittal and frontal diameter of the chest.

It may be considered sufficiently well known that ZWAARDEMAKER retired from the military service in order to devote himself to physiology; among the military physicians his anthropological work was not continued.

VAN DER STOK wrote a book in two volumes on the consanguineous marriage, some conclusions of which are important to us: nature does not know incest; intermixture of races has a more unfavourable effect as the components differ more; consanguinity as such yields no dangers: the qualities of the progeniture depend to the same extent as in any other marriage on heredity¹).

With a few words should be mentioned the interest taken by STOKVIS in the pathology of different peoples, which led him in the direction of physiological anthropology. This is apparent from some of his writings, which for the rest need not be discussed in this treatise.

¹) This point of view was shared by A. SASSE (1) in connection with an inquiry (1861 and 1865).

CHAPTER V.

Committee for Ethnology. Since 1865.

Even more important to anthropology than the "Committee for Statistics" was the "Committee for Ethnology", likewise an institution whose foundation had been promoted by the "Maatschappij tot bevordering der Geneeskunst". In this Committee personal contact was made between the Dutch anthropologists, it afforded an opportunity to exchange views and requested the physicians of the whole country to assist in the examination of the Dutch population. This was also aided by the fact that at the annual meeting of the "Maatschappij" sometimes skeletons and instruments could be demonstrated.

Owing to a decision of the "Maatschappij" to take up "ethnology", an article was published by LUBACH (6) in 1864, containing a request to send in crania. In addition to general directions for the study of anthropology, he gave the pattern of an inquiry to record body length, general bodily build, shape of the skull, skull measurements according to VAN DER HOEVEN, characteristics of the face, colour of eyes, hair and skin, qualities of the hair, fertility, duration of life, pathological data, dialect, peculiar customs, and results of the examination with the dynamometer. For the rest LUBACH (8) wrote with regard to the study of living people: "Van mathematische juistheid der maten moet men bij levende organische voorwerpen afzien" ¹⁾.

A year afterwards the Committee was mentioned for the first time. LUBACH, at the time a physician at Kampen, reported on eight skulls and the fragments of a ninth, received from ZEEMAN and found in the St. Jorishof at Amsterdam. The skulls were supposed to belong to Dutchmen of the 15th century and, with one exception, were brachycephalic ²⁾. In addition to these skulls LUBACH showed at the meeting a number of skulls sent by A. SASSE. Again he requested to contribute material to the Committee, after which SASSE demonstrated measuring instruments of LUCAE and BROCA ³⁾ and besides could point out that he regarded the existence of human life in the diluvium as probable.

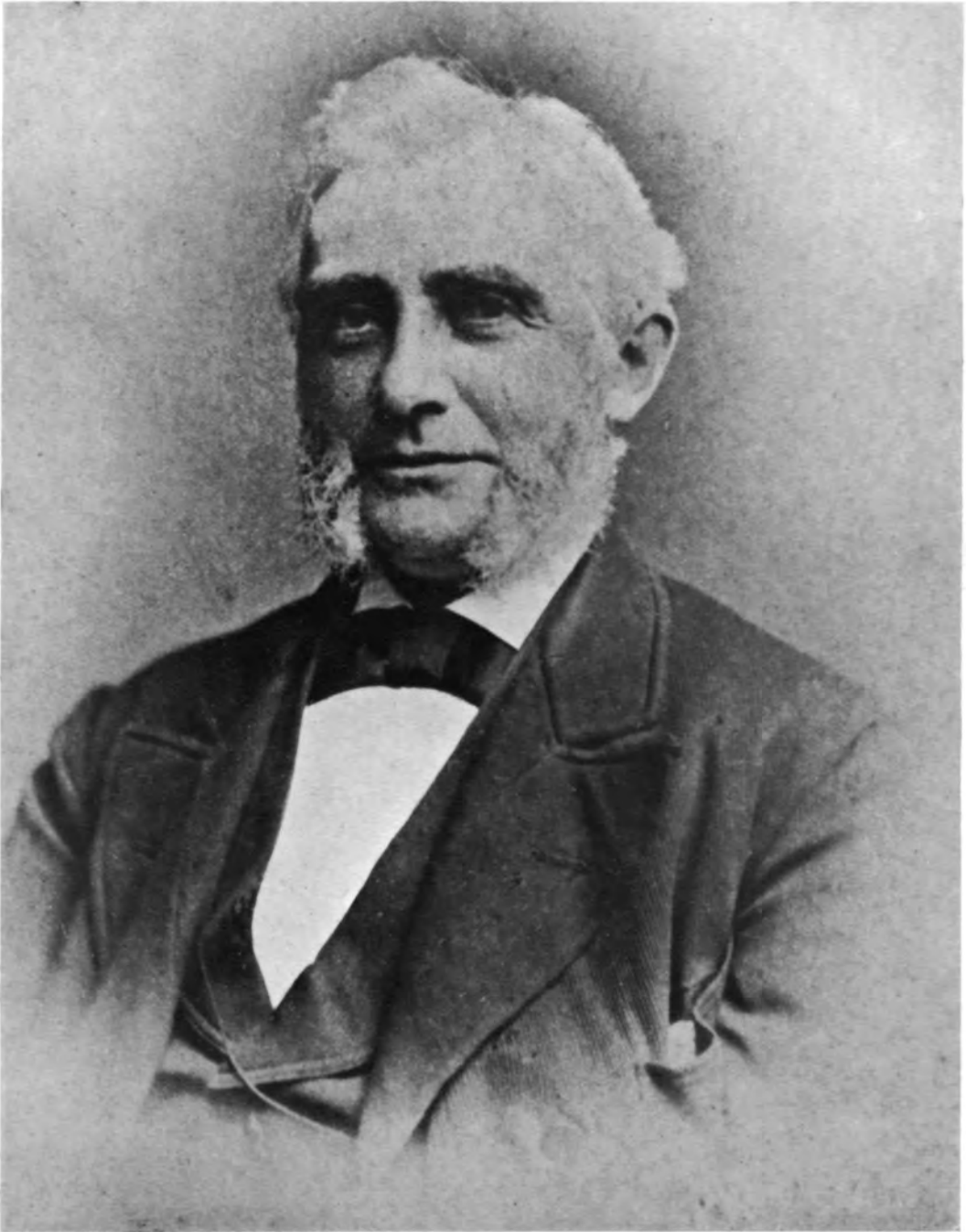
August Sasse *)
1832—1893

¹⁾ "Mathematical correctness cannot be attained in case of living organic objects."

²⁾ At a meeting of the "Genootschap ter bevordering van Natuur-, Genees- en Heelkunde" also in 1865 ZEEMAN showed six skulls from the same excavation, one of which tended to brachycephaly, the others being dolichocephalic.

*) DANIËLS, C. E. 1893. In memoriam Dr. A. SASSE, Ned. Tijdschr. v. Geneesk.

³⁾ SASSE's acquaintance with the French anthropological school was also apparent from his publication (2) in the *Bulletins de la Soc. d'Anthropologie*, Paris 1865, which need not be mentioned any further here.



AUGUST SASSE (1832—1893).

His article (4) written in 1866 was not specially announced as a communication of the "Committee for Ethnology", but yet it was indirectly connected with it. It begins somewhat spitefully with the remark that only two collaborators, one of whom was the author, had responded to the request to send crania. With respect to craniology SASSE developed the point of view that the shape of the skull, like the colour of hair and skin, is a permanent racial feature, not subject to the influence of climate or culture. Diversity of types within a certain population area is, according to SASSE, exclusively due to racial impurity. When in case of admixtures, a quality begins to predominate, it is due to "numerical majority", "fertility", "intensity of the type" (dominance), "development of the body (resistance against detrimental influences) and of the mind" (the capacity to take advantage of external conditions owing to a greater intellectual development), while the "mode of life" was also considered of importance. On account of the possibility of admixture, SASSE considered it necessary to examine large numbers of skulls.

He referred to the skull from one of the Zuiderzee islands, described by BLUMENBACH as *cranium batavi genuini*, which has been supposed to belong to the Neanderthal race. On the other hand, the skulls from the Zuiderzee islands from VAN DER HOEVEN's collection show no relationship with this race, while VROLIK also had denied the similarity. Nevertheless, SASSE was convinced that the Neanderthal race lives on somewhere and he believed to have discovered a representative in Noord-Holland. He thought that the Netherlands had first been inhabited by this race; after the men of this racial type the builders of the "hunebedden" were supposed to have come and still later the Celts.

SASSE finally communicated that he had examined 50 skulls from the Zaan, which for the greater part were found to be brachycephalic (average cranial index 80.8). He agreed, therefore, with WELCKER's statement: "Der deutsche Schädel ist nicht dolichocephal", although it must be taken into consideration that SASSE founded his conclusion on another method of measuring (3). In order to explain the anthropological distinction between the brachycephalic Dutch and the dolichocephalics living among them, SASSE did not allow the final decision to philology, although he admitted its value as auxiliary science.

For a good understanding of the following reports of the "Committee for Ethnology" it is necessary to be acquainted with a publication of DE MAN (4), lecturer of anatomy at the Medical School in Middelburg. His article ¹⁾ describes a number of separate bones as well as 22 skulls found on the beach of Walcheren, one ²⁾ of which he had shown at the

¹⁾ An anthropological communication in those days evidently needed some excuse, for DE MAN wrote: "..... and yet this communication may be given, since also in Holland there seems to be a growing interest in ethnology....."

²⁾ Probably the same as had been examined by P. J. I. DE FREMERY (p. 38).

sixth general meeting of the "Maatschappij tot bevordering der Geneeskunst" (2). In the table of measurements the facial angle of CAMPER may be found. Since the skulls appeared to belong to persons of very different ages, DE MAN regarded them as the remains of a settlement, which he dated at c. 800 A.D. Local conditions have meanwhile changed to such an extent that the grave-yard where the skeletal fragments were found, and which at the time was situated inside the old line of the dunes, now appeared to be on the outside.

The teeth which DE MAN found in the skulls were strikingly sound and did not show caries. The skulls had a small average capacity (1371 cc.) and were on the whole fairly long (4 dolichocephalic, 17 mesocephalic and 1 brachycephalic), so that DE MAN thought that they resembled the row-grave skulls. It could not be found out whether the discoveries at Walcheren belonged to a Frankish, Norwegian, Frisian or Germanic settlement.

SASSE (14) was surprised that DE MAN, without examining recent inhabitants of Zeeland, neglected the possibility that his discovery might be connected with their ancestors. He would have valued such an examination particularly since VIRCHOW ascribed a number of skulls from Zeeland measured by SASSE to brachycephalic Frisian Teutons.

In 1867 SASSE was the reporter of the "Committee for Ethnology"; he expressed his opinion that all Teutons have come from the North and referred in this connection to the decreasing dolichocephaly in the Netherlands in southern direction. He had arrived at this point of view by continued examinations of skulls. More material was discussed now; for example, three skulls from Zuid-Beverland, 28 from Geertruidenberg (average cranial index 78.2), and a number from West-Friesland, which will be dealt with later on.

A year later the report was made by LUBACH; he had measured a West-Frisian skull, nine skulls and skull fragments from Zutphen from before 1829, and two skulls from Haarlem, dating from before the 16th and 17th century. Four of the skulls from Zutphen were brachycephalic, all others mesocephalic. LUBACH considered the cranial index with the addition ortho- or prognathous insufficient as a racial characteristic and without further characteristics often even useless, but on the other hand combined with other characteristics of great importance, the more so as, according to him, there is a certain relationship between neurocranium and facial skull and the "whole bodily build". He observed that the greatest breadth of the skull is not always to be found between the tubera parietalia.

Although in 1870 SASSE could again report on a large number of skulls, yet for several provinces the average cranial index had to be calculated from small numbers. The report mentioned, among others, 18 skulls from de Rijk, the average cranial index of which was calculated to be 81.9. In some respects and also by a tendency to brachycephaly Hindeloopen appeared to differ slightly from the rest of Friesland. On the ground of

his skull researches SASSE objected to the current opinion that the Dutch are dolichocephalic.

The skull described by HARTING and KOSTER ¹⁾ made SASSE observe that dolichocephaly is always caused by the length of the occiput; that is why he rejected BROCA's distinction between frontal and occipital dolichocephaly.

When reading that a year afterwards SASSE as the spokesman of the Committee repeated the complaint that so few skulls were available and that not only old specimens or curiosities were of importance, we wonder why they did not proceed to measure living persons ²⁾. Meanwhile the collection had been enlarged with 29 skulls excavated at Amsterdam, probably buried between 1400 and 1596. Among the 43 measurements taken by SASSE, the cranial index yielded 81.0 as the average value. These skulls corroborated SASSE's above-mentioned view concerning the occiput as the seat of dolichocephaly.

Since the Germanic peoples are dolichocephalic, SASSE stated in the report made in 1874 for the Committee that the brachycephalic element in the Dutch population is due to a settlement which had preceded the Germanic one. He regarded the brachycephalics as belonging to a race different from the Germanic peoples and consequently did not agree with VIRCHOW who had said that there are also brachycephalic Teutons and in this connection had referred to the brachycephaly of a group of skulls from Zeeland. SASSE, who in the same report described these skulls together with some others, admitted that the Teutons in the course of time had obtained a greater breadth of the head but ascribed this phenomenon to intermixture with elements from the population of Denmark and the South of Germany. For the rest he thought that the brachycephaly of these skulls from Zeeland ³⁾ was caused rather by comparative shortness than by breadth.

SASSE communicated that, to make a general determination of the racial features, he was going to measure male and female skulls indiscriminately: a closer investigation would have to wait till later. From the general observations of this report must yet be mentioned the supposition that low skulls possess a comparatively far projecting external occipital protuberance.

As to the measurements, SASSE reported on three groups of skulls: 19 from a terp near Bolsward, 10 from a part of Zuid-Beveland which since 1530/32 has been flooded, and 25 from Geertruidenberg. The skulls from Zeeland and Friesland were described according to WEISBACH's method, which had been somewhat extended by SASSE. The conclusion for the skulls from Zeeland was:

¹⁾ p. 30.

²⁾ It will be seen later on that SASSE soon afterwards made use of data from living persons (12); the publication of these researches was not at the disposal of the "Committee for Ethnology".

³⁾ On this group of skulls a less extensive article had been published a year before (10).

small, short, high, broad at the base, in sagittal direction strongly, in transverse direction moderately vaulted; orthognathous; orbits high, fairly broad, not deep; root of the nose broad, palate very broad and rather long; chin broad, average cranial index 85.0.

The Frisian skulls led to this conclusion ¹⁾:

large, subdolichocephalic (average cranial index 77.5), not low, base broad; sagittally less, transversely more strongly vaulted than the skulls from Zeeland; receptaculum cerebelli long, foramen magnum fairly broad and large; face long, slightly more prognathous than the Zeeland skulls; orbits not high, deep and fairly broad; palate narrower but equally long as that of the skulls from Zeeland; chin very broad.

Concerning the skulls from Geertruidenberg we read in the report ²⁾:

rather heterogeneous: the cranial index for the greater part of these skulls (52 %) varies from 75 to 77.8; on the whole moderately large, lower than the Frisian skulls; base less broad than in the Frisians, sagittally as well as transversely less curved than in the Frisian skulls and those from Zeeland; occiput long and very broad; face low, cheek-bones strongly curved; orbits broad, deep, not high; palate shorter than in the Frisian and Zeeland skulls; tubera parietalia not high; slightly more prognathous than the skulls from Friesland and Zeeland. Of the skulls from Geertruidenberg SASSE distinguished those with a smaller cranial index than 75 as the "Langeraar type".

With satisfaction the *Revue d'Anthropologie* (1874) mentioned this report and a gift of skulls from SASSE.

Since following reports by SASSE are connected with his articles published elsewhere (e.g. 9, 12), it is necessary to discuss some of these. For example, there is a communication on the previously mentioned fifty skulls from Zaandam, where SASSE was a physician. This article deals at the same time with skulls from Oostzaan, Broek op Langendijk, de Rijp, and Kolhorn; from this investigation he concluded that the population of Noord-Holland is subbrachycephalic, with the exception of that of the most northern part of this province, where the Frisian influence prevails. In the same publication SASSE communicated the results of observations on living persons; this part of the article refers to an examination of the colour of eyes and hair of 303 children from 7 to 14 years old (56.3 % fair type, 20.8 % dark type and 22.9 % intermediate type) and of recruits from Zaandam and Oostzaan (43.2 % fair type, 19.2 % dark type and 37.6 % intermediate type). The average body length of 96 recruits of the dark type was 1.587 m. and of 159 recruits of the fair type 1.554 m.

¹⁾ These skulls have also been described in the *Revue d'Anthropologie* (11).

²⁾ These skulls have also been discussed in the *Revue d'Anthropologie*. 1875. T IV; in that volume TOPINARD expressed his doubt about the cranial index of the skull from Nieuwland (85.6; VAN DER HOEVEN) because he thought that the Dutch were on the whole dolichocephalic.

The 18 skulls from de Rijp have been described in detail in the first part of the report published on behalf of the "Committee for Ethnology" of 1877. Then SASSE stated them to be:

small, low, narrow at the base, sagittally and transversely slightly curved; occiput low, in breadth intermediate between Frisian skulls and those from Zeeland; the left and right mastoid processes closely together; low and narrow face; rather prognathous; orbits fairly broad, moderately deep; average cranial index 81.9.

Concerning these skulls the author remarked that they show a frontal brachycephaly, in contrast with the skulls from Zeeland, which are characterized by a short occiput, a difference which afterwards in particular would interest FRETZ (19).

The second part of the report, the contents of which may be found as well in a German publication (16), gives the details of the eleven skulls from Broek op Langendijk, and the seven from Kolhorn. As a group these are:

fairly large, narrow at the base, transversely slightly curved, sagittally even less, occiput long, broad and high; left and right mastoid processes closely together; base of the skull short; foramen magnum fairly long and broad; facial skull low and narrow; strongly prognathous; orbits high and deep, not broad.

On this occasion SASSE gave for the first time an average cranial index for the whole of the Netherlands, viz. 77.0; deviations from this average were supposed to occur in particular on the West coast. Now that at last he could form an opinion of the craniology of the Netherlands, SASSE persisted in his objections to VIRCHOW's point of view, which controversy has been mentioned above.

The history of the Committee in these years was strongly connected with the name of SASSE; in 1878 he was again the spokesman. There had been an investigation of two skulls from the pathologic-anatomical museum at Groningen, obtained from Schokland and Scheveningen, and one from Ameland, as well as ten which had been buried at Leeuwarden before 1680. About these ten skulls we read:

average cranial index 78.8; low, broad at the base, transversely slightly, sagittally strongly curved; forehead narrow, occiput small, broad, fairly low; left and right mastoid processes closely together, base short; a small foramen magnum; facial skull low and broad; orbits small, leptorhine.

The last publication by SASSE, not published for the "Committee for Ethnology" (19), forms a summary of his skull researches until 1878; there is an interesting remark that he thought to have found a similarity between the skull of Furfooz and the brachycephalics of Noord-Holland and Geertruidenberg.

In those years the attention of the anthropologists was drawn by a book of A. FOLMER¹⁾ (1), who had examined a number of skulls from terps, partially belonging to the collections of the Frisian museum, and had compared them with material of a later date. Of each skull FOLMER mentioned 132 data, from which he inferred that the older specimens, owing to their dolichocephaly, show a similarity to the rowgrave skulls, whereas the younger ones, which have a higher cranial index and date from the 15th century, may be compared with recent skulls from Urk and Marken; in the last four centuries the cranial index in Friesland is supposed to show no alterations. The report made by SASSE in 1882 for the "Committee for Ethnology" contained a discussion of this skull research. Although the reporter was inclined to praise FOLMER's work, yet he did not agree with the conclusion, which pointed in the direction of VIRCHOW's statement that with the Germanic peoples an element of brachycephaly had penetrated. SASSE on the other hand thought that also the examination of terp skulls might supply evidence of an ancient brachycephalic population which had preceded the Germanic tribes.

If FOLMER had been a member of the "Maatschappij", there would probably have been no objections in 1882 and 1883 to SASSE's proposal to accept him on the Committee; it was not until 1885 that this wish was fulfilled. FOLMER had meanwhile become a member of the "Maatschappij".

When in 1883 SASSE spoke on behalf of the Committee²⁾, the number of Frisian skulls at his disposal had amounted to 38. In addition to a repeated objection to VIRCHOW's statement that the Frisian skull is short and low, this report contained the remark that on heads of living persons several measurements which are characteristic of the skull cannot be taken; further that Jews anthropologically differ so slightly from Aryans that there is no reason to classify them with another group.

A year afterwards SASSE reported on an investigation of 35 skulls from Reimerswaal, flooded since 1631, the majority of which appeared to be brachycephalic.

That skulls from the neighbourhood of Sneek were found to be longer than those from Leeuwarden, was, according to SASSE, due to the stronger mixture in the larger town. In order to refute RANKE's opinion that a rise of the cranial index is caused by life in the mountains, he pointed to the brachycephaly of the inhabitants of Zeeland, a flat country on the coast.

The examination of 13 dolichocephalic skulls, sent by Dr. S. J. HALBERTSMA from Rotterdam, made SASSE form the opinion that along the large rivers in the Netherlands dolichocephalic elements have penetrated, even there where they had to replace an older brachycephalic population.

In order to understand the following reports of the Committee, it is

1) FOLMER lived from 1833 to 1915.

2) In this report an "appendix" was mentioned, which however was not to be found.

necessary first to mention the conclusions arrived at by FOLMER (2, 3) and DE MAN (7) on the ground of continued skull researches.

The controversy between SASSE and FOLMER gradually obtained the form of a difference of opinion on the changeability of the cranial index. SASSE maintained the stability of this index, since he could not suppose that this characteristic would behave differently from the colour of the skin, hair and eyes, whose stability he regarded as an established fact. FOLMER on the other hand, on the ground of an examination of 30 persons from Groningen who of old had lived in this province, was inclined to conclude that the colour of eyes and hair is more stable than the cephalic index: that is why he accepted the point of view that the original dolichocephalic population has gradually become brachycephalic.

FOLMER also studied one group of seven skulls, from different places in Groningen and of various ages, and a second group, comprising ten skulls, not older than the 12th century, from a terp near Lutjehuisen. Of the first group he described the skulls separately; with regard to the second group his conclusions, which for each object were deduced from 37 data, were as follows:

homogeneous group; average capacity 1396; average cranial index 75.1; high skulls, sagittally and transversely slightly curved; forehead broad and low; three skulls had a frontal suture; parietal surface moderately vaulted; cerebellar receptaculum long, left and right mastoid processes wide apart, foramen magnum broad and large; chin broad; lower jaw strongly curved; indications of pressure applied during infancy (flattenings, hollow in the parietal bone, depression round the frontal fontanel, high frequency of metopism).

FOLMER thought that this group pointed to a relationship with the Scythians and rejected any connection with the Neanderthal type.

On the ground of an examination of many older and younger skulls and of measurements on living persons (we see that DE MAN had taken SASSE's¹) hint!), DE MAN arrived at the conclusion that SASSE's theory of an earlier brachycephalic settlement being driven back by a later dolichocephalic population was incorrect: since the older skulls, ascribed by him to Suevians, are more dolichocephalic than the recent ones and the Western part of Zealand (Walcheren) has a lower cranial index than the Eastern part (Noord- and Zuid-Beveland), DE MAN thought that the brachycephalic element in Zealand had later been added and mixed with the original dolichocephalic population.

DE MAN confined his observations on living persons to the Protestants, since he regarded not only the Jews but also the Roman Catholics as foreign elements. He attached little value to data concerning the colour of hair and eyes, only admitting the significance of the correlation between

¹) p. 44.

blue eyes, fair hair and dolichocephaly, and that exclusively where the low cranial index prevails; for the rest dark hair was considered to be more closely connected with brachycephaly than brown eyes.

Among the numerous subjects discussed by SASSE in the report for the Committee in 1886 was also this study by DE MAN, with the conclusions of which he could now agree. From this year onwards the Committee is also called "Committee for Ethnography", but SASSE still referred to the "Committee for Ethnology". In this report he discussed eight skulls from Sneek, in all probability the collection mentioned in 1883. On these skulls SASSE took 86 measurements, observing that the absolute breadth is far more constant than the length and that it is advisable to express the height by the total height. The summary concerning the skulls from Sneek was the following:

subdolichocephalic and high, not broad at the base, transversally and sagittally slightly curved; occiput large, narrow, very high, sagittally strongly curved; left and right mastoid processes close together, base fairly long; foramen magnum rather short and distinctly narrow; facial skull high, narrow, small orbits. The dolichocephaly is chiefly caused by the occipital lengthening.

The report further called attention to the investigations by PAUW and JACQUES¹⁾ into the anthropology of the Netherlands, mentioned measurements on 46 skulls from Westzaan (average cranial index 78.27) and acknowledged receipt of material from Kockengen, Dokkum, Bellingwolde, Lutjepost, and Leeuwarden. Finally SASSE found an opportunity to point out that FOLMER approached his point of view in the controversy with VIRCHOW.

DE MAN and FOLMER came on the Committee and LUBACH resigned; LUBACH's significance for the anthropology of the Netherlands fell partly outside the sphere of action of the Committee and may be briefly discussed here.

Between 1853 and 1862, so mainly before DARWIN published his theories, LUBACH wrote a number of articles (1, 2, 3, 4, 5) on the problem of evolution. In discussing this problem the question of the unity of the human species was in those days strongly influenced by the point of view taken towards slavery. LUBACH declared to be convinced of the unity of the human species, although this did not imply that the descent must be monogenetic. He was an adherent of LAMARCK's theory and, with respect to the objection that this doctrine would be an attack upon the Christian faith, he remarked "dat het alleen bestaat in de verbeelding van hen, die den vorm, waarin hun geloof gegoten is, voor het geloof zelf aanzien"²⁾. LUBACH was

¹⁾ Bulletins de la Société d'Anthropologie de Bruxelles. Tome III. The authors found as average cranial index for 97 skulls from Saaftingen 85.6.

²⁾ "that the objection exists only in the imagination of those who regard the form in which their faith is moulded as the faith itself."

inclined to admit that the first men must have lived before Adam ¹⁾, but he was not sure that in the diluvium men would have existed, as several of his contemporaries felt justified to conclude from various discoveries.

LUBACH made a distinction between zoological and anthropological qualities of man, as he expressed himself. Zoologically he wanted to include man in the series of animals, but in an anthropological sense man stands by himself. However, he considered the absence of the intermaxillary bone in man useless as a characteristic distinction between man and animals, because he was acquainted with the existence of this part of the skeleton in ontogeny.

LUBACH applied CAMPER's facial angle, although he had objections. Afterwards he measured according to the method of VAN DER HOEVEN.

Many statements from the small articles discussed above may be found again in the book (8) that won LUBACH a reputation. However, he did not maintain his conviction concerning the heredity of acquired qualities; he then called them: "tot in zekere mate erfelijk, niet volstrekt en noodzakelijk, maar toch erfelijk" ²⁾. By the side of this he admitted that new types originate from intermixture.

In that part of his book which deals with the origin of the Dutch population LUBACH quoted WESTENDORP and ACKER STRATINGH, but on the ground of an examination of bones from foreign "hunebedden" ³⁾ he could also state that they must have been built by brachycephalic pre-Germanic tribes (8, 10), taking into consideration that a culture period does not determine the duration of a race. He supposed that after the pre-Germanic tribes the Teutons lived in the Netherlands, viz. the subdivision of the Ingaevones, blond to reddish, with a fair skin and blue eyes. Coming from the East, the Batavians and Caninefates, who were not Ingaevones but Hermiones, penetrated like a wedge into this population, thus separating the Frisians in the North from the Menapians in the South. Moreover, for the East of the country he mentioned a separate invasion which partly took place later.

LUBACH thought that in the recent population the pre-Germanic elements still exert their influence and it is probably due to this opinion that he distinguished two principal Germanic types which were supposed to be merged: a more brachycephalic, smaller and slightly darker type and a more dolichocephalic, taller and fairer type. For Limburg he explained the stronger pigmentation from admixture with Gallic elements.

The average body length of the Dutch is, according to LUBACH, 1,762 Dutch yards. Having settled in Haarlem, he studied Noord-Holland anthro-

¹⁾ In this connection he referred to a little book published anonymously in 1653 or 1655 at Amsterdam by ISAAC LA PEYRERE from Bordeaux. In many respects the contents agree with what has been said afterwards by DOORNIK on Genesis I and II. The public executioner was ordered to burn the book.

²⁾ "hereditary to a certain extent, not absolutely and of necessity, but yet hereditary".

³⁾ LUBACH repeatedly reported on foreign anthropological literature in the "Album der Natuur".

pologically and obtained the result that the population of West-Friesland and Waterland shows the Frisian type.

Among his observations of a more general nature there is one that on the whole women represent a type less distinctly than men.

The interchange of views by SASSE and FOLMER on the characteristics of the Frisian skull was frequently resumed. Since VIRCHOW and with him SPENGLER and WELCKER had stated that these skulls, owing to their small height, might be connected with Neanderthal Man, FOLMER examined this characteristic according to the classification of KOLLMANN again on skulls from two terp layers¹⁾ which differed in age and compared these skulls with recent ones from Friesland. He found that the modern Frisian is chamaecephalic, but that the old one, who besides had a long nose, was not (4). FOLMER suggested that among dolichocephalics two types should be distinguished: the leptoprosopic and the chamaeprosopic type. He did not exclude the possibility that characteristics connected with a powerful development of the respiratory organs are due to the influence of external conditions. FOLMER admitted to the German anthropologists that among the older as well as among the more recent skulls some specimens were found which remind us of Neanderthal Man, but he did not attach great value to this. Both for Groningen and Friesland it had once more become apparent that in the course of time the cranial index had increased (8).

With this study of FOLMER SASSE agreed in the report for the Committee of 1887. SASSE did not persist any longer in his opinion that the original population of the Netherlands had been brachycephalic; the brachycephaly found in Zealand might probably be explained by the arrival of an element of the population which, originating from Russia, had taken its way through the South of Germany. The report further contains the measurements and indices of 46 skulls from Nieuweschans, of ten from Terschelling²⁾ and of the collections³⁾ obtained by the Committee in the previous year; in this report are also found the results of an investigation made by SASSE Jr. on 195 living Jews (cephalic index 80.7).

In 1889 the Committee did not publish a report, but we find that in Rotterdam J. RUTGERS had tried to create an interest in ethnology and that in the Committee DE MAN was replaced by TRESLING⁴⁾. This com-

¹⁾ Material in the possession of the Friesch Genootschap.

²⁾ Presented by professor HUBRECHT.

³⁾ With the exception of 100 skulls from Leeuwarden, which SASSE Jr. had been allowed to examine. The results of this investigation have not been published separately; the length-breadth index of all skulls in the possession of J. SASSE (among which were 10 + 87 from Leeuwarden) may be found in MAYET 1902. Notes sur les sciences anthropologiques en Hollande et en Belgique. A. Storck en Cie, Lyon. This book contains a fairly complete survey of craniology in the Netherlands at that time.

⁴⁾ Neither before nor after his appointment as a member of the Committee did TRESLING publish any anthropological studies. However, there is an indication that he lived at Nieuweschans and consequently the supposition is obvious that the Committee was indebted to him on account of the donation of 46 skulls from Nieuweschans.

munication is not very clear, considering that afterwards DE MAN spoke again on behalf of the Committee, without a renewed appointment being mentioned. It is certain that he remained active in the field of anthropology: this is also evident from a publication (8) on skulls from a grave-yard at Domburg, which he examined together with the local physician, I. M. JANSSEN. Since DE MAN came to the conclusion that this material was of foreign origin, there is no need to mention the results here.

FOLMER, who before had had an opportunity (5) to remark that opinions had changed to such a degree "dat zelfs de stelling is uitgesproken, dat geen enkele verworvene eigenschap zich bij den mensch op het nageslacht voortplant" ¹⁾, made the report for the Committee in 1890, again on Frisian and Groningen terp skulls, the latter mainly collected by himself, the former in the possession of the Frisian museum. He and his son H. C. FOLMER considered the oldest specimens of this collection of the same type as the skulls from the rowgraves.

In 1891 SASSE's son, J. SASSE Azn., was appointed a corresponding member of the Committee.

In 1892 there was no report of the Committee but FOLMER published a study (7) on various discoveries in the neighbourhood of Appingedam of skulls and a femur, which showed the same flattenings as ZUCKERKANDL had observed in cave material. FOLMER found the skulls to be typically Germanic: powerful eyebrow arches, merging frontal tubers, bulging occiput, small frontal breath, left and right mastoid processes wide apart.

The article further discusses 24 modern skulls from Leeuwarden (average cranial index 78.2) and fragments of six skulls from Amsterdam. In these Frisian skulls the extreme indicial values appeared to be more strongly represented than in terp skulls, which besides seemed to have belonged to men of a stronger type. Since all brachycephalic skulls appeared to be high, FOLMER excluded admixture with a low brachycephalic type.

The report published in 1893 for the Committee by SASSE Jr. was the last manuscript of his father who shortly before had died ²⁾. It dealt with the usefulness of anthropological research, not only for the anthropological science as such but also for the identification of criminals — in which connection the author thought of the registration of finger-prints — and likewise for obstetrics, since, according to SASSE, intermixture of races might cause discordance between the pelvic measurements of the mother and the shape of the fetal head.

The report praised the work of ZWAARDEMAKER in connection with measurements on recruits and had great expectations of VAN DEVENTER;

¹⁾ "that even the statement has been made that not a single acquired quality of man is transmitted to posterity".

²⁾ For the sake of completeness may yet be mentioned a little book for secondary schools (6) on the classification of races by A. SASSE.

but the author would have preferred the recruits to be a year older, in order that they might have been fully developed.

SASSE was convinced that the question of the origin of the various components of the population in the Netherlands could not be settled by simple explanations and added the warning: "Men begaat telkens de groote fout om alles met éénmaal te willen overzien" ¹).

Further, SASSE said in this article that he did not know whether man belongs to one species.

DE MAN was one of those who continued SASSE's work (9). For observations on living persons he received assistance from several colleagues. From these data he concluded that in Zeeland two types may be distinguished, of which the fair dolichocephalic type is more strongly represented on Walcheren than on the more eastern islands, where the darker brachycephalic type prevails. In particular twelve skulls from Reimerswaal were examined (average cranial index 83; none of these crania, however, showed this index: the peaks of the curve lay at 81 and 85), half of which represented the type established by SASSE for Reimerswaal.

The report published by DE MAN for the Committee in 1895 was founded on the investigation of a large number of skulls from different times and from different places in Zeeland. The reporter decided from the data that the earliest inhabitants of this province had been dolichocephalic "Celts"; the Romans were supposed to have no descendants among the later population. According to DE MAN, the skulls from the beach at Domburg date from the time after the Romans and belong to a Germanic tribe (Frisians) who lived fairly far eastwards (Kruiningen); the brachycephalic element in Zeeland was said to have penetrated from the East.

SASSE Jr. communicated to the fifth Nederlandsch Natuur- en Geneeskundig Congres that the Committee, at the instigation of DE MAN and TRESLING, intended to study the pigmentation of the Dutch children.

In 1896 SASSE was the reporter for the Committee. He suggested new methods for skull research: it should be tried to establish a type for the different groups of the population and besides to describe each of the skulls. For this purpose should be used the "modulus" of WELCKER and SCHMIDT, who supposed that $\text{Length} + \text{Breadth} + \text{Height} = 300$.

The report further mentions the examination of 16 skulls from Terschelling, which again offered an opportunity to oppose VIRCHOW. In these skulls SASSE distinguished two types: a mesocephalic type (peak of the index curve at 77—79) and a brachycephalic one (peak of the index curve at 84—86), the first of which prevails in number. He was inclined to think that the brachycephalic inhabitants of Terschelling were descendants of a pre-Germanic settlement, but agreed with VON HÖLDER that not all brachycephalics must necessarily have this origin. Since both these racial

¹) "Frequently the great mistake is made of wanting to survey all together."

elements on Terschelling speak and feel Frisian, SASSE considered this proof that language and customs are of little use for anthropology ¹⁾.

After 1896 nothing more is heard of or about the Committee for Ethnology; probably it was considered to be superfluous after the foundation of the Nederlandsche Anthropologische Vereeniging in 1898, which SASSE Jr. had promoted and for which his father had considered the time to be ripe ²⁾.

The Committee existed for over 30 years; a closer contact between the Dutch anthropologists than that brought about by this Committee there has never been in any other period. It was the flourishing period of anthropology as field of work in the hands of practising physicians. The names of three collaborators are closely connected with the publications of the Committee; it may be said that it was supported by those three: LUBACH, A. SASSE and DE MAN. Among its contributions to the anthropology of the Netherlands, craniological studies are strongly represented: by collecting as well as by minute examinations the Committee had done excellent work for craniology. Meanwhile a beginning had been made with the investigation of living persons ³⁾. In this respect SASSE Jr. called DE MAN a pioneer, to a certain extent justly; however, it was SASSE Sr. who had advised him to do so and who himself occasionally carried out such investigations.

¹⁾ See also the defence (20) against KOHLBRUGGE (7).

²⁾ Since 1893 the fourth section of the Nederlandsch Natuur- en Geneeskundig Congres was engaged on "Ethnography", including physical anthropology (J. SASSE Azu. (6)). However, from a later remark by SASSE (8) we find that in the end it was considered better for the study of anthropology to found an independent society.

³⁾ FOLMER (8).

CHAPTER VI.

Johan
Sasse Azn. *)
1862—1915

In a previous chapter we saw that A. SASSE during his craniological studies had contacts with French scientific circles. His son, J. SASSE, did not sympathize with them: for example, for his skull researches he rejected the methods of the French school. In particular he considered it wrong to collect the skulls from a region into a group and to calculate the average cranial index (1). It is remarkable that on the ground of his own experience he took the cranial index of the value 80 as the boundary between brachycephaly and dolichocephaly and then discovered afterwards that BROCA had done the same! Meanwhile SASSE found that for the characterization of a skull the conclusions should not exclusively or to a large extent be dependent on the cranial index. And besides he considered the calculation of the average value unscientific: he took into consideration the maximum and minimum value and calculated the "oscillation percentage" ¹⁾. By the side of the cranial index he wanted to pay special attention to the length-height ratio. It was remarked before that he liked to use the modulus of SCHMIDT. He observed that, in contrast with what applies to the *absolute* measurements of the Dutch types, of the *relative* measurements the length is the least variable magnitude. Later (9, 19) he applied the graphic representation which EYKMAN had designed for the modulus and suggested, according to their relative length, breadth and height, a classification of the different skulls which can best be compared with a scale division.

However, though SASSE thought that the characterization of races in the first place has to take into consideration peculiarities of the skull (8), yet he paid attention also to other anthropological characteristics and therefore proceeded to the measuring of living persons (17). Concerning this method of observation he once wrote: "..... naar 't voorbeeld van de beroemde Dr. COLLIGNON, die als waren 't inboorlingen van Azië of Afrika de lotelingen mat — hoofd, gezicht, lichaamslengte, neus — en hun kleuren noteerde" ²⁾. However, the relation between the natives and Dr. COLLIGNON will have been somewhat different from that between SASSE and his sub-

*) BLOM, D. VAN. 1915. Levensbericht van J. SASSE. De Groene Amsterdammer.

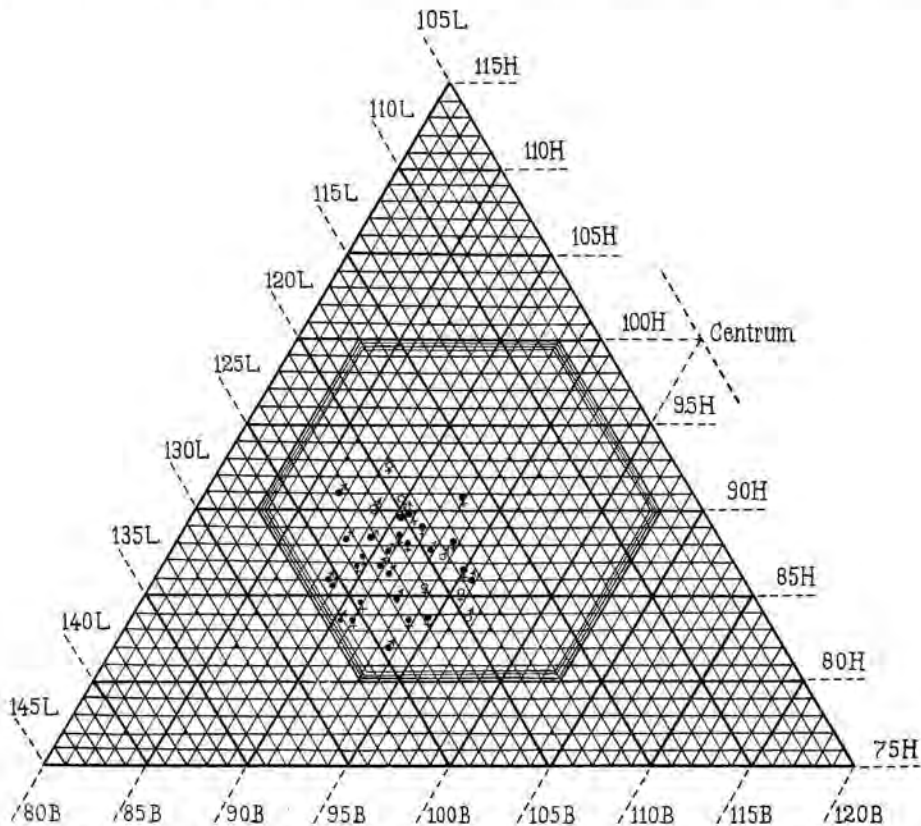
KATE, H. F. C. TEN. 1916. In memoriam Dr. JOHAN SASSE Azn. Tijdschrift Aardrijkskundig Genootschap.

ZWAAN, J. P. KLEIWEG DE. 1916. Naschrift. Tijdschrift Aardrijkskundig Genootschap.

¹⁾ From: $\frac{100 (\text{maximum} - \text{minimum})}{\text{average}}$

²⁾ "..... after the example of the famous Dr. COLLIGNON, who measured the recruits as if they were natives of Asia or Africa — head, face, body length, nose — and registered their colour."

jects: from various sides it has been pointed out that the latter was on very good terms with them.



EYKMAN's method of triangulation, applied by J. SASSE (9) to Frisian terp skulls from the collection A. FOLMER.

SASSE agreed with his father that a race is more homogeneous according as it is purer; in his defence (20) against KOHLBRUGGE he stated his opinion that an absolutely pure race would represent one single type. However, he doubted the unmixed existence of such a race at the present time.

He did not believe that in historical times the shape of the skull has been altered, except by intermixture of races. His adoption of this view will have been promoted by the fact that he did not regard the influence of external conditions as hereditary; he could, therefore, accept the Mendelian laws, although he did not want them to be applied in anthropology (13). Rather would he, like DE WILDE, check the Mendelian laws by anthropological phenomena (15) and he meant to do this with EYKMAN.

Meanwhile he had deduced from observations by BOLK (15) that fair hair "dominates" blue eyes and dolichocephaly (evidently "dominate" is not used here in the same sense as in modern genetics) and that dark hair and brown eyes are somewhat more easily transmitted to posterity than

fair hair and blue eyes. From his own researches he concluded that on intermixture the fair hair and blue eyes may become detached from the other Germanic characteristics. Moreover, he thought that fair dolichocephalics die out by natural selection.

DE WILDE had represented children born from the intermixture of T(euton) and A(lpine) by $\frac{1}{2} T + \frac{1}{2} A$ (so as intermediate hybrids). SASSE has opposed this view (13). In this connection his line of thought is easier to follow than his statement that the adoption of exclusively male elements in a population would lead to a trackless assimilation (8).

We have already observed that SASSE, unlike the French method, tried to find skull types in special groups of the population. In this respect he took VON HÖLDER's side, with whom he also agreed that among the brachycephalics a type with a long face (the Sarmatians) may be distinguished by the side of one with a short face (the Turanians). SASSE's doctoral thesis (1) deals with 35 skulls from Reimerswaal which he examined according to the above-mentioned views¹⁾. He found that of this collection 19 were typical "Zealand skulls", i.e. short, broad and high, 7 "Germanic", i.e. dolichocephalic, but not altogether resembling the type of the row-graves, and 9 mixed. As to the kind of brachycephaly of the inhabitants of Zealand, SASSE reckoned them among the Turanians of VON HÖLDER. The existence of two types among the brachycephalics was once more confirmed by SASSE by means of an investigation on skulls from Celebes (2), while he could point out a correlation between brachycephaly, a broad nose and broad face for men at de Hoorn (Terschelling) (14).

Further investigations were made by SASSE on skulls from Katwijk (11, 12, 16) and on living persons from Urk (12, 17) and Terschelling (14, 15, 17). In the Klein-Duin at Katwijk more than once skulls had been discovered²⁾, which might be dated at 500—800 A.D. SASSE had at his disposal 38 skulls from several discoveries. In this collection, which he compared with the rowgrave skulls, SASSE found, by the side of pure representatives of the Germanic type, skulls which he regarded as intermediate forms between this type and a short-headed race with a broad face. He observed besides that among the skulls of the Germanic type there were some with a low, broad face. Since SASSE in this group also found a representative of the Cro-Magnon type, he was inclined to think that intermixture with this race had given rise to Germanic elements with a broad face.

¹⁾ In the review of SASSE's doctoral thesis in the *Nederl. Tijdschrift voor Geneesk.* (1891 II) by DE MAN we read that the critic considers it important, in connection with the pelvis, that brachycephalic skulls are not always chamaeprosopic and dolichocephalic ones leptoprosopic.

²⁾ For example, BOLK (12) authorized HOLWERDA and KROM in the *Oudheidkundige Mededeelingen van het Rijksmuseum van Oudheden* at Leiden of 1907 to publish his observations on skeletal remains of 17 to 18 individuals. In so far as the skulls could be measured, they showed a similarity to the rowgrave skulls.



J. SASSE measuring children on the Isle of Urk.

The investigation at Urk comprised 250 adults and 220 children. In this group of the population there appeared to be few typical Teutons and some Alpines; SASSE defended the point of view that at Urk representatives are found of the Mediterranean race and in this respect was supported by TEN KATE ¹⁾.

On Terschelling SASSE examined 30 to 40 characteristics on more than 60 persons, which yielded fairly good variation curves. As to the shape of the skull, he found one of the rowgrave type and further chamaemesocephalics and brachycephalics of the type which is generally called Alpine. On the east side of the island a good many broad faces were found. Half of the population was fair; brown eyes were not observed. During the investigation on Terschelling SASSE also tried to find several correlations. It became apparent that on Terschelling dolichocephaly is accompanied by long, narrow faces, a fairly large body length and a rather narrow nose. For the brachycephalics practically the reverse is true. According to SASSE, the population of this island is composed of these two elements and their hybrids. Dark hair on Terschelling must be considered as originating from the brachycephalic component. The body length did not yield a useful standard for the division of the population into groups.

SASSE had succeeded in collecting from different places in the Netherlands 16 skulls which seemed to him comparable with Neanderthal Man. He wanted to investigate once more whether the low skulls which frequently occur among recent Frisians might be regarded as faint reminiscences of this race (6).

It was SASSE's intention, on the ground of his researches, to form a conception of the composition and origin of the Dutch population. Repeatedly (1, 4, 7, 8, 10, 14) we read in his publications that a brachycephalic element occurred in the Netherlands before the Teutons arrived, an opinion which had been shared by his father. This point of view, which was opposed to those of VAN BAREN, DE MAN and STARING, was due to his opinion that the Teutons were the last great people that settled in the Netherlands. Descendants of the brachycephalic pre-Germanic tribes, who probably also were the builders of the megalithic tombs, might nowadays be found in Friesland, on Urk and Terschelling. Originally SASSE objected the name "Franks", which some authors, like WINKLER, gave to these dark-haired brachycephalics of the short, broad type, because he thought that this element of the population should not be regarded as Germanic but as pre-Germanic. SASSE would have preferred to call them "Celts" in the sense of BROCA and his school. When WINKLER met SASSE so far as to admit the existence of pre-Germanic tribes, SASSE withdrew his objection to the name Franks: he had mainly wanted to oppose the conception that in olden times among the Germanic tribes already brachycephaly had occurred by the side of dolichocephaly (TE WINKEL).

¹⁾ Obituary of SASSE in Tijdschr. Aardr. Genootsch. 1916.

With regard to the spreading of brown eyes in the northern provinces, as pointed out by BOLK, SASSE was inclined to think that the more strongly pigmented component of the population had originally inhabited the whole of the Netherlands. Later SASSE used the name Alpine for these dark brachycephalics who, as he supposed, had come from Asia.

From the frequent occurrence of Scandinavian proper names on Ter-schelling (15) SASSE concluded that the Teutons came from the North; owing to the high percentage of dolichocephalics with blue eyes and fair hair, the neighbourhood of Katwijk and Noordwijk should be considered as one of the places from where they had spread since the invasions of the Norsemen.

As further characteristics of the Teutons SASSE (14) mentioned: a long face, long, narrow, straight nose, large, long feet and hands, fore-finger longer than ring-finger, body length eight times the height of the head; the Alpines on the other hand would be characterized by: brachycephaly, dark hair, brown eyes, broad face, broad nose, broad and small hands and feet, fore-finger shorter than ring-finger, body length $7\frac{1}{2}$ times the height of the head.

On account of the broad face, SASSE together with BOLK ascribed the brachycephalic element in Groningen to another, a fair type, while he assumed an invasion of Mediterraneans for Zeeland. That in het Gooi (Laren) a colony of Frisians had settled was confirmed by BOLK (7).

After the war of 1870 Germany was the scene of a national revival and it was tried to prove the Germanic descent of all German inhabitants of the country. In this respect the brachycephalics offered a difficulty. As was remarked before RANKE tried to explain this away by his statement that life in the mountains should influence the shape of the skull, SCHAAFFHAUSEN thought of the influence of civilization, and VIRCHOW, who considered the Germanic type as being best preserved in the Frisians, neglected the brachycephaly, where this occurred in the Germanic group of the population. Nevertheless, in a paper¹⁾ written against an article by SASSE (4), he denied to have said that the German people form an anthropological unity. Yet, SASSE (17) did not agree with BARGE (1) that VIRCHOW tried to point out brachycephaly among the Germanic peoples. The actual difference of opinion between VIRCHOW and SASSE referred to two subjects, in the first place the objection of the latter that the German anthropologist gave too wide a meaning to the term "Frisians" and, for example, described crania from Geertruidenberg also as Frisian, and secondly the relative height of the Frisian skull which was estimated lower by VIRCHOW than by SASSE. With regard to the latter point SASSE met his opponent half-way after making a scale division for the skull indices (9) by means of the triangulation of EYKMAN. Again, when SASSE thought to have found admixture of the Teutons with the Cro-Magnon race (11), he approached the German point

¹⁾ 1895. *Nederlandsch Tijdschrift voor Geneeskunde* II.

of view in so far that in ancient times the Teutons would not have been racially pure. SASSE completely shared the view of VIRCHOW and of WIAZEMSKY that grey eyes are the result of intermixture of races. In this respect he differed from BOLK who classified grey eyes with blue ones. Since SASSE, besides, from BOLK's figures (15) found a connection between grey eyes and red hair, he regarded this colour of the hair too as a mixture of fair and brown. The very frequent occurrence of grey eyes in Noord-Brabant seemed to confirm SASSE's supposition that the Germanic tribes had travelled to the South through this province (10, 12, 13). SASSE had a very high opinion of the anthropological value of BOLK's charts and supported him when they were criticized by DE WILDE, without agreeing with BOLK in all respects. By BOLK's work a plan had been fulfilled which BOS had recommended for the province of Groningen and of which SASSE (7, 12) approved to such an extent that he tried to interest the *Nederlandsche Anthropologische Vereeniging* in it. This attempt, however, had no success and from another side this suggestion of BOS even met with serious opposition. At any rate SASSE remarked that the execution had failed, owing to the "domme tegenwerking van een Limburgsch Kamerlid" ¹⁾.

KOHLBRUGGE (7) had doubted the value of the skull index as a racial characteristic and thus given rise to various discussions. The last paper published by SASSE also disputed KOHLBRUGGE's article. Evidently SASSE wished to be reasonable towards his opponent and tried to meet him in some respects; nevertheless, a considerable difference of opinion remained.

Shortly before his death SASSE (18) had an opportunity to express his opinion on the great diversity in the headform of the new-born.

In a previous chapter SASSE was mentioned as the founder of the *Nederlandsche Anthropologische Vereeniging*. It must have been a great satisfaction to him, when WINKLER was willing to help him in bringing together the Dutch anthropologists in an independent society. It may be regarded as a well-known fact that this society, which has for its object "de bevordering van de Anthropologie in den ruimsten zin van het woord, bij voorkeur van Nederland en koloniën" ²⁾, has not only been able to keep its ground till the present day but also meetings, a library, excursions, and publications bear witness to its activity. Concerning its oldest history we are informed by the report ³⁾ of the first meeting on November 19, 1898, C. WINKLER being in the chair. In his inaugural address the chairman considered it a danger for the young society that the number of sciences connected with anthropology is so considerable. Whether this is a danger, need not be discussed here, but if that is the case, the varied program of this meeting must indeed have put the society to a severe test. There was JAN TE WINKEL who spoke about language variety as the result of

¹⁾ "stupid opposition of a member of Parliament for Limburg".

²⁾ "the advancement of Anthropology in the widest sense of the word, preferably of the Netherlands and colonies."

³⁾ Published in *Nederl. Tijdschr. voor Geneesk.* 1899.

language adoption, which gave him an opportunity to remark that dialects probably are due to racial characteristics of the organs of speech ¹⁾. VAN DER BURG made a communication on the pathology of the human races ²⁾ and STEINMETZ on slavery. SASSE suggested that the 16 Dutch skulls ³⁾ which he had compared with Neanderthal Man should be checked by the description given of this race by SCHWALBE and he expected that a different result would then be obtained. Although he was still convinced that this race sometimes manifests itself among recent men, yet SASSE suspected that it would be no longer possible to consider these 16 skulls as evidence.

After the closing of the afternoon meeting, which had been held in a room of Genootschap Natura Artis Magistra, the discussions were continued at night in hotel Krasnapolsky. There EUG. DUBOIS spoke about comparative measuring of the quantitative development of the brain, EYKMAN on his graphic system ⁴⁾, and GREVERS on a method for measuring prognathism. It should be admitted that the board of the society, which then had already 36 members and 2 donors, offered a great variety of subjects at the very first meeting. In the society year 1903/04 the Nederlandsche Anthropologische Vereeniging requested the then Minister for the Home Department to bring all Anthropological collections in the Netherlands together in a new-founded Rijks-Ethnographisch Museum and to domicile this at Amsterdam. In 1904 the society began to publish an organ of its own: "Handelingen van de Nederlandsche Anthropologische Vereeniging".

There is no doubt about it that anthropology in the Netherlands is greatly indebted both to the founder of this society and to his father. In spite of his peculiarities, for example, writing a spelling of his own ⁵⁾, J. SASSE was respected by his contemporaries. This was evident from the request which he received from the Hollandsche Maatschappij der Wetenschappen to compose a bibliography of the Anthropography in the Netherlands ⁶⁾ and also, at the end of his life, from the promise made by BOLK to continue his work.

Before the history is continued in this direction, some publications from the end of the 19th century should be discussed.

SCHOOR described skeletal fragments which had been found near the Merwede canal at a depth of 6 m.; he regarded them as the remains of a 20 to 22 year old Merovingian Frank, whose skull showed the peculiarities which KOLLMANN had called characteristic of this tribe.

SERRURIER, L.L.D., director of the Ethnographical museum at Leiden, considered it necessary to give some directions in which he referred to

¹⁾ C.f. G. J. VAN GINNEKEN. 1934. Congrès international des sciences anthropologiques et ethnologiques. Londres.

²⁾ See p. 63.

³⁾ See p. 59.

⁴⁾ In a similar kind of graphic representation Dr. JULIEN puts down the results of his blood-group researches in Africa (1937).

⁵⁾ SASSE refused WINKLER's request to make use of the official spelling.

⁶⁾ Cf. p. 1.

anthropology. He suggested that it should be tried to give a reliable anthropological foundation to ethnography. He made a sharp distinction between the ideas "race" and "ethnic group" and attached little value to the language for the classification of races. There is an interesting remark that in his days among the anthropologists hardly any monogenists were left.

BERENDS' thesis deals entirely with criminal anthropology, so that the contents should not be discussed in this treatise.

Dr. ERENS found in Limburg the right half of a human lower jaw, which HOUZÉ described. HOUZÉ came to the conclusion that this skeletal fragment had probably belonged to an adult woman who partly showed similarity to the Canstadt race and partly to recent Europeans.

The relation between race and susceptibility to diseases was the subject of a publication by VAN DER BURG who, referring to STOKVIS, stated that no disease is limited strictly to one race, no more than there can be said to be racial immunity. For the study of susceptibility in different races, which he admitted, he did not start from physiology, for its phenomena, for example, in natives of our colonies and Europeans are almost the same. He considered the origin of races as gradual, hereditary modifications, adapted to the climate. In this connection he quoted the following passage from a letter sent to him by SWART ABRAHAMS: "'t manifesteert zich dagelijks, dat het de koude is, die hier de menschen schift en een bepaald type in het leven laat, terwijl 't ginds de warmte is, die hetzelfde doet" 1).

In connection with the above remark by SERRURIER it is not altogether without importance that VAN DER BURG did not consider the races as definitely originating from one single species.

VAN WALSEM published a method for taking out the brain in such a way that, contrary to BROCA's "coupe anthropologique", the skull besides yields a good museum object. For this purpose he suggested a section which demonstrates some more characteristics and enables us to take mutually comparable photos of the base of the skull. There is reason to suppose that VAN WALSEM, who was a psychiatrist, when taking out the brain, had a pathologic-anatomical purpose in view and only spoke of "coupe anthropologique" with regard to the preservation of the skull, for in his days there was hardly any interest yet in the anthropology of the cerebrum. One of those who became conscious of this deficiency was TEN KATE (2) who in general pleaded for anthropological investigation of the soft parts, carried out on corpses in hospitals abroad. This anthropologist besides suggested that on examination of soldiers should be noted down not only the form of nose and teeth and the degree of prognathism as well as the results of accurate measurements and of the determinations of the colour of skin, hair and eyes, but also physiological characteristics and phenomena due to intermixture of races.

1) "It becomes daily manifest that it is the cold which here sorts the people and keeps a special type alive, whereas over there it is the heat which does the same".

For the study of the patella TEN KATE (3) suggested an index and a classification.

The publications by TEN KATE, who frequently went abroad, refer for the greater part to foreign races (e.g. 1, 9). His studies on birth marks (Mongolian spots) have, also by the later contributions of CORNELIA DE LANGE ¹⁾, LOOS ²⁾ and Tj. HALBERTSMA, become of some importance to anthropology in general, in so far as these articles point out that the marks are not specifically "Mongolian", but may occur in all races in a varying degree and frequency, according to the pigmentation.

Besides SASSE also TEN KATE objected to the disregard of the cranial index as a racial characteristic by KOHLBRUGGE. For a better understanding of this difference of opinion we should first discuss the article which gave rise to it. KOHLBRUGGE did not consider it an established fact that a pure race has only one type of skull (7). On reading this, we cannot help wondering whether this statement may refer to the nationalistic tendency in Germany, which has been mentioned before in this chapter. This supposition is confirmed by KOHLBRUGGE's doubt as to the existence of the Alpine race (SASSE (20)).

KOHLBRUGGE admitted that there is a congenital hereditary shape of the skull, but he mentioned many external conditions which might influence it, such as the position of the infant, the labour mechanism, the head-gear, and the nature of the food, according as this requires a more or less intensive use of the masseter muscles. With the aid of an extensive summary of the literature KOHLBRUGGE studied the connection between food supply and body length on the one hand and the form of the skull on the other, and also the influence on the latter of the town as opposed to the country, of factory work compared to work in the fields (NYSTRÖM), the consequences of life in the mountains (RANKE) and of civilization.

Since KOHLBRUGGE considered the weight of the brain dependent, not on the intellect, but on the more or less intensive use made of the brain, he concluded that this cannot be a racial characteristic and, the shape of the skull being connected with the development of the brain, the latter could not be used as a racial characteristic either. Another objection of KOHLBRUGGE to the cephalic index was due to the fact that it is a ratio and that consequently, for example, dolichocephaly may be caused either by small breadth or by great length.

An animal as a whole cannot be placed in a diagram of descent, according to KOHLBRUGGE, but it may be possible to do so with separate organs, because an animal on account of one of his organs may require a higher position in a genealogical tree than on account of another. For this reason KOHLBRUGGE considered it wrong to go by one characteristic in the case of man, the cephalic index, and he disapproved of it still more strongly on the ground of his numerous objections to this characteristic itself. He

¹⁾ 1907. Een geval van Mongoolsche blauwe vlek. Nederl. Tijdschr. voor Geneesk. I.

²⁾ 1927. Mongolenvlek. Nederl. Tijdschr. v. Geneesk. II.

recommended collaboration with folklore, ethnology and history, and the anthropologist should besides make regular investigations on the skulls of children, from birth up to the 10th or 15th year.

Already before SASSE (20) TEN KATE (8) had answered KOHLBRUGGE's article with a warm plea for anthropometry and a defence of accurate and uniform skull measurements in particular. From this it is clear that TEN KATE then no more than before, by the side of the cephalic index, wished to neglect other characteristics. Among those he was willing to admit, as had been suggested by KOHLBRUGGE, the colour of the skin, although more than the colour he attached value to the condition of the skin which he could observe by sight and touch. And above all TEN KATE wanted to take into account the peculiarities of the physiognomy.

In opposition to KOHLBRUGGE, TEN KATE very definitely stated that a race is characterized by one type. Otherwise the criterion of what is a race would be wanting. Possible changes of this type would again become apparent from measurements.

Meanwhile TEN KATE by no means denied the influence of external conditions, but he was convinced that on the other hand the racial characteristics would always try to manifest themselves: "De relatieve frequentie van een aantal somatische kenmerken zal moeten uitmaken welke de ras-kenmerken zijn, die de invloeden van buiten hebben overleefd"¹⁾.

As to the shape of the skull, against the influence of civilization, mentioned by KOHLBRUGGE, TEN KATE put the dolichocephaly of Nordic man, opposite to the effect of intensive use of the masseter muscles the brachycephaly of tribes as the prairie Indians and others who have to chew coarse food. STEINMETZ (3) also objected to these points in KOHLBRUGGE's article, referring to the dolichocephaly of the British and Scandinavians and the brachycephaly of pygmean races, whose mode of life is similar to that were, according to KOHLBRUGGE, dolichocephaly should be expected.

In his replies (8, 10) KOHLBRUGGE did not yield the point: the value of the cephalic index remained doubtful to him, while he could not accept the idea "racial characteristics" as a starting-point for measurements.

Some years before KOHLBRUGGE (2) himself had made anthropological observations at Volendam and Marken on men, women and children. He noted the colour of eyes and hair, the shape of the nose, the cephalic index, the facial index, the body length, the nasal index, and the frontal index. Particularly for the cephalic index these two groups of the population yielded different figures: Volendam 83.0 and Marken, where he pointed to the inbreeding, 78.5.

In addition to the value of the cephalic index as a racial characteristic, KOHLBRUGGE also studied the occurrence of red hair, and arrived at the conclusion that this is a freak of nature of a pathological kind which may be compared with the phenomenon of albinism.

¹⁾ "The relative frequency of a number of somatic characteristics will have to decide which are the racial characteristics that survived the influences from outside".

The racial characteristics which KOHLBRUGGE afterwards in his book (14) preferred to the cephalic index are the colour of the skin and hair and the shape of the nose. From an anthropological point of view there is in this book an interesting summary of the different foreign elements which the Dutch population has absorbed in the course of time. In a later chapter there will be occasion to mention KOHLBRUGGE's views with regard to the problem of evolution.

As a matter of course STEINMETZ as an ethnographer frequently came into touch with anthropological problems and in some of his publications he expressed an opinion bearing on those questions. In 1892, for example, he broke a lance for the teaching of anthropology (1), in connection with a brochure by BRINTON, which American writer divided this science into physical anthropology, ethnology, ethnography and archaeology. With regard to the racial type of the psyche, STEINMETZ (2) adopted the view that psychical disposition is hereditary; however, when he expressed this opinion, the laws of heredity in general were hardly known and the field of psychology in this respect still lay completely fallow. STEINMETZ thought that the characters of the races originate from a primitive character by "survival of the fittest"; here the significance of the surroundings is evident.

According to STEINMETZ, all character elements may be expected in every race, but each time the frequency of their occurrence will be different. Owing to this unequal "distribution" it is possible to distinguish better racial characters from less good ones. STEINMETZ assigned a favourable "distribution" to the Germanic tribes; however, their excellence had developed rather late, by means of history and surroundings. Supremacy of the Aryan was rejected by STEINMETZ and he objected to CHAMBERLAIN's opinion that the Jews should be sterile as far as their spiritual life was concerned. When studying the character of a nation, in contrast with that of a race, it should be borne in mind that nations sometimes have only a short existence and that the national character is subject to rapid changes.

STEINMETZ (4) also gave his opinion on intermixture of races: "....., der Verkehr besorgt die Auffrischung des Blutes, welche man nach den guten Folgen bei den Angelsachsen, Hugenoten und anderen wohl als von eugenetisch günstiger Wirkung betrachten darf". On studying the results of interbreeding, we should not forget, according to the author, that frequently individuals are concerned in a hybridization who are not representative of their race.

Summarizing we may say that in the latter part of the 19th century in anthropology particularly craniology and the examination of living persons came to the front. As compared with previous periods, we are struck by the fact that at that time less interest was taken in evolution. From this we may conclude that in the Netherlands Darwinism was fairly generally accepted: during 30 to 40 years the problem of descent was regarded as solved by this theory.

CHAPTER VII.

Nearly all BOLK's numerous publications bear the stamp of his great personality, so that we must get an impression of it even if we study only part of his scientific work. Since we are particularly interested in his contributions to anthropology, which not only was his favourite science but in which field also lay his life-work, it is to be expected that from these works we may form an idea of BOLK's significance for Dutch science.

Lodewijk Bolk *)
1866—1930

Although on the one hand in his skull researches BOLK by no means neglected the racial characteristics, on the other hand he raised questions of social importance. This tendency to take into consideration the community was characteristic of the whole of BOLK's scientific work. When he examined skulls for the first time (2), he wanted to find whether there is any relation between the shape of the skull and its capacity. Since he thought that in general a greater intellect is accompanied by a larger brain volume, he was struck by AMMON's statement that the population of the towns, which may be considered more intelligent, is more dolichocephalic than that of the country, from which consequently might be deduced that dolichocephaly is connected with greater capacity. BOLK examined 229 female skulls, which he divided into dolichocephalic, mesaticephalic and brachycephalic ones. The remarkable result was a strong indication that the capacity is greatest for the most frequent indicial values, i.e. those of the mesaticephalics in the Dutch material. In contrast with what had been found by AMMON¹⁾, the capacity appeared to be smallest for dolicho-

*) BARGE, J. A. J. 1935/36. LOUIS BOLK. Jaarboek Mij. der Nederl. Letterkunde. Leiden.

VAN DEN BROEK, A. J. P. 1930. In memoriam Prof. Dr. LOUIS BOLK. Nederl. Tijdschr. v. Geneesk.

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DE JONGE COHEN, TH. E. 1930. In memoriam Prof. Dr. L. BOLK. Tijdschr. v. Tandheelkunde.

DE JONGE COHEN, TH. E. 1930. Prof. Dr. LOUIS BOLK †. Paradentium.

DE JONGE COHEN, TH. E. 1930. Prof. Dr. L. BOLK. In dankbarer Erinnerung. Deutsche Zahnärztliche Wochenschrift. Jg. 33.

KAPPERS, C. U. ARIËNS. 1930. In memoriam: L. BOLK. Psychiatr. en Neurol. Bladen.

MIJSBERG, W. A. 1930. In memoriam Prof. Dr. L. BOLK. Geneesk. Tijdschr. voor Ned. Indië.

WENT, F. A. F. C. 1930. In memoriam LODEWIJK BOLK. Kon. Akad. v. Wetensch. Amsterdam. Verslag afd. Natuurkunde, XXXIX, No. 6.

¹⁾ On comparing with AMMON's results it should be borne in mind that he examined men; further, that his indicial figures did not refer to the skull but to the head, and finally that real dolichocephalics did not occur in his material.

cephaly. BOLK was inclined to think that the relation between shape and capacity of the skull is far less simple if the cranial height is taken into account. The following passage may be quoted from this study, because it is opposed to what is commonly accepted: "Bekend is het, dat in het Germaansche ras de vrouwschedel niet alleen kleiner doch ook relatief langer is, met andere woorden de vrouwschedel heeft gemiddeld een lageren index dan de mannschedel" ¹).

In a later publication which was the result of calculating the indices of 300 skulls and determination of the capacity of 255 ²), BOLK (3) stated that each of the groups, large, medium and small skulls, are equally spread over dolicho-, meso- and brachycephalics, but that the very large prevail in the round skulls and the very small in those with a low index. The very accurate method used by BOLK for his capacity determination is described in a third contribution (4), which contains a curve showing that with a rising cranial index from 74 to 77 the capacity increases regularly, after which a decrease sets in until index 81, which at 82 changes into a rise even exceeding the elevation at index 77. From this BOLK inferred that within dolichocephaly 77 is the optimal indicial value for the capacity; he was not sure whether within brachycephaly 82 must be regarded as this value, owing to the small number of skulls with a higher index at his disposal. In these results BOLK saw an indication that indeed the capacity influences the shape of the skull but not to such an extent that the shape might lose its racial characteristics.

Meanwhile BOLK used his accurate determinations for the drawing of curves referring to length, breadth, height, horizontal circumference, and cranial index, from which he studied the mutual relations of these magnitudes and that with the capacity. He hoped that by investigation of different races it would be found whether the conclusions can be generally applied. Among other things, it had become apparent that for Amsterdam skulls the capacity is far less dependent on the height than on the length and breadth.

In later years (37) he has once more determined the average cephalic index and the average sum of head length and breadth of 9975 men in the whole of the Netherlands, divided according to the provinces, and noted down these values on charts. The average cephalic index of the population of the North-Eastern provinces, which are supposed to represent the Saxon element, appeared to amount to 81 or more. The North-West, where the Frisian element prevails, is likewise particularly characterized by an index up to 80.5. The coast is more long-headed than the country inland; this holds good for Zealand as well, where a Western island like Walcheren shows the relatively low cephalic index of averagely 79.9. Of the Southern provinces, Zealand has averagely 80.8, Noord-Brabant 81.5 and Limburg

¹) "It is a well-known fact that in the Germanic race the female skull is not only smaller but also relatively longer, in other words, the female skull on the average has a lower index than the male skull."

²) Amsterdam skulls.

80.6. According to BOLK, it should be taken into consideration that the pigmentation points to a strongly mixed population both in Zealand and in Limburg.

The inhabitants of a number of towns appeared to be more dolichocephalic than country people. BOLK observed that this peculiarity for Amsterdam is due to a greater head length and smaller breadth, but for Rotterdam, Utrecht and Arnhem to a smaller breadth and length with regard to the country, the decrease of the former exceeding that of the latter.

The sum of head length and breadth appeared to grow slightly larger from West to East.

There has already been occasion to remark that BOLK mainly regarded the skull as a cover for the brain and that he was not only interested in the cranial form but also in the capacity. He now tried (5, 6), by means of capacity determination, to make the weighing of the brain unnecessary, since the brain weight is often influenced by illness and age.

Evidently he ascribed it to this fact that on direct weighing the heaviest brains of Dutchmen have not got a smaller weight than those of other Europeans, but the lightest weigh less than the lightest of other Europeans, so that the average brain weight of the Dutch contrasts unfavourably with the rest of the Europeans. In order to eliminate direct weighing, BOLK calculated the ratio between skull capacity and brain volume, finding up to the 50th year for men 100 : 93 and for women 100 : 94. By taking for the specific weight of brain tissue the figure 1034, found by himself, BOLK determined the average brain weight for Dutch men at 1400 gr. and for Dutch women at 1225 gr. The smaller brain weight of women is only partly connected with the smaller body length and is partly a sexual characteristic, according to BOLK, who introduced the conception "relative brain weight", i.e. grammes of brain per cm. body length. This relative brain weight appeared to be for men 8 and for women 7.4. BOLK also studied the specific weight of the brain in fetuses and infants: this magnitude appeared to increase in fetuses with the body length, to amount to 1027 at birth, and at the age of 7 to 8 months to have reached the value of adults.

After this naturally short discussion of these studies by BOLK, it may be pointed out that the Amsterdam anatomist not only spared no pains with regard to the amount of his material and the accuracy of his methods, but that he also, when starting his problems, placed himself on a higher level than his predecessors, excellent scholars as they were. Undoubtedly they tried, as he did, by continued research, to get an insight in the origin and composition of the Dutch population, but for BOLK this was one object among many: now from this point of view, then from another, he tried to account for his scientific material. This is also very evident when we read his publications on body length.

These studies (16, 19, 22, 26) in the first place refer to 422629 recruits

from the years 1898—1907¹). BOLK studied the results of the municipalities separately, in order to be able to note them down on charts. He could draw the following conclusions:

1. The body length is influenced by the race.
2. The tallest Dutchmen are found in Friesland, Groningen, Noord-Holland and Utrecht, an intermediate group in Gelderland, Overijssel and Zuid-Holland, the shortest in Zeeland, Noord-Brabant, Limburg and Drente. Evidently the Saxon element of the population is of comparatively small stature, as well as the more strongly pigmented component. Owing to their small body length, the numerous Jews at Amsterdam influence the average size in Noord-Holland.
3. Fertility of the soil influences the body length.
4. In industrial centres the body length exceeds that of the surroundings.
5. The two preceding conclusions lessen the value of the body length as anthropological characteristic.
6. The Dutch population exceeds most other European groups in length.
7. The Texel excels by a particularly tall population.
8. The area of the large rivers, characterized by taller inhabitants, in the East of the Netherlands interrupts the region of shorter people.

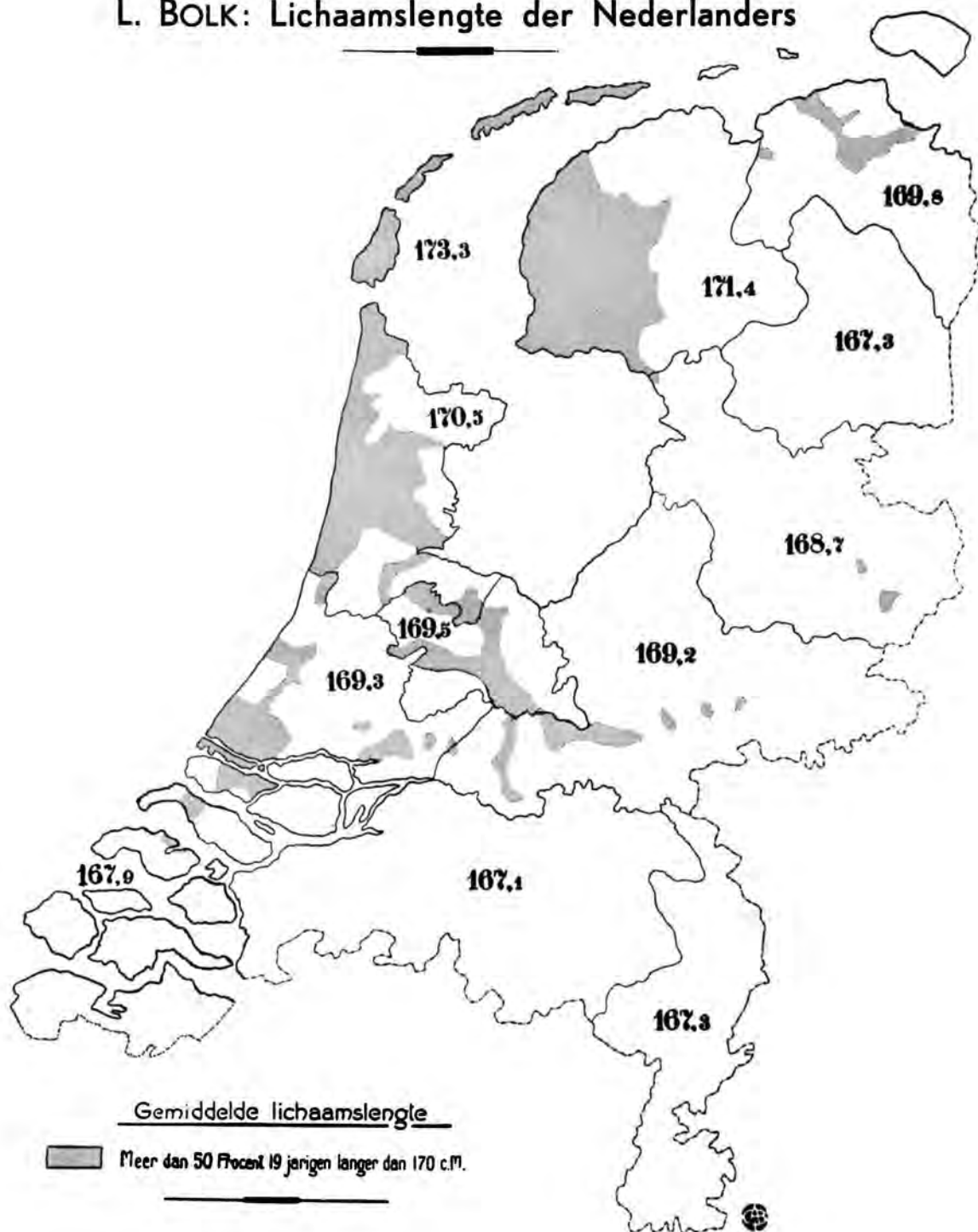
Comparison of the data concerning the body length with those of previous years soon showed BOLK that this length is subject to fairly rapid changes. An investigation of Amsterdam people revealed that since 1850 the average body length of the 19 year old non-Jewish men had risen from 158.5 cm. to 169.4 cm., the length of small persons having particularly increased. In the same way, though to a somewhat smaller extent, this increase was observed for the Jews, whose curve struck BOLK by its strong similarity to the one given by AMMON for the Jews living outside the towns in Baden.

The increasing length was observed not only since the middle of the 19th century but even within the decennium 1898—1907. However, BOLK was inclined to think that a stabilization might be expected. Differently from the time studied by EGELING and ZEEMAN²), in these years the increase in body length was accompanied by an increase of the number of recruits. The change occurred in the whole of the country; however, the intensity of the change was not equally great for all provinces, and for example for Limburg smallest, while Utrecht also had an exceptional position. BOLK did not consider the improved external conditions since 1850 sufficient to explain the strong increase of the body length and suggested a biological reason: it occurred to him that the rapid increase might be compared with the rapid recovery sometimes observed after illness, and this supposition seemed the more plausible as this phenomenon had been

¹) In collecting the data BOLK was assisted by COENEN, CASPARI and STORK.

²) p. 34.

L. BOLK: Lichaamslengte der Nederlanders



Distribution of the body lengths in the Netherlands according to the provinces.

preceded by a period of decline which had manifested itself also mentally¹). From the fact that the non-Jews as well as the Jews in the Netherlands had grown taller BOLK inferred that it was a national phenomenon and not a racial one.

The system of compiling charts has been applied by BOLK also to the spreading of the pigmentation of the Dutch (7, 9). For this purpose he collected data of 479000 school children, among whom there were no Jews. As a standard for the pigmentation BOLK drew a distinction between brown eyes and those of other colours. The chart showed an irregular increase in pigmentation in the direction North-South, while we are struck by a gradual transition from a poor pigmentation to a stronger one in the West and a sudden change in the East; special mention deserves the West coast of Noord-Holland which is comparatively rich in brunettes. From this spreading of fair and dark types BOLK drew the conclusion that already long before the Christian era the more strongly pigmented race, the Alpine race, had extended further to the North than was the case later on; the Teutons would have moved from the North to the South, in part assimilating the Alpines, partly driving them forward. The investigation besides showed that the fair Dutch may be distinguished into dolichocephalic leptoprosopes and brachycephalic chamaeprosopes and that the brachycephalics with brown eyes and long face, found in Zeeland, must be regarded as a mixture. The observations on the rate of the pigmentation in the Dutch population, which offered an opportunity for BOLK to remark that anthropological boundaries may coincide with geological and church boundaries, were the starting-point for a study first on the significance of red hair and afterwards on the nature of the pigment in the hair (10, 11, 13, 14).

With the exception of Zeeland, the frequency of red hair is practically the same for the whole of the Dutch population, the Jews included²), viz. c. 2.45 %. From the smaller figure for Zeeland, 1.8 %, almost the same as the percentage found by AMMON for Baden, BOLK concluded that the phenomenon is less frequent in the Alpine race. He found that pyrrhotism is not connected with intermixture of races, neither with a special colour of the eyes or with fair hair in particular, as had been stated by some authors³). BOLK was inclined to think that red hair is a variety based on qualitative properties of the pigment and that red-haired persons may be distinguished on the ground of quantitative differences. Flaxen to jet-black colour of the hair depends on the smaller or greater amount of nigrochrome which occurs in grains and during childhood increases with the age.

¹) Contrary to BOLK, MURK JANSEN did not regard the increased body length as evidence of the improved physical condition of the Dutch, but as a manifestation of weakness. *Onze Volkskracht. Verslag der voordrachten voor leden van het Bataafsche Genootschap 1921—25. Vol. II.*

²) The number of examined Jewish children amounted to 10.000 (14).

³) BOUMAN (3) afterwards published figures from which he concluded that red hair is less frequent among brown-eyed people than among fair blue-eyed persons.

Golden to fiery red hair is accompanied by the presence of chrysochrome, a diffuse colouring matter. Mixture of these two forms of pigment yields auburn, while an excess of nigrochrome covers the chrysochrome, thus preventing the red colour of the hair from manifesting itself.

This theory of BOLK's was first opposed by DUBOIS who called the nigrochrome melanochrome and the chrysochrome pyrrochrome, regarding the latter as a modification of the former. Both DUBOIS¹⁾ and KOHLBRUGGE (4), who also took part in this controversy, thought that red hair has a pathological origin and that the phenomenon may be compared with albinism.

The conception formed by BOLK, on the ground of his anthropological researches, of the origin of the Dutch population is the following (15, 55). In the glacial period lived in the West of Europe, South of the glacier, the Alpine race which, when the ice retreated, following the foot of the glacier, penetrated into the Netherlands by two ways. One group moved along the Meuse and Scheldt, the other went northward along the coast, and BOLK called the latter group Celts. He did not consider it impossible that they spread so far East in the Netherlands that they may be regarded as the "hunebed" builders. We have already seen that BOLK had indications for the invasion of the Teutons from the North after the settling of the Alpines. Elements of the population which afterwards penetrated into the Netherlands from the East are the Franks, who are particularly important for Belgium, and the Saxons whom BOLK took for a fair variety of the Alpine race.

Although these components of the population, among which according to BOLK the Mediterranean race was wanting, have not mixed so closely as to form one Dutch type, yet they have certainly influenced each other. It seems that in Zealand the brachycephaly decreased through the ages by intermixture with Frisians who went southward along the coast, and that in comparison with the period of the terps the cranial index in Friesland has increased by northward penetration of the Saxons. For this penetration BOLK considered a biological cause probable. The Teutonic type was said to be best preserved at Katwijk and Noordwijk and the Alpine race in the neighbourhood of Venlo.

The anthropological charts of the recent Netherlands, for which we are indebted to BOLK, show three zones for the pigmentation, of which the first with averagely 80 % of fair people and 79.1 % of light-eyed persons comprises Friesland, Groningen, Drente and Overijsel, the second with averagely 77.2 % of fair and 69.9 % of light-eyed people Gelderland, Utrecht, Noord- and Zuid-Holland, and the third with averagely 64.2 % of fair and 60.5 % of light-eyed persons Zealand, Noord-Brabant and Limburg. For the charts of the cephalic index 4600 adult persons were

¹⁾ The article by DUBOIS (7) and BOLK's reply are to be found in the same volume of the *Nederlandsch Tijdschr. voor Geneesk.* (1908) in which BOLK's study was published.

measured. While the pigmentation indicated a change in the direction North-South, in the chart of the Netherlands referring to the headform a transition from East to West is to be observed in the sense of a decrease of the cephalic index. On both kinds of charts the towns are distinguished from their surroundings: the population of the towns is more strongly pigmented and slightly more dolichocephalic.

BOLK's study on the composition of the Dutch population gave rise to some discussions. DE WILDE observed that BOLK for the percentage of Alpines in the Netherlands mentions a far higher figure than the data for Belgium and the neighbouring part of Germany. This was, according to DE WILDE, due to an incorrect interpretation of the data. He gave evidence of the simplicity of his views in the field of genetics, giving an interpretation which not only led to a more consistent result but from which he also concluded to an east-westward increase of the pigmentation in the Netherlands. The tendency of DE WILDE's article was doubt about the predominantly Celtic character of the oldest population of the Netherlands. In this controversy SASSE (13) agreed with BOLK, but concerning the Mediterranean race, which according to BOLK was absent in the Netherlands, he expressed a different opinion. In this respect TEN KATE (8) agreed with SASSE, but he thought that with regard to the pigmentation of the Dutch population DE WILDE was right, although he admitted to SASSE that in the field of genetics DE WILDE made use of incorrect principles.

Occasionally BOLK discussed a connection between the distribution of the races over the Netherlands and pathological as well as physiological problems. From their very nature the first-mentioned publications are of no importance in this study; it may merely be mentioned that they deal with tuberculosis and dental caries (8, 25) and that BOLK in one of these articles remarked that the Germanic type gradually disappears from the Dutch population, the fair people also being more subject to caries than dark persons.

The above-mentioned physiological publications by BOLK refer to the menarche (48, 49, 50, 57, 60)¹). The investigation, made on 1130 fair women, 670 brunettes and 165 Jewesses, showed that the age of menarche must be considered as a racial characteristic which is influenced by temperature, season and external conditions of a social nature. The influence of the season may possibly be a reminiscence of the rutting season. By collecting data of mothers and their daughters, BOLK succeeded in showing the heredity of this characteristic. Paternal hereditary factors did not seem to exist here. During one generation puberty was accelerated by about a year and a half, a fact which BOLK tried to explain by the influence of external conditions. The average age of menarche is somewhat earlier for

¹) This subject was also discussed by H. POSTMA (Nederl. Maandschr. voor verlosk., vrouwenziekten en kindergeneeskunde, V, p. 150), which publication is not mentioned here any further because it deals with pupils of an asylum.

fair women than for brunettes. That this is not connected with the pigmentation as such was found by BOLK from the figures collected for the Jewesses, for this group, which is still more strongly pigmented than the brunettes, generally attains puberty at a slightly earlier age than women of the fair type. BOLK besides found that among Jewesses two types occur with regard to the age of menarche. His wish that a similar investigation might be made on the age of menopause has not yet been fulfilled.

There is little connection between his other anthropological articles and a special publication ¹⁾ by BOLK (23, 24) on the retrosacral fossa, in which he compared some peculiarities in the pelvis of Dutchmen with those of Papuans and Australians. BOLK attributed the differences to a difference in posture.

Another communication deserves special mention, viz. on the direction of the growth of the hair in the frontal region; BOLK was struck by the great variability observed in the Dutch and wished to find out whether this occurs as well in groups of less strongly mixed races (52).

Yet another contribution by BOLK (1) has likewise been considered for years as not having any connection with the rest of his publications and, as it presented itself as a casuistic study, it will at first probably have attracted but little attention. Now that afterwards it is discussed in a study on BOLK's contributions to anthropology, it is the more remarkable that this publication has been his very first in the field of this science. It is a description of the corpse of a 63 year old man which showed many fetal characteristics. BOLK was inclined to think that this series of remarkable features had to be ascribed to one cause. He did not discuss the nature of this cause, but it is practically certain that gradually he had formed a definite opinion on this subject. How long it has actually been before the principle of development which he deduced from this conception had taken definite form in his mind, is not known ²⁾. When in 1918 he published it (33), 18 years had elapsed but there is reason to suppose that a number of articles (17, 18, 20, 21, 27, 28, 30), published since 1909 which will be discussed below, already contain more or less purposeful arguments for the theory which he would later put into words.

By comparing skulls of older and younger men and apes BOLK showed that in ontogeny in both of them the inclination of the foramen magnum increases and that it is shifted ³⁾ in occipital direction by lengthening of

¹⁾ Anniversary volume for HECTOR TREUB.

²⁾ In 1908, when discussing an article by KOHLBRUGGE (5), BOLK took the stand on behalf of polygeny. *Nederl. Tijdschr. v. Geneesk.* I.

³⁾ In order to obtain a standard for these displacements, BOLK determined in the median plane the point where on the inside of the skull the frontal wall merges into the roof of the nose and the point farthest away from it, likewise in the median plane on the inside of the skull. On the line connecting these points, the distance between which he called G, he erected a perpendicular from the basion, thus cutting a frontal piece A from G. The inclination of the foramen magnum is measured by the angle between its

the base of the skull and diminished vaulting of the occipital bone. With regard to each of these phenomena the skull of young anthropoids appeared to be closer to that of man than the skull of adult anthropoids, owing to the fact that the described ontogenetic development of the latter had proceeded further; the consolidation of the more fetal condition in man benefits the posture in connection with his erect gait. Likewise the backward and downward movement of the meatus acusticus, which postnatally may be observed both in men and apes, occurs more strongly in the latter than in the former.

An analogous phenomenon is, according to BOLK, the obliteration of the cranial sutures, which in mammals sets in as soon as the brain reaches maturity, but in man years afterwards or not at all. Man obtained this peculiarity in a phylogenetically young phase; BOLK considered cases in which the sutures fade away not of a pathological but of an atavistic nature.

In those years BOLK did not yet classify metopism (29, 31, 34) ¹⁾ with the series of the above-described phenomena, but regarded it as a racial characteristic which is more frequent in Teutons than in Alpines and is due to the poor development of the temporal muscle which besides, owing to the strong vaulting of the frontal bone in man, has an altered direction of traction ²⁾.

BOLK seized the opportunity of the rectoral annual address on January 8, 1918, to pronounce the idea which had been gradually formed in his mind. What BOLK offered his audience contained proof of constructive thinking and was in form almost sublime. The first publication of the theory, with which in future his name would be connected, consequently had less the form of a scientific treatise than that of an excellently finished natural-philosophical discourse, the reading of which might be a pleasure to the scholar as well as to the educated layman (33). It will not have happened often that an annual address went into a third edition!

In agreement with what has been briefly mentioned of some previous contributions by BOLK, he was convinced that in the ontogeny of man not the successive phases of development of apes occur, as might be expected according to the biogenetic law of HAECKEL, but that in human development conditions remain, which are of a passing nature in apes: the human fetus is not ape-like but the fetus of the ape is man-like. With regard to his

plane and this perpendicular. For the fronto-occipital localization of the foramen magnum BOLK calculated the basilar index $\frac{100 A}{G}$. The connecting line on which the distance G is measured appeared in the end to be less useful for races with occipitally flattened skulls.

¹⁾ Examination of 1400 skulls from a grave-yard at Amsterdam.

²⁾ VAN KRANENDONK DUFFELS could not confirm this connection comparative-anatomically (Kruisschedels, Diss. Leiden 1923).

A. E. SITSEN thinks that the phenomenon has to be ascribed to insufficient fixation of the frontal bone by the falx cerebri. Ueber die Ursachen des Metopismus, Anthr. Anz. 1937. XIV.

disposition BOLK called man conservative in his development and the ape propulsive; an organism which is conservative in its ontogeny reaches an adult form at a higher degree of development than one which takes a propulsive way. In the evolution from lower to higher forms BOLK saw the manifestation of a fundamental quality of life itself: in the primitive organism the anthropogenesis had already been given. While consequently the form which will develop is already contained in the primordium, BOLK however did not want to neglect selection and adaptation as active factors. He considered evolution for the organic world as analogous to growth for the organism. For the latter phenomenon admitting the significance of the system of glands of internal secretions, the endocrinon, BOLK suggested that this organic system might also be of particular importance to phylogeny.

In addition to what has been said of the shifting of the foramen magnum and the persistence of the cranial sutures, BOLK advanced as arguments for his theory of evolution in the first place the practically fetal topography of the orbits in man, the freely projecting nose, the frontal vaulting, the peculiarities of the teeth, the pelvis, the hymen, the length of the extremities with respect to the trunk. The propulsive development of the chimpanzee as compared to the conservative one of man would be apparent from the vanishing of fetally present labia majora in the former and from the growth of the hair and colour of the skin. Already on this occasion BOLK called the dark human races propulsive in contrast with the white races. He arrived at the conclusion that the large brain weight of man must be regarded also as a manifestation of his conservative development.

Before giving a summary of numerous results of his researches, on which he originally founded his theory or which afterwards confirmed it, it is advisable to confine ourselves first to the theory itself and to observe how BOLK gradually built it up (61, 62, 63, 64, 66, 67). The acquiring of the deeper insight into the process of development, needed for this purpose, took another eight years of BOLK's life, years also of severe physical suffering. In that time he became convinced that the fetalization of man, the result of his conservative ontogeny, is founded on an extension of the various phases of life, which he called retardation. The longer duration of these phases would offer an opportunity to the organism to reach a higher degree of development.

The principle of retardation, having its seat in the organism itself and withdrawn from external influences, applies, according to BOLK, to all primates, but is strongest in man. Retardation does not only put its stamp on the morphogenesis of man but is also manifest in the whole course of his individual development. Since the rapidity of this development is highly dependent on the function of the endocrine glands, BOLK, after having formed a conception of the nature of fetalization, felt still more justified to suppose that the condition of the endocrinon determines the degree of fetalization. Thus he allowed an important position to physiology in the problem of anthropogenesis.

The theory of retardation is intended to explain the morphogenesis of man: BOLK denied it any phylogenetic significance. However, it offers an opportunity to contemplate what man may expect of his future evolution. BOLK considered the possibility of a certain connection between retardation and a diminished power of endurance, from which he concluded that continued retardation in the end might lead to extinction. Thus man would finally perish through his excellence.

Discussing the specifically human characteristics, BOLK made a distinction between a primary and a consecutive group; the first are caused by developmental tendencies, the second, including the erect gait, the hymen, the chin, the broad orbital septum, the ramification of the aorta, and the arch of the foot (45), have to be regarded as a series of adaptive phenomena to the first. Among the primary characteristics, which consequently are supposed to be a direct proof of the fetalization of man, are reckoned the shape of the concha, the temporary interruptions in the dentition, the shape of the stomach (39), and the persistence of the fetal conditions on the cranial and caudal endings of the body-axis.

BOLK took some of the above-mentioned characteristics as subjects of separate treatises. He discussed elaborately the topography of the orbits in young and adult people and in anthropoids (32, 35, 36, 46, 47). In young anthropoids the orbit is situated below the cerebral cavity and gradually, by growing in frontal direction, obtains a place in front of the cavity; by the formation of a bony crest the orbits are provided with a new roof. At the perinatal age as well as afterwards the topography of the orbits in man differs only slightly from that observed in young anthropoids. BOLK's researches further revealed that the nasal cavity in reptiles and mammals is likewise ontogenetically subject to growth in frontal direction (43, 44), causing the orthognathism existing in a fetal stage to change into prognathism. In man the orthognathism remains, whereas in apes a partial pseudo-prognathism develops, owing to the fact that the bottom of the nose grows in frontal direction but the nasal cavity retains its position below the cerebral cavity.

The prominent chin of man, being a consecutive characteristic, could not be explained directly as a fetalization phenomenon (53, 54, 56). Examination of embryonal and adult forms enabled BOLK to compose the following table:

	Primordium	Final stage
Lower primates	ageniotic	ageniotic
Anthropoids	mesogeniotic	ageniotic
Diluvial man	mesogeniotic	mesogeniotic
Recent man	mesogeniotic	eugeniotic

The mesogeniotic primordium is formed by the turning up of the tips of MECKEL's cartilage, which again is due to the persistence of the nasal capsule in subcranial position. In anthropoids a prolongation of the jaw sets in with the tooth change, thus an ageniotic chin being formed out of a mesogeniotic one. In man the growth of the alveolar part of the jaw has stopped during the changing of the teeth between the 6th and 14th year, whereas the development of the basal part proceeds in harmony with the growth of the body, which causes the eugeniotic chin to be formed out of the mesogeniotic one. Thus the retardation, which becomes manifest in the dentition of recent man, would indeed be closely connected with the formation of the prominent chin. BOLK thought that in diluvial man the development of the alveolar and basal parts of the jaw was equally rapid, and he considered it of importance that, according to VIRCHOW, in the child of Ehringdorf tooth-change and prolongation of the jaw took place at the same time.

The contributions by BOLK dealing with endocrinology are numerous. Studying the symptoms in pathological cases for nearly all known endocrine glands (40, 42, 45), he found that they always correspond with the absence of retardation phenomena, which as a complex are characteristic of the last phase in evolution so far experienced by man. BOLK, therefore, felt justified in considering retardation dependent upon the qualities of the endocrinon, which is not only liable to pathological modifications but is also influenced by the nature of the food. Here BOLK thought of the herbivorous anthropoids in contrast with omnivorous man.

The rapidity of development of the various organs and the mutual relation of these rapidities being of great importance in the intra-uterine period, BOLK was convinced that quite early in embryonal life hormones must be active. He supposed that in this phase of development the recapitulation organs, such as the chorda dorsalis, pronephros and mesonephros, must be granted the significance of endocrine glands (58, 59).

BOLK reduced sexual difference to difference in intensity of fetalization and racial difference to difference in extension of fetalization (61, 62). He remarked repeatedly that men are more highly fetalized than women (40, 45, 48, 63). For the anabolic periods of life we can agree with this statement, but afterwards a change seems to take place which in the catabolic phases makes women more strongly subject to retardation. Without drawing this conclusion, BOLK himself gave indications for it; to these may be added the data obtained by MEURSING from the weighing of organs.

When BOLK further realized the varying degree of fetalization as a characteristic for the distinction of races (68, 69, 70), it became apparent that the various organs with regard to retardation are more or less independent of each other: a race may in one characteristic be more, in another less strongly fetalized than another race. In many respects, among

which pigmentation, the fetalization in Nordic man has, according to BOLK, reached a very advanced stage. Previously he had classified metopism among the racial characteristics and there was no need to abandon this point of view when afterwards (65), like the persistence of sutures in general in man, he wanted to regard it as a fetalization phenomenon of a histological nature. In the problem of the classification of races BOLK suggested the possibility of a connection between evolutive retardation and psychical evolution, the study of which, however, he wished to leave to others.

It has been mentioned above that BOLK considered continued retardation responsible for a weakened resistance. In some respects this phenomenon indeed appeared to occur more frequently in the more highly fetalized sex, according to BOLK, as well as in the most highly fetalized race: 150 male fetuses are concerned in abortus against 100 female ones (63), while dental caries and tuberculosis ¹⁾ are more frequently observed in Teutons than in Alpines (8, 25).

BARGE has taken great pains to explain BOLK's theory to a large circle of the Dutch ²⁾; however, this does not imply that he belongs to its adherents.

Although it cannot be denied that BOLK's fetalization theory met with little approval, yet it is rarely disputed in the literature. Objections were raised by ELLIOT SMITH ³⁾ and DE NEUVILLE ⁴⁾ and in this country by SLIJPER (1, 2). However, in a discussion with ARIËNS KAPPERS ⁵⁾ the latter withdrew several of his objections, which were partly due to a misunderstanding frequently met with in regard of fetalization. Already when revising the third edition of BOLK's rectoral address, KAPPERS had occasion to point out that fetalization, in the sense that BOLK used, is not a fixation of fetal forms but a prolonged activity of fetal tendencies. Taken in that way, fetalization is not a static but a dynamic conception. When BOLK himself explained this difference (51), he pointed out that retardation leading to fixation does not result in a higher development, but on the contrary may lead to pathological conditions.

VAN DEN BROEK (1, 8) who thought that not only morphological characteristics are hereditary, but also tendencies to certain future differentiations, found as the result of the fetalization theory a shifting of the problem of anthropogenesis.

Adherents of the fetalization theory are in addition to ARIËNS

¹⁾ This point of view was not confirmed by H. SANDRA. Oogkleur en Tuberculose. 1937. Ned. Tijdschr. v. Geneesk. Vol. 81.

²⁾ Retardatie en foetalisatie. De Gids 1927.

³⁾ 1927. The evolution of man. Oxford University Press. Londen. Humphrey Milford. Second edition.

⁴⁾ 1927. De certaines caractères de la forme humaine et de leur cause. L'Anthropologie. Tome 37.

⁵⁾ 1936. Werken van het Genootschap t. b. v. Natuur-, Genees- en Heelkunde. Amsterdam.

KAPPERS (7), for example, S. T. BOK¹⁾ and GANS²⁾ and among the anthropologists BIJLMER (3), while the author of this study thought to be able to demonstrate, on two different forms of an incompletely buried insula of the brain, the consolidation of a fetal characteristic as against the persistence of a fetal tendency³⁾.

For psychical life RÜMKE accepted the principle of retardation. However, the soul in its development does not reach the highest peak without purification: "...aan de voorwaarden voor de volkomen ontwikkeling moet het vermogen tot lijden worden toegevoegd"⁴⁾. Was this condition not pre-eminently fulfilled by the great Dutchman among the anthropologists who considered it his life work to deepen our insight into development?

¹⁾ 1924. Een functie-uitstellend beginsel in de embryonale ontwikkeling. Ned. Tijdschr. v. Geneesk. I.

1926. Assimilatie tegenover additie van vormeigenschappen. Ned. Tijdschr. v. Geneesk. I.

1926. Vormassimilatie en foetalisatie. Ned. Tijdschr. v. Geneesk. I.

²⁾ 1923. Alte Hinweise auf die Menschenähnlichkeit junger Affen. Anat. Anz. Bnd. 56.

³⁾ 1934. A. J. VAN BORK—FELTKAMP. Review of the frontal operculum and the burial of the insula. Psychiatrische en Neurologische bladen.

⁴⁾ "..... to the conditions for a perfect development the capacity for suffering must be added". H. C. RÜMKE. Ontwikkelingspsychologie en Psychotherapie. Inaugural adress. 1933.

CHAPTER VIII.

Evolutionists.

It is apparent from the previous chapter that at about the beginning of the 20th century the problem of evolution once again began to attract attention. Before and after BOLK a number of Dutch workers have thrown light upon this problem.

The first to be mentioned among them is HUGO DE VRIES, whose theory of mutations has become familiar. It is sufficiently known how HUGO DE VRIES conceived the formation of species by changes, mutations, in the bearers of hereditary qualities. Occasionally DE VRIES wrote articles in which he applied his theory to man, that is, as an explanation of the origin of human races, not of man as such. He regarded the races as species and believed that man, on entering a following period of mutations, might still be able to form new types. The possibility of a gradual improvement of the race was denied, as might be expected on account of his theory; the racial differences were considered constant, although within a race fluctuations may be observed.

In his first inaugural address (1) the embryologist HUBRECHT expounded the hypothesis that evolution would be most clearly perceptible in organisms which are removed from the original form by the greatest possible number of generations. He compared a series of descendants, each time in their generation being first-born, with a similar series, represented as a succession of last-born. After some time the first series has had far more opportunity to evolve than the second in the same time; still less opportunity is offered to species which mainly multiply asexually. HUBRECHT produced his hypothesis in order to explain the observed fact that in organized nature are found side by side phylogenetically highly and less highly developed forms.

In his later studies HUBRECHT remained faithful to his interest in evolution: on the ground of researches on the amnion he had come to the conclusion that mammals originate from viviparous amphibians, while after observing the decidua and placenta he thought that the primates descend from unknown insectivora. Intermediate forms between these insectivora and the primates were supposed to be *erinaceus* and *tarsius*, the first of which must be more closely related to man and anthropoids and the second to the lower apes of the old world. HUBRECHT, expecting that in the theory of evolution in the end the dichotomous genealogical trees would have to be replaced by almost parallel lines of descent, wanted to place the lemurides outside the line of descent he had designed. In palaeontology he believed not only by the peculiarities of the primitive insectivora (OSBORN) to find some support for his point of view concerning the descent of the mammals in general but

also in those of *chirotherium* and *anaptomorphus homunculus* for the descent of the primates in particular. According to HUBRECHT, *pithecanthropus erectus* lived in far too late a geological period to be regarded as the progenitor of man. Owing to his embryonic conditions being a very old form among the mammals, man cannot have appeared after *pithecanthropus erectus* but must have been one of its contemporaries.

For the origin of man HUBRECHT considered mutations to be responsible. Only some of these needed be active: for example, a comparatively simple mutation might cause the formation of the tracts connecting association and motor centres, which make articulated speech possible. It may be due to this small number of mutations that HUBRECHT repeatedly called man primitive.

On the occasion of the DARWIN commemoration, organized in 1909 by the Dutch Physical and Medical Congress in collaboration with some medical and biological societies, HUGO DE VRIES and HUBRECHT (8) were the speakers.

Occasionally WIJNAENDTS FRANCKEN also dealt with anthropology; his statement: "het kind is tijdelijk als 't ware bovenmenselijk"¹⁾ was a pleasant way of mentioning the phenomenon which BOLK would afterwards interpret after his own fashion.

DUBOIS must be mentioned in the first place in connection with the discovery of the *pithecanthropus erectus*. However, in a treatise of this nature we should not follow DUBOIS in his description of the details of the discovered skeletal fragments, but rather call to mind which position in the series of primates he assigned to the creature reconstructed by him from these fragments. It may be considered a matter of common knowledge that DUBOIS (1, 2), on the ground of the peculiarities of the skull cap and the discovered molar teeth as well as on those of the femur, originally took *pithecanthropus* for a transition form between the *simiidae* and *hominidae*. He thought that the genus *pithecanthropus* formed part of a separate family of the *pithecanthropidae*. In the course of time this point of view was considerably modified: in the end DUBOIS felt more inclined to classify the genus *pithecanthropus* with the family of the *hominidae* (22). No longer did he take *pithecanthropus* for a genealogical intermediate between ape and man, for he considered it best to give it place on one of the off-branches in the pedigree (23). Again some years later (26) he gave an entirely new diagrammatic representation of the descent, which hardly resembles the usual one. DUBOIS arrived at this altered insight by means of a series of profound studies, starting from the cranial capacity of *pithecanthropus erectus*. Soon DUBOIS was convinced that the brain weight is dependent on the intellectual degree of development of the animal, which relation he called cephalization, and on the size of the body, reduced to the body weight (3, 4, 6, 8, 9, 10). He succeeded in representing the mathematical relation of these

Marie Eugène
François Thomas
Dubois
b. 1858

¹⁾ "Temporarily the child is so to speak superhuman".



EUG. DUBOIS (b. 1858), from a painting by Fr. Oerder.

magnitudes in the equation $E : e = c S^r : c s^r$, where of two animals of equal intellectual organization, expressed in the cephalization factor c , the brain

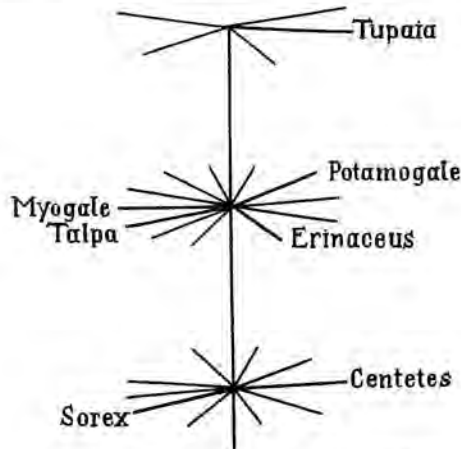


Diagram of descent according to DUBOIS.

weights are represented by E and e and the body weights by S and s ¹⁾, r being a relation exponent which on comparison of animals of different species appeared to have the value 0.553 or c. $\frac{5}{9}$ and in case of animals of equal species the value 0.22.

From the value of $r = 0.55$ for men and women DUBOIS inferred that with regard to cephalization the sexes stand in the relationship of different species. This conclusion was abandoned when he took into consideration the relative muscular masses of men and women (11, 12); the value of r now became 0.28, only slightly deviating from $r = 0.22$. In this connection DUBOIS pointed out that, in comparison with their muscular power, women have a disproportionately high body weight, to which remark he added a sociological expatiation.

In many ways (5) DUBOIS expressed the brain weight in connection with magnitudes which may be measured or weighed on the body; his methods grew continuously more subtle and finally he even used data obtained from the histology of the nervous system (13, 14, 15).

The formula $c = \frac{E}{P^{\frac{5}{9}}}$, applied to a number of mammals, yielded results for c which may be arranged in the geometrical progression 1, 2, 4, etc. (5, 18, 19, 20, 21, 26, 29). In this progression man, pithecanthropus and the anthropoids were represented by three successive terms, in other words: the cephalization of pithecanthropus may be expressed by a figure which is half that of man and double that of the anthropoids. From the change in stages of the cephalization and the special ratio in which it takes place according to the progression, DUBOIS concluded that every higher stage

¹⁾ For this magnitude DUBOIS also used P and p .

of intellectual development is due to a doubling of the neurons as the result of one more cell division than corresponds with the immediately preceding stage.

Shortly after the discovery of pithecanthropus DUBOIS calculated (5) that recent and fossil human races hardly differ in cephalization, while the recent races show some mutual difference in cephalization factor (6). When DUBOIS afterwards (16, 17, 28) discussed the racial differences more in detail, he explained that a relatively high brain weight is not due to a greater amount of neurons but to larger ones; a high brain weight is usually found in short, strongly muscular races, which peculiarity is not caused by more but by thicker muscle fibres. According to the conception formed by DUBOIS of the phylogeny of the brain, cephalization could neither be regarded as a racial characteristic nor as a sexual one; the difference in cephalization factor formerly found by DUBOIS for a number of recent human races might be explained in connection with the varying thickness of the muscle fibres and should not be regarded as the manifestation of a different cephalization.

DUBOIS' views on evolution in general show some points of contact with those of BOLK; in this connection we may refer to the statement by DUBOIS: "Ook de phylogenese toont zich als groeiverschijnsel" ¹⁾ and to his conviction that the repeated doubling of the brain cells, which he calls phyloblastesis (24, 25, 27) is caused by an autonomous developmental principle which leads to perfection.

The phyloblastesis underlies the "Grossmutationen", which DUBOIS distinguished from the "Kleinmutationen" of DE VRIES ²⁾. Each time when a "Grossmutation" has occurred, it is decisive for the adaptive development of the peripheral animal organs, which specialization, according to DUBOIS, for every species is brought about in its own way. Since the evolution is dependent on these "Grossmutationen", no evidence may be expected in palaeontology for gradual transitions: DUBOIS compared evolution with a building of pillars and arches. Of these the pillars are found in palaeontology; the arches are representatives of a phylogenetic phase which becomes manifest in embryonic life and consequently does not leave behind palaeontological traces. Incomplete, so inadequate intermediate forms are not to be expected because the newly born mutant chooses the functions suitable to his organization, thus avoiding inadequacies. According to Dubois, this view was confirmed by results of experimental embryology (ROUX, DRIESCH, SPEMANN), while in pathology an indication was found of the correctness of the phyloblastesis ³⁾.

BRUMMELKAMP's views are analogous to those of DUBOIS; this investigator

¹⁾ "Phylogenesis also appears to be a phenomenon of growth".

²⁾ Cf. the discussion by DUBOIS of a book by L. J. C. VAN ES. The age of Pithecanthropus. The Hague 1931. "Mensch en Maatschappij", 1934.

³⁾ 1934. R. BRUMMELKAMP. Ned. Tijdschr. v. Geneesk. The cephalization of microcephalics apparently corresponds with terms of the geometrical progression discussed in this chapter.

is inclined to think that for the comparison of human races in the calculations the brain weight has to be expressed in relation to the stem length. The difference in growth of the various races would be due to hereditary differences in the induction capacity of the SPEMANN organizer. It would lead us too far to describe BRUMMELKAMP's reasons for the composition of a progression in the form: $\frac{1}{4}$, $\frac{1}{2\sqrt{2}}$, $\frac{1}{2}$, $1/\sqrt{2}$, 1, $\sqrt{2}$, 2, etc., expressing the variation in stages of the cephalization factor.

BARGE also dealt with the problem of descent (5): he argued that, even though pithecanthropus morphologically might appear to be an intermediate form, yet its position in the genealogical tree would not yet be determined.

In the 20th century the theory of heredity arose. On account of its close relationship to problems of evolution, it is not surprising that many workers who studied that theory also dealt with these problems. In HUGO DE VRIES we got acquainted with one of these geneticists; LOTSY was a second. Like DUBOIS he expressed the opinion that recent forms are not better equipped than the older. LOTSY did not agree with the anthropologists who, supposing that the original races had been purer, tried to form an idea of them. In his opinion, the formation of the species, which he compared with a chemical process (1), is dominated by interbreeding, and for man also he considered this origin probable. Consequently, from the beginning we should have to deal with heterozygous forms (2, 3). According to LOTSY, human races likewise owe their origin to cross-breeding, while for their further development isolation and inbreeding might be responsible. He thought that his theory of cross-breeding is not only in agreement with the views of ELLIOT SMITH but that it can also explain the loss of human characteristics in the ontogeny of the anthropoids, one of the phenomena on which the fetalization theory has been built.

With the exception of one publication on correlations between the form of the pelvis on the one hand and the body length and shape of the skull on the other (5, 6), the anthropological studies of MIJSBERG all refer to the problem of descent. In the contribution on these correlations it was stated that the relative transverse diameter of the pelvis in dolichocephalics is larger than in brachycephalics and that the inlet index, represented by $100 \times \frac{\text{conjugata vera}}{\text{transverse diameter}}$, appeared to be dependent on the race.

MIJSBERG regarded as a principle of evolution the concentration (4), by which he meant the phenomenon that the simple may be derived from the complex; a distinction is made between concentration in space and concentration in time. In a case of concentration in space a tendency occurs either to mutual approach of the components of a complex system, which may result in a fusion, as sometimes may be observed on lateral branches of blood vessels, or to dominance of the other parts by one, as is the case with the aorta, developed from a dimerous primordium. Concentration in time occurs when two or more originally successive developmental

phenomena take place simultaneously or when the number of repetitions is reduced. The first case is connected with BOLK's theory of dimerism (dentition), of the second an indication might be found in the bald-headedness of man. Numerous examples of concentration, mentioned by MIJSBERG, offered an opportunity to point out that man is primitive. It is not always easy to distinguish concentration from reduction, as he himself admitted; in order to solve this difficulty it should be taken into consideration that reduction, contrary to concentration, gives rise to loss or decrease of function.

Concentration in psychical life becomes manifest by the prevalence of a single association, which is observed as formation of habit; since this phenomenon is more frequently met with in animals than in men, MIJSBERG thought that in this direction might be found the explanation of the fact that animals in ontogeny abandon the comparatively high brain weight of the embryonal phase.

By other means also MIJSBERG endeavoured to obtain a deeper insight into evolution: from the biogenetic law he deduced that phylogenetic progression may be acquired by terminal lengthening of the ontogeny and from the fetalization theory that it can also be the result of terminal shortening of the ontogeny. From the results of his researches he concluded that there is yet a third possibility by which in nature a higher degree of development is reached, viz. a primary intercurrent change in the ontogeny, a phenomenon which he called diametagenesis. In the latter case for the first time in the course of ontogeny something new is obtained which at first ontogenetically is lost again but in phylogenetic development remains gradually longer and finally occurs in permanent form (10).

While working out his theory, MIJSBERG relied upon the point of view that evolution should be studied not on organisms but on organs. For this purpose he himself selected the foot (1), the spinous processes of the vertebrae (7, 8) the kidneys (12), the metopic suture (13) and the chin (3, 11)¹⁾. From his researches on the development of the kidneys and the chin he obtained arguments for the diametagenesis. The developmental diagram from the studies by MIJSBERG and Mrs. MIJSBERG—VAN ROOJEN on the problem of the chin is given below:

	Primordium	Final form
Lower apes	ageniotic	ageniotic
Anthropoids	mesogeniotic	ageniotic
Siamang, Neanderthal Man	mesogeniotic	mesogeniotic
Recent man	mesogeniotic	eugeniotic

¹⁾ For the sake of completeness it may be mentioned that VAN DEN BROEK also wrote contributions to the solution of the problem of the chin. He suggested a connection between the formation of the chin and the development of the mimic muscles (Kin en spraak. Ned. Tijdschr. v. Geneesk. 1918 II. 1921/25. Voordrachten voor het Bataafsche Genootschap II.)

From this diagram it is clear that in later phylogenetic phases the primordial form is not only ontogenetically consolidated but can even be surpassed (recent man).

According to MIJSBERG, the development of the foot and of the spinous processes appeared to proceed in agreement with the fetalization theory, for which he had already previously (2) produced arguments from other theories of evolution. In his tripartite conception of the phylogenetic progression MIJSBERG can be more easily followed than in an attempt (9) to consider the descent of man simultaneously from the point of view of the biogenetic law and from that of the fetalization theory. Moreover, BOLK himself had said that his theory was of no use for the solution of the problem of descent.

Among the geneticists Mr. and Mrs. HAGEDOORN—VORSTHEUVEL LA BRAND support a definite point of view with regard to the problem of descent. For the manner in which the formation of new species takes place, according to A. L. HAGEDOORN, may be referred to the original papers; concerning the doctoral thesis by A. C. HAGEDOORN—VORSTHEUVEL LA BRAND, which partially also refers to man, may be said that the author, like her husband, wants to apply the idea of species to groups of the population who intermarry. With the American Negroes "species" then means "race", but with the castes in India this is not the case. In regions where the species are determined by geographical boundaries, real biological groups would be formed, gradually becoming purer by loss of potential variability.

To the obstetrician DE SNOO we owe a theory of evolution based on "obstetric selection", which selection aims at the most favourable conditions for the embryological development and for birth. According to DE SNOO, parturition contains less danger in case of head presentation; the fetal head is then supported by the pelvic ring, owing to the erect posture of the mother. It is a conspicuous peculiarity of human parturition that it occurs aperistaltically. DE SNOO thinks that there is a connection between this and the, in comparison with the mammals, long umbilical cord, large head, short neck, and relatively long arms of the human new-born. He composed a progression of descent, starting from a primitive vertebrate, from which the ganoids would have originated; from a stem which remained primitive originated, by formation of MÜLLER'S duct, the amphibians, from which arose in a similar way, but now by formation of the amnion, the reptiles, birds and marsupial animals. Further evolution would then have taken place by formation of the cervix in primitive forms, either in the direction of peristalsis and differentiation into mammals or in the direction of aperistalsis to primates, of which the differentiated forms became apes and the undifferentiated ones are represented by man. According to DE SNOO, this primitiveness of man at the same time explains his forming only one species.

As is apparent from the above, a certain conformity to natural laws is found in the diagram of descent composed by DE SNOO: each time it is the undifferentiated animals which by obtaining something new, of embryo-

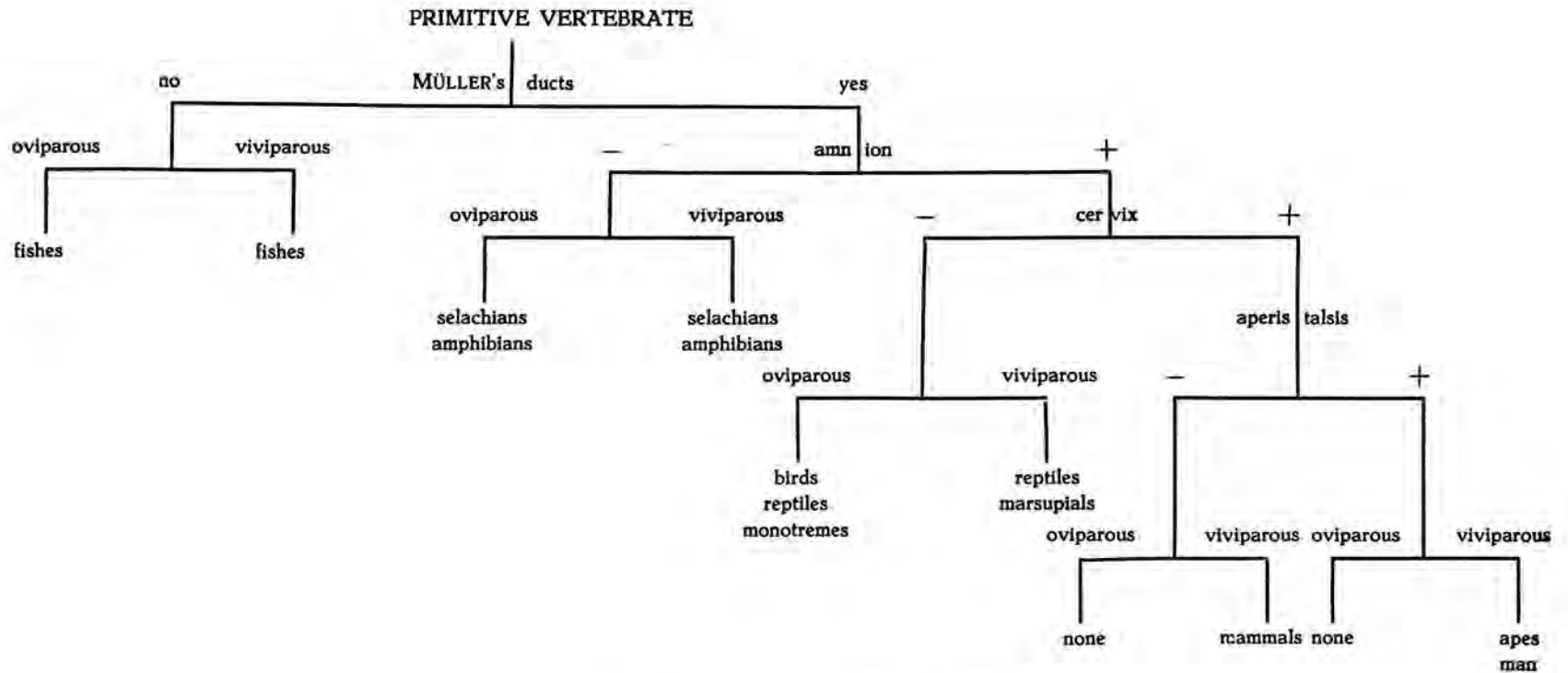


Diagram of descent according to DE SNOO.

logical or obstetric importance, reach a higher degree of development. According to BOLK's theory as well as to that of DE SNOO, the primitive consequently is a condition for progression. However, DE SNOO rejects the fetalization theory¹⁾. Some other points of those two theories may be compared here: The large head of man, which BOLK regarded as a fetalization phenomenon, is according to DE SNOO necessary for a safe birth. The long intra-uterine phase, which causes the new-born to come into the world in an advanced state of development, was explained by BOLK by the occurrence of retardation as principle of development, whereas DE SNOO states that it is due to the formation of the cervix. Once more we are inclined to mention the statement of the anthropologist VAN DER HOEVEN: "Hetgeen langs één weg Waarheid gebleken is, kan niet in strijd zijn met andere, even zekere waarheden".²⁾

BOLK pointed to a principle of evolution which exerts its influence on the whole of the organism, DE SNOO showed that the "obstetric selection" is in harmony with it; that he should raise this process by the side of natural selection to the exclusively active principle of evolution is, according to many scholars, presumptive³⁾. Does not the above-mentioned conformity to natural laws, which is conspicuous in the diagram of descent composed by DE SNOO, rather deserve acknowledgment as such? Concerning this, however, he only expresses the supposition "dasz prinzipiell Neues nur bei undifferenzierten Arten entsteht". In this connection he refers to the indication produced by embryology that new qualities only occur during embryonal development. That new qualities are obtained during the embryonal phase is considered certain by DUBOIS⁴⁾, while BOEKE (1, 2) supposes that for the solution of the problem of descent much is to be expected of embryology.

For the sake of completeness ARIËNS KAPPERS⁵⁾ should be mentioned among the Dutch scholars who studied evolutionary processes in connection with his description of the phenomenon of neurobiotaxis, which according to HERINGA⁶⁾ is a special case of biotaxis, since the principle underlying it may be observed as well outside the nervous system. It would lead us too far to discuss these contributions to the theory of evolution.

1) "Zelfs de ongetwijfeld geniale retardatie- en foetalisatie-theorie van BOLK heeft in de leer der interne secretie haar toevlucht moeten zoeken" (Even the undoubtedly ingenious retardation and fetalization theory of BOLK had to have recourse to the theory of internal secretions) and "Diese Theorie ist mehr genial gedacht als überzeugend".

WOERDEMAN expressed his disappointment that DE SNOO did not check his point of view more closely by BOLK's opinions. *Vakblad voor Biologen*, Vol. 15, 1934.

2) Cf. p. 24.

3) To this and other points objections were made by E. J. BOK, DEN HERDER, PLATTE, and VAN TRICHT, which may be found in *Nederl. Tijdschr. v. Geneesk.* 1932 IV.

4) Cf. p. 84.

5) 1920/21. *Die vergleichende Anatomie des Nervensystems der Wirbeltiere und des Menschen*. I and II.

6) "Biotaxis" as morphogenetic factor outside the nervous system. *Psychiatrische en Neurologische Bladen* 1934.

Jacob Hermann
Friedrich

Kohlbrugge
b. 1865

The Dutch evolutionists of the 20th century mentioned above all were or are workers in the laboratory. KOHLBRUGGE with one exception tried to obtain an insight into evolution in another way.

Only his study on atavisms (1) refers to his own experiments¹⁾. The results made KOHLBRUGGE form the opinion that all phenomena which are regarded as atavistic anomalies may be reduced to variations. He came to this conclusion because he thought that development may take either a progressive or a retrogressive direction, while moreover retardation of development may cause the occurrence of anomalous forms. KOHLBRUGGE pointed out that pithecoïd features in man are usually emphasized, whereas there is a tendency to regard peculiarities of another nature as "neutral hereditary variations". It is useless to look for human races which are more or less far removed from the hypothetical pithecoïd stem, for in the form of pithecoïd features variations would be distributed throughout all races, and no race is entirely apelike, according to KOHLBRUGGE, also on the authority of RANKE and WEISBACH.

The starting-point of his other contributions (3, 6, 9, 11, 12, 13, 16) to evolution caused him to become well acquainted with the history of his subject. Few scholars will have an equally extensive knowledge of this literature: in one of his publications KOHLBRUGGE mentions no less than two hundred authors who already before DARWIN no longer accepted the constancy of species.

Recommending the study of racial and animal psychology, KOHLBRUGGE remarked that one-sided differentiation seems to lead to extinction and that higher differentiation in an anatomical sense has nothing to do with psychical differentiation.

KOHLBRUGGE always made a sharp distinction between evolution and descent: he admits the existence of the first, the second he positively rejects²⁾. That is why he feels obliged to add to his acceptance of evolution: "Wij weten dus ook niets van het wezen en worden der evolutie, al dringt deze zich ook aan ons verstand op."³⁾ As the alternative of descent he mentioned the action of supernatural forces. According to KOHLBRUGGE, we are faced here by a decisive choice, since these two exclude one another. Is it necessary, we are inclined to ask, to deny a priori that supernatural forces, the action of which consequently is hidden to man, may be accompanied by special hypothetical phenomena, in this case descent? If only we relinquish the pretension of understanding the process of descent, the answer

¹⁾ Schwanzbildung und Steiszdüse beim Mensch und das Gesetz der Rückschlagsvererbung. Tijdschr. Natuurk. Vereeniging voor Ned. Indië 1897. Muskeln und periferer Nerven der Primaten.

²⁾ After what has been said in this chapter of the views of DUBOIS, the reader will be surprised to hear that, according to KOHLBRUGGE, DUBOIS rejects descent of man completely. A. SCHREUDER very justly objected to this statement (Vakblad voor Biologen, Vol. 18, No. 6. 1937).

³⁾ "Consequently we know nothing of the nature and origin of evolution, although it urges itself upon our mind."

to this question need not be definitely in the affirmative. It is true, elsewhere in his exposition KOHLBRUGGE was inclined to place the statement, that all organisms originate from one stem, outside science, but he did not consider this statement of necessity at variance with it; on the other hand he writes: "Stelt men schepping tegenover descendentie, dan kan de geloovige verklaren: Alle genera werden geschapen met de inwonende potentie allerlei veranderingen te ondergaan, waardoor vele nieuwe species binnen het genus ontstonden. Zulk een standpunt zou onaantastbaar zijn".¹⁾

Here the question presents itself whether the genus as unit of creation is not an arbitrary choice. Would that point of view be much less unexceptionable with regard to a unit of creation of a higher order? And might such a unit not likewise possess that inherent potency which KOHLBRUGGE also interprets as a regulating principle, operating upon the substance and itself unsubstantial?

In spite of the fact that KOHLBRUGGE's views will not satisfy everybody, it should be admitted that they have deepened our insight.

Of old the problem of descent has had the attention of church circles. It does not appear necessary within the scope of this work to follow the discussions devoted to the problem from that side, but we may briefly discuss two studies of later years which may be considered to represent more or less the orthodox-Protestant and Roman Catholic point of view generally accepted by those circles. For the Calvinists a small book was written by SCHOUTEN, who regrets that no coreligionist has specialized in palaeontology and emphasizes that he himself is not a biologist.

It is probably due to this fact that, on discussing several theories of evolution, he does not mention DUBOIS and BOLK, not even where he objects to the biogenetic law or where he refers to the recapitulation organs. SCHOUTEN's main objection to the majority of the evolutionists is that from similarity relationship is deduced. On the contrary he thinks that all facts advanced as arguments for the theory of evolution fit in the guidance of creation and may be regarded as manifestations of laws of creation. SCHOUTEN, therefore, says that to the orthodox Christian the theory of evolution in general is already unacceptable and then again positively rejects the descent of man. It seems strange that SCHOUTEN takes such an interest in the Roman Catholic point of view; in this connection he refers to the writings of GUIBERT and CHINCOLE and of O'TOOLE and among the Dutch GRONDIJS²⁾, while the publication of PAIMANS³⁾ and VAN GOOR would seem more suitable for this purpose.

The latter wrote an elaborate natural-philosophical study on this sub-

¹⁾ "Taking creation and descent as alternatives, the believer can declare: All genera were created with the inherent potency to various changes, thus many new species being formed within the genus. Such a point of view would be unexceptionable."

²⁾ 1911. *De R. K. Kerk en de afstammingsleer*. Amsterdam. W. Versluys.

³⁾ 1926. *De praehistorische mensch. Studien*. After the book by SCHOUTEN four articles by J. E. SCHULTE were published in the *R. K. Artsenblad* 1935/1936.

ject, in which he did full justice to palaeontology and embryology. Leaving man aside, VAN GOOR considered evolution for animals and plants sufficiently probable to study the question whether the origin of organized nature has been mono- or polyphyletic. He was inclined to think that the answer might be found in the direction of monophyly.

Adherents of a theory of evolution which applies to the animal world may not a priori deduce from this the descent of man: a separate proof a posteriori is required, according to VAN GOOR, and as a biologist he is only willing to examine somatic man; purposely he left the soul out of consideration. Within the series of hominides VAN GOOR found strong indications of evolution but, though all this, added to the similarity to apes from a morphological, embryological and serological point of view, pleads for descent of man from animals, yet on theological-philosophical grounds he did not consider it probable. Meanwhile VAN GOOR—still leaving the soul out of consideration—went so far as to classify man in the order of primates and he even declared that descent would better account for the facts revealed by morphology and embryology than creation would be able to do. However, the consideration that creation and descent are not equivalent hypotheses prevented him at the present state of science from preferring descent: for it might be possible that man is directly created by God, even though He gave him a form resembling apes.

In connection with VAN GOOR's remark that Roman Catholics are allowed to give the "physical" proof of the descent of man and that—this proof scientifically being given—the Roman Catholics are willing to relinquish the literal interpretation of the Biblical story, may be observed here that apparently the Roman Catholics indeed make use of the obtained permission for natural-scientific research ¹⁾.

From this chapter and the preceding one may be seen that in the 20th century also many Dutch scholars have tried to bring the problem of evolution closer to its solution and in particular it may be pointed out that they approached the problem from various points of view. By the side of this may be remarked that formerly anthropology often led to discussions on evolution, but that, owing to the rise of the theory of heredity in our days, the study of evolution occasionally leads to interest in anthropology. It will become apparent in the following chapters that the development of genetics is highly important to anthropology.

¹⁾ VAN GOOR, for example, did not conceal that the hairy skin of the fetal head of the Chimpanzee forms a difficulty in connection with his argument.

CHAPTER IX.

The phenomenon of progressive differentiation, which in the long run is found in almost every science, occurs also in anthropology and is besides promoted there by the above-mentioned development of genetics, by the discovery of the blood groups and by the methods of investigation which psychology lately has at its disposal. By the side of this it has to be attributed to the attention nowadays paid to eugenics and racial problems that of late years anthropology has been enriched with a great variety of studies to which numerous scholars have contributed. It will always be difficult to give a survey of what has not yet been historically crystallized, but such a heterogeneous material as that under discussion seems particularly unsuitable for this purpose. In order to arrange to some extent the anthropological publications after 1900 which remain to be discussed, a chronological classification of this period was abandoned and it was dealt with according to the subjects, as indeed was already done in the previous chapter. There was the more reason to do so as most anthropologists of the present time have specialized in a certain direction; however, not all subjects that have to be dealt with can, like evolution, be discussed in a separate chapter.

In the field of craniology BARGE published some elaborate studies on 37 Frisian terp skulls, as he thought from the upper layers, and 13 skulls from Marken (1, 2, 3, 6). BARGE raised the question whether the Frisian skull in the course of time decreased in height, as e.g. FOLMER had stated, by admixture of brachycephalics. However, BARGE found that the most brachycephalic specimens of the collection, the cranial index of which as a whole varied from 70.34 to 85.05, were not the very low skulls. For the height of the orbits he arrived at an analogous result: on the whole it is considerable in the Frisians and it is not predominantly the brachycephalics where the lower orbits are found. BARGE considered comparison of terp skulls with rowgrave skulls useless as long as the relative height of the latter had not been determined. On the ground of numerous indices and angles measured in the median plane as well as on the facial skull, BARGE came to the conclusion that the original dolichocephalic population of Friesland must have been mixed with a type possessing a long, low skull and broad face, low orbits and short nose. When considering which race this might have been, BARGE found himself faced by the choice between the Cro-Magnon and the Mediterranean race. According to BARGE, the brachycephalic skulls among the Frisians show subtle differences with the Alpine type.

From the data obtained from the Frisian skulls he had deduced the supposition that there is a negative correlation between the gradient of the frontal bone and the angle formed in the bregma by the coronal suture.

This supposition was confirmed by the skulls from Marken; these appeared to be less dolichocephalic than the old terp skulls and less brachycephalic than recent Frisians. The inhabitants of Marken are, according to BARGE, descendants of Frisians from Waterland who in the 13th century settled on the island in the Zuiderzee. Yet there are some characteristics by which the inhabitants of Marken differ from the Frisians: as such must be mentioned the strongly receding forehead, accompanied by a small frontal angle and a considerable positional index of the bregma, the fairly common (40 %) prognathism, the mesoprosopic face, high orbits, long narrow nose, and high frequency of the intercalary ossicles in the sutures. These peculiarities, which are more frequently found in women than in men, were for BARGE an indication that the skull from Marken must be considered in connection with artificial deformation by the cap.

Comparison of the skulls from Marken with that of Neanderthal Man only pointed to a slight similarity in the angle and positional index of the bregma; BARGE positively denied a relationship between these two types.

With this contribution by BARGE a period of the craniology in the Netherlands is actually closed: measurements on skulls and on heads of living persons have been taken since but no longer for the purpose of obtaining an insight into the composition and origin of the population of the Netherlands. However the recent anthropological investigation in the Zuiderzeepolders seems to point again in this direction.

Some measurements and indices may be found in a publication on the comparison of healthy and insane persons by SCHERMERS, which need not be discussed here any further.

POSTMA examined in the years of puberty of girls the influence of age, sex, social standing, number in order of birth, season of birth, residence (town or country), province of birth, race, body length, feeding during infancy, nourishment, illness, and degree of intelligence on the size of the head, expressed in the sum of length and breadth. This study has the drawback that the observations were made on 1472 patients of an asylum ¹⁾; for this reason the author examined another 74 men and 58 women from the normal community with regard to sex and standing, with the result that the men exceed the women in size of the head and persons of a higher social standing those of a lower standing. POSTMA realized that puberty coincides with the second stretching in body length between the 10th and 15th year, with the next period of growth at a slower rate between the 15th and 17th year and partly with the third stretching between the 17th and 19th year. The measurements showed that the second stretching is also an important phase of growth for the head. Moreover, the size of the head, arranged according to the number in order of birth, appeared to be smallest for first born, with a rise till the third child, then remaining fairly constant till the eighth child

¹⁾ POSTMA added: "volgens een wetsartikel geselecteerd"; "selected according to a legal regulation".

and slightly increasing after that. The percentage of girls with large heads, born in winter, exceeded that of girls born in summer, while there was an indication that in the country the large head is somewhat more frequent than in town.

The result of the investigation in connection with the province where the girls were born made POSTMA conclude that the Frisian component of the population is small-headed, the Saxon component large-headed and that the Alpine component has a medium size of the head. Up to a value of 165 cm. for the body length, a rise of this magnitude was accompanied by an increased size of the head; among larger girls the small-headed Frisian element is more strongly represented, which, according to POSTMA, accounts for the fact that in this group the above-mentioned relation to the size of the head is disturbed.

Influence of natural or artificial feeding during infancy could hardly be observed; the influence of the nutrition at the time of the examination could more easily be distinguished. Hypoplastic teeth, which the investigator took into account as an indicator of illness, showed that this phenomenon is slightly more frequent in girls with a small head size; POSTMA found that a tendency towards feeble-mindedness became more frequent at the limits of the observed values for the head size, so in girls with the smallest as well as in those with the largest heads.

A casuistic communication by VAN DEN BROEK (3) also refers to a cranio-logical problem of a general nature: from determinations carried on for three years on binovular twins the value of the hereditary moment against that of external influences became apparent; in these children the shape of the head determined the posture during sleep, so the position of the head, and not the other way about. On account of his observations VAN DEN BROEK could not agree with WALCKER that the cephalic index obtained in the first year persists: between the 6th and 20th year this would commonly decrease by $3\frac{1}{2}$ units.

With the aid of the basilar index according to BOLK ¹⁾ ENSINK showed that after the 8th year the foramen magnum is first shifted backwards by stronger growth of the frontal part of the base of the skull than of the occipital part and afterwards by increase of the frontal part at the cost of the occipital portion. His investigation also led to the conclusion that the gradient of the frontal bone decreases with age and, except in the longest skulls, is larger according as the basilar index is more considerable. The shifting of the foramen magnum, according to ENSINK, counteracts the decrease of this gradient, in spite of the fact that both these changes are phenomena of growth. The postnatal decrease of the vaulting of the forehead was considered to be a change independent of other phenomena.

The studies by KLEIWEG DE ZWAAN on the lachrymal bone and on the relation between facial skull and neurocranium, as well as on the position and

1) Cf. p. 74/75 footnote.

dimensions of the temporal bone (5, 6) deal with the comparison of Papuans with Dutchmen, owing to which fact most of his conclusions are of no importance here. However, the valuable data obtained by these researches certainly justify calling the attention of those who are interested in these subdivisions of the craniology of the Dutch. In the communication on the lachrymal bone it was stated that the height of this bone and that of the os planum do not increase clearly with a greater height of the orbits.

On measurements of lower jaws of 89 Dutch men and 29 women KLEIWEG DE ZWAAN published an extensive separate study (7); here he could maintain his previously expressed statement that the lower jaw both in shape and dimensions is subject to racial differences. He also accurately examined the existence of sexual characteristics: although in all absolute measurements, except those of the breadth of the ascending branch in the alveolar level, the lower jaws of men are larger than those of women, and "swinging" jaws are somewhat more frequent in women than in men, the author did not consider it possible to decide at first sight whether one has to deal with the lower jaw of a man or of a woman. Lower jaws of Dutch persons are, according to KLEIWEG DE ZWAAN, characterized by a fairly low and moderately broad branch and do not fit in any of the groups distinguished by PUCCIONI.

Measurements on living persons were carried out by LOUISE KAISER who of 186 male and as many female undergraduates made "STENTS-models", on which she took 9 measurements of the palate. After explaining in a preliminary communication that the Dutch undergraduate as phylogenetically original form possesses a fairly high palate, she pointed out later that correlations of the palatal measurements with a number of anthropological magnitudes of the head and with the colour of eyes and hair are on the whole not or hardly perceptible. There was only a clear relation between the facial height and the palatal height, the connection with the body length being still more conspicuous, while sexual differences in the absolute measurements cannot be denied. Consequently the investigation even on this, from an anthropological point of view heterogeneous material seemed worth while and LOUISE KAISER would like to perform it in different parts of the country, the more so as the data of five youngsters from Urk in this direction were promising. J. A. W. VAN LOON must be mentioned as a Dutchman who contributed to the methods of such an investigation.

From the statistical data obtained by measurements of LOUISE KAISER and others on wax models of 176 palates of men and 170 of women DRION found that, with a few exceptions, all palatal measurements of men are larger than those of women; only the height in the frontal part of the mouth was larger in women. He found an indication that there is a difference in shape of the palate between male undergraduates in arts and male medical undergraduates. That no correlations can be observed between palatal measurements mutually, at any rate if we confine ourselves to measurements of which one is not part of the other, DRION attributed to 1. the possibility of

genetic independence between teeth and palate, 2. genetic differences between the examined persons, 3. the influence of dental treatment.

DE FROE studied the frequencies of ossification of the foramen pterygospinosum and of the porus crotaphiticobuccinatorius in 700 skulls and concluded that the observed percentages of these ossifications in a number of races must be considered of some importance as a racial characteristic.

Both HERDERSCHÉE and HAMELBERG took head measurements on school children in order to find a possible relation between the intelligence and the dimensions of the head. HERDERSCHÉE did not succeed in revealing such a direct relation; only in children exceeding in body length the average for their age and sex the circumference of the head appeared twice as often to exceed the average for that age as to remain under that measurement.

A more positive result was obtained by HAMELBERG who in addition to the body length also took into consideration the social standing in his researches together with DEYLL, VAN DER MEER and TEN SELDAM on 1854 children of the age of ten. According to HAMELBERG, the circumference of the skull increases slightly with the intellect, the breadth somewhat more clearly, although the author said that there is no relation between the cephalic index and the intelligence. For the various other conclusions and for the figures may be referred to the elaborate original publications.

Miss KEERS finished a manuscript by A. HAGEDOORN on his researches on skull capacity in Frisians and Zealanders, made in BOLK's laboratory shortly before his illness. Of 33 Frisian skulls¹⁾, the average cranial index of which was 77.69, the capacity appeared to increase with this index, though to a smaller extent according as the index is higher. Closer examination showed that for this group of skulls the cranial index mainly rises owing to increase of breadth. The skulls from Zeeland, the index of which was averagely 84.6, produced an indication that the capacity diminishes with a rising cranial index, and in this group of skulls this rise was due to a smaller length. HAGEDOORN concluded that with the Frisians the average breadth of the skull and with the Zealanders the average length, consequently the measurements which, so to speak, chiefly determine the capacity, have shifted to the side of the minimum. Exactly the reverse is the behaviour of the cranial length with the Frisians and the breadth of the Zeeland skulls. Although the small number of objects, from which the figures have been derived, has to be taken into account, yet this study shows, according to the author, that dolichocephaly and brachycephaly are essentially different qualities. HAGEDOORN expects that with the Frisians rise of the cranial index will not be accompanied by an increased length-height index but that this will be the case with the Zealanders. He concludes with the advice that in anthropological studies of the Netherlands the difference between the types of the anthropological components of the population should be taken into consideration.

¹⁾ This is the same material as has been described by BARGE in his doctoral thesis.

The determinations of the skull capacity and the weighing of the brain carried out by DIJKSTRA deal with inhabitants of Groningen. For the average capacity he found a value considerably exceeding BOLK's data and he observed that the variability of this magnitude as well as of the length and breadth of the skull in women is larger than in men. For either sex the highest value of the capacity appeared to lie near a cranial index of 78. Although DIJKSTRA pointed out some relation between the capacity and the body length, the first was, also independently of the second, smaller in women than in men, owing to which fact he was inclined to consider the smaller head of women as a secondary sexual characteristic. By determinations of the brain weight he could decide that the cerebrum before the 20th year reaches its maximal size and that the relation of the brain weight to the body length is closer than that of the capacity. Calculation of the surface of the brain showed on the one hand that brains with a large volume have a larger surface than small ones and on the other hand that a large surface is accompanied by deep fissures and a small surface by shallow ones.

From the studies by C. U. ARIËNS KAPPERS (10, 11, 12, 14) on the cephalic and cranial index some general conclusions may be mentioned. KAPPERS attaches great value to this index as a racial characteristic and regards frequency curves as the most convincing representation. When collecting all available data on cephalic and cranial indices, he was struck by the fact that certain indicial values not only repeatedly occur as peaks in the curves but that two or more peaks, representing certain values, may be found in combination. This relation has been more closely examined by KLEIN on 673 male and 357 female Askenasim of varying ages at Amsterdam. It became apparent that the adults, owing to the high frequency of the indicial value 79—81, represented what KAPPERS calls the palaeo-Asiatic type, but that the Askenasim in their development pass KAPPERS' Central-Asiatic type which is characterized by prevalence of the index 83—86. KLEIN thought that in his curves a Mediterranean admixture was to be found in a peak near the value 76 for the adults, that of the children lying near the value 77.

On account of the results of BOAS, GUTHE and KLEIN, from which it became evident that the index 83—86 as well as the index 73—76 may change into 79—81, a figure lying close to what BOLK and DIJKSTRA considered the optimal value for the capacity, KAPPERS regarded the value 73—76 as primitive and supposed that from this by progression the value 79—81 may develop. He wondered whether perhaps also the increase of the cranial index of the Frisians, by COX (1) attributed to natural selection, might be due to such a change, which he called mutation, and not to admixtures. A similar consideration was expressed by PIEPERS.

Apparently KAPPERS regards the cranial index as subject to an evolution under the influence of the endocrinin; then he would have abandoned other possible explanations for the phenomenon of changing indices which he had previously suggested, such as greater viability of the brachycephalics and dominance of (postauricular) brachycephaly. While this evolution re-

fers to the increase of the figure 73—76 to 79—81, the relation between the indices 79—81 and 83—86 was interpreted as modifications, the latter being formed under special—probably less favourable—circumstances and the former under better conditions.

In connection with the cranial indices collected by him, KAPPERS is inclined to attach greater value to the results of blood group researches than most anthropologists do. Moreover, extending the connection to the spreading of the sun culture (FROBENIUS), KAPPERS feels justified, on the ground of his researches, to consider a monophyletic origin of man probable.

The first contributions to anthropology by KAPPERS did not deal with craniology but with the study of the brain. After a short communication on the sulcus lunatus (1) he discussed whether racial differences might be perceptible in the ratio of the weights of different parts of the brain (2, 3, 4). When this investigation yielded a disappointing result, he invented a number of determinations of angles and indices, to be performed on photographs¹⁾, in order to obtain a standard for the determination of the general form and some characteristics of the fissuration (5, 6, 7). KOHLBRUGGE (15) recommended this system, not so much for the tracing of racial differences as to decide, whether determinations on the brain of racial differences, going further than the distinction between dolichocephaly and brachycephaly, will ever be practicable (5).

On application of this method, KAPPERS always divided the brains of Dutch persons into brachycephalic and dolichocephalic ones. Comparison of the first with Chinese brains led to the conclusion that in brachycephalic Dutchmen the shortening is more compensated by the breadth and in Chinese by the height. It became further apparent that racial characteristics in details of the fissuration are hardly perceptible but that its type is dependent on the shape of the skull (8, 9, 13). It is obvious that this result induced KAPPERS to proceed to his numerous studies on the form of the skull which he has published since. However, it would be incorrect to infer from this that anthropological investigation of the brain must be considered useless.

J. ARIËNS KAPPERS studied the relation of the brain weight to the body weight in ontogenesis, which need not be discussed here any further.

Likewise mention must be made of the discussion by J. J. J. KOSTER on the anthropology of the muscles of the face, to which he added the advice to make statistics of the dissected material.

STRATZ dealt with the anthropology of the nose. He attached great value to RANKE's remark that children of all races are platyrrhine and besides assumed a very close parallelism between ontogeny and phylogeny, which in his opinion also applied to the human races. Differences in the shape of

¹⁾ By means of a simple gauge the required measurements may be taken directly on the brain. A. J. VAN BORK—FELTKAMP 1930. *Uitkomsten van een onderzoek van een 60-tal hersenen van Chineezers*. Amsterdam, Versluys; 1933. *Recherches sur 88 cerveaux de Chinois*. *L'Anthropologie*. T. XLIII.

the nose should, therefore, be regarded as manifestations of a more or less far advanced development, according to STRATZ, who added to his discussion a classification into four principal types of noses (4).

As a contribution to methodics for the anthropology of the soft parts of the face must be considered the description by KLEIWEG DE ZWAAN (1) of the manner in which he made plaster casts. The scientific value of this method has been highly praised by VAN DEN BROEK (2).

In connection with observations on a number of Negroes and Pygmies¹⁾ and on 2500 Dutchmen, DANKMEYER wrote a treatise on the anthropological significance of the examination of the finger pattern. He considered this of particular value because of the invariability during life and the partial heredity of the characteristics; it is advisable to investigate a large material, but DANKMEYER stated that the obtained results cannot contain measuring errors. He divided the data into 14 groups, adding one more index to those of FURUHATA.

Both on adults and children many observations have been made with regard to body length and weight. Although in the minority of cases the observations may be regarded as contributions to anthropology, since they were either made in connection with nutrition and social welfare or carried out on selected material, yet as many of these publications as possible will be mentioned here, in order to do justice to the indirect importance which the data may have for anthropology.

Tables referring to the body length, the body weight, the circumference of the chest, the thoracic index, to the relation between the circumference of the chest and body length, and to that between this circumference and the thoracic index in 9317 soldiers of the Dutch army, were inserted by BORGERHOFF MULDER in the statistics of the medically treated patients in the Dutch army. In these tables the data were arranged according to the provinces. A year afterwards (1899) QUANJER added similar tables concerning 9336 persons to these statistics. The report of 1900, published without mentioning the name of the author, contains a table from which the relation between body length and weight of 28036 soldiers may be derived. The figures induced the author to remark that with growing body length the difference between this magnitude (expressed in cm.) and the body weight (expressed in kg.) would increase.

BRUINSMA, who accurately took into account the selecting influences on his material, found that the increase of average body length, observed since 1863 in recruits, was not attained at the cost of the general build ("overgrowing their strength") and that it was due to increase of the number of tall men and decrease of the small ones: the percentage in the medium sizes remained the same. By including in his investigation pupils of the Koninklijke Militaire Akademie and the Cadettenschool²⁾, so boys of 15 and older:

¹⁾ These data had been collected by P. F. J. A. JULIEN.

²⁾ Either category represents a certain social standing.

BRUINSMA could show that the greater average body length is not due to a more rapid growth during youth but to a longer continuation of growth in a larger number of young men. The figures strongly indicated that in this period not only the body length had increased but also the circumference of the head and the length of the feet. On comparison with data collected by BRUINSMA from the colonial reserve troops, the instructional battalion, the instruction company, and from sailors of the navy, there appeared to be a relation between the extent of the increase in body length and the degree of social welfare. In agreement with what was published by POSTMA (1) on girls, BRUINSMA found smaller values for the body length of young men in the provinces containing the sandy soil of the Netherlands than in the clay provinces, with the exception of Zeeland. However, this relation must have been different in former days. He concluded that the average body length of Dutch men from 19 to 20 years old exceeds 1.671 m.

In order to determine the influence of social welfare on the average body length of recruits, ENKLAAR ascertained for Utrecht from which schools they came, after acquainting himself with the various school fees. It became apparent that the average length of the ex-pupils both of the more expensive and the cheaper schools who were measured as recruits between 1881 and 1909 had increased during that period. The ex-pupils of the expensive schools were on an average 5 cm. taller than those of the cheap schools, the difference in body weight being $6\frac{1}{2}$ kg. for the year 1911. The men of that year had an average body length of 1.713 m.

By arranging them according to the professions, which he had classified in various degrees of welfare, ENKLAAR showed that the average length of the Utrecht recruits in 25 years (1885—1910) had increased by 3.4 cm. and that the difference in body length between the poorest and richest had become somewhat greater in that period. The investigation was extended by determinations of the circumference of the chest and of the body weight. ENKLAAR made use of the latter magnitude in a calculation of the form $\frac{G}{L^2} = K$, a variant of LIVI's formula, G representing the weight in kg. and L the body length in dm. For the value K may thus be calculated 20 to 22; a higher figure would point to a favourable anthropometrical condition of the body. On application of this formula as well as that of PIGNET, such a condition appeared to be more frequently found in the higher social classes than in the lower ones.

The study on body length by BENDERS consists partly of a continuation during the years 1908—1912 of BOLK's investigation, the conclusion of which is that in these years, a slight retrogression in 1910 excepted, the increase continued; for the greater part this treatise deals with the varying value of the average body length during nearly a century. BENDERS communicated that it is a well-known fact that already in 1821 the body length was decreasing; the descent of the curve certainly continued to 1858 but changed into a rise in 1863. The exact time of the turn is not known but

BENDERS was inclined to think that the curve did not possess a sharp reversal. However, he suspected that an acutely active cause with a long continued after-effect had existed. He represented the Dutch population as composed of two racial elements, characterized by greater body length L and smaller body length L' . In the total population descendants would be found who might be represented by LL , LL' , and $L'L'$. BENDERS thought that the wars during the French domination greatly reduced the number of L -factors of the population, which might account for the above-mentioned descent of the curve. Since it takes several generations to recover, the long duration of the rise in the curve may, according to BENDERS, be understood.

VAN DEN BROEK (4, 5, 6, 7) also devoted elaborate publications to the increased body length of recruits. His researches dealt with the years 1916—1925 and showed that the increase, observed by BOLK, in these years still continued. From the average length of the 19 year old recruits, 170.77 cm., VAN DEN BROEK calculated as average length for the adult Dutchman 172.36 cm. In the Netherlands the length appeared to decrease from North North West to South South East. The increase in body length, which must be admitted on comparison of different points of time, is according to VAN DEN BROEK a general phenomenon: not influenced by social welfare or limited to a certain area, although it did not occur to the same extent in the various provinces. The largest increase, observed in Drente, could not be due to immigration and consequently took place among the autochthonous population. The smallest increase, found in Limburg, where even in the years 1921—1925 a slight retrogression occurred as compared to 1916—1920, should neither be regarded as a result of immigration, the latter being too insignificant in the mining district, nor as a racial characteristic, since in Noord-Brabant and Zeeland a different condition is found. VAN DEN BROEK suggested that by the side of external factors the function of the endocrinon is responsible for the increased body length.

Owing to the small increase, Limburg has become the region where the value for the body length is smallest; BOLK mentioned as such the district round the industrial centres in Overijsel. Like BOLK, VAN DEN BROEK found higher values for the industrial towns in Overijsel than for the immediate neighbourhood.

A remarkable condition is found in the province of Utrecht, where the number of short elements in the population increased; VAN DEN BROEK thought of possible influences of immigration or struma.

The tables of body weight, body length, circumference of chest and abdomen, given by COERT, have only a relative anthropological value, since they are meant to be used at examinations for life insurances and were obtained from observations on soldiers.

The determinations of measurements and weights which yet have to be discussed were all performed on children and were used for studies on the relation with welfare and nutrition, in which connection may be observed that after 1916 in the Netherlands, owing to the war in the surrounding

countries, food shortage set in and that examinations in these days had to reveal a possible underfeeding.

MOQUETTE examined 888 boys, divided according to their schools into five groups of social welfare. He determined the weight, the body length, and the circumference of the chest at expiration and deep inspiration. Both the difference in body length and in weight between the poorest and the richest boys appeared to increase between the seventh and thirteenth year; the smallest increase in length evidently coincides with the eleventh year. The data concerning the circumference of the chest yielded less clear results.

VAN VOORTHUYSEN's observations refer to six year old children. In case of unequal welfare, he found larger differences in body length than in weight.

Of the examination carried out by VAN DER MEER, in collaboration with HAMELBERG, LEDA and Mrs. BOUMAN—SLATERUS, particularly the tables of the figures obtained by measuring and weighing are of importance from an anthropological point of view. The report also mentions the weight coefficient¹⁾. With regard to age, the children were divided into groups of half years. It should be remarked that the body length of children from a school with almost exclusively Jewish pupils, examined by LEDA, appeared to be smaller than that of other schools, whereas the weight of the Jewish children was no less than that of the others. The investigation was repeated a year later in the same schools; this time it was also carried out by DEYLL and by LUBSEN who published the report on this subject. He stated that the "erste Streckung", described by STRATZ²⁾, is clearly perceptible in the figures and that the second period of strong increase in height occurs sooner in girls than in boys.

SCHUCKINK KOOL compared pupils of 1916 with pupils of 1905 from the same schools as those discussed by MOQUETTE. The observations showed that in these 11 years the average weight had increased with 0.5—1.5 kg. and the average body length with 1—3 cm. SCHUCKINK KOOL made use of a formula of the form $10 \left(\frac{G}{L} - t \right) = 117$, G representing the weight in kg., L the length in meters and t the age. The number 117 must be regarded as an average.³⁾

VAN DER LOO in the first place checked the results of his determinations of measurements and weights on children by the above-mentioned phases of growth, described by STRATZ; this showed that children of parents in an easy financial position develop more rapidly than children who are less well off. For the calculation of the weight from the body length he used a

1) Weight divided by length.

2) *Der Körper des Kindes*, IIIte Aufl. 1909. Stuttgart. Fred. Enke.

3) Unlike the definition by VAN DER MEER, SCHUCKINK KOOL interpreted *this* magnitude as "weight coefficient". VAN DER LOO (3) mentioned as formula of SCHUCKINK KOOL $L - 2G = 73$. However, this formula as well as some of another form did not satisfy SCHUCKINK KOOL himself.

formula of the form $G = 13.86 + (L-100) 0.488$ kg., G representing the weight and L the body length. The number 13.86 varies according to the conditions of nutrition; as a simpler form of the formula VAN DER LOO also used $G = (L-100) 0.45 + 13.5$. This and similar formulas are the more useful as VAN DER LOO had succeeded in pointing out that, assuming an equal body length for boys and girls, an equal value will be found for the average weight, which is not dependent either on the degree of social welfare; the length measurements found at a certain age exhibit a maximal difference of 30 cm., according to this author. Later publications by VAN DER LOO, in this connection of minor importance, for the greater part refer to the relationship between the results of his calculations and tuberculosis and the conditions of nutrition.

IN VON ZIEGENWEIDT's communication curves are found which were composed by means of the formula of SCHUCKINK KOOL.

WIJSMAN examined children at the Hague and used a formula of the form $G = L \frac{t+11}{100}$, derived from a formula, calculated by him for adults of the form $G = cL + \frac{t-30}{10}$, c being a coefficient connected with sex and nutrition.

Before closing this survey of the contributions to the physical-anthropological characteristics, a few studies on the pelvis and sacrum must be mentioned. VAN DER HOEVEN LEONHARD wrote a thesis in which he concluded that the human pelvis has derived its type from a form which must be regarded as closely related to the pelvis of the anthropoids and may have originated from it under the influence of the erect gait.

On the ground of a comparison of the Moriori pelvis with that of the Dutch, KWAST formed the opinion that the frequency of the incisura sacralis is neither a sexual nor a racial characteristic. The investigation yielded a strong indication that there is a relation between the incisura ischiadica and the angle of the pubes. It became further apparent that in women the preauricular sulcus of the ilium and of the sacrum are more frequent and more strongly developed than in men.

FRETS (1) examined grave-yard material of the Amsterdam population ¹⁾ of 1865—1890, comprising one group of 1732 sacra of unknown sex, a second of 740 sacra and a third of 393 specimens. In his communication percentages are found of variations, such as the number of vertebrae having part in the formation of the sacrum, the frequency of lumbosacral and sacrocaudal transition vertebrae, of the preauricular sulcus, of the foramen sacrale superius, and of the sacral canal being completely open. As a so far unknown deviation, FRETS described a sacrum of which the body of the upper sacral vertebra was split into two halves.

¹⁾ The collection, studied by FRETS, contained no Jews.

From the table and the curves, referring to 455 objects, FRETs found that long sacra yield relatively low values for the sacral index and the longitudinal curvature index and that there is a certain relation between these two indices. He observed, moreover, that the curves have only one peak and that consequently the difference in sex is not expressed.

CHAPTER X.

Gerrit Pieter

Frets
b. 1879

From the point of view of heredity physical characteristics of the Dutch have been studied by a number of scholars. Among them FRETTS occupies an important position. In collecting the data, he follows the method of individual examination of families (11); convinced that new ways for the research on heredity may be found by experimenting on animals and plants, he also pays great attention to these experiments (29).

In this survey should in the first place be considered FRETTS' numerous studies on the headform (2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 18, 19, 21, 22, 23, 25). Already in his first article based on observations on 1000 persons, he declared that we are compelled to abandon the opinion of RETZIUS who assumed two centres for the value of the cephalic index, viz. one for dolichocephaly and one for brachycephaly. He admitted that heterozygotes are intermediate with regard to the absolute measurements, but in connection with the headform they point to segregation. Moreover since FRETTS found that not only the extreme values of the cephalic index are hereditary but also intermediate ones, there is reason to agree with him when he warns the anthropologists against regarding mesocephaly as a mixture between brachycephaly and dolichocephaly.

FRETTS could also state that, in agreement with the somewhat greater variation breadth of the cephalic index in men, the correlation coefficient between mothers and daughters and between sisters is largest and that the average value of the index in men is slightly smaller than in women¹). He supposed that there is a tendency to dominance of dolichocephaly in men and of brachycephaly in women; sons would show the tendency with regard to the headform to follow the father and daughters the mother. In case of brachycephaly, in men the length would decrease in the same proportion as the breadth increases, in women the decrease in length would be slightly larger. According to FRETTS, whose total material in the end comprised 3600 persons, dolichocephaly in men is accompanied by a considerable variability of the absolute measurements and is due to great length rather than to small breadth. He found that in both sexes the variation coefficient of the breadth somewhat exceeds that of the length.

The figures, collected by FRETTS, revealed that children may show strong deviations from the parents and that on the one hand the variability of the cephalic index in children of parents with intermediate values of this index is greater than in children of parents with extreme values and on the other hand the variability is greater in children of brachycephalic parents than in

¹) FRETTS remarked here that occasionally reversed results are found. Cf. p. 68.

children of dolichocephalic parents. From this he concluded that the heredity of the headform is indeed subject to Mendelian segregation, showing symptoms of dominance of brachycephaly and polyhybridism with the possibility of the existence of some hereditary factors working in the same direction.

Soon FRETZ began to distinguish brachycephaly according to the heads being either large and broad or small and short, because he had noticed that the latter type is recessive. Afterwards he defined the difference between these two forms of brachycephaly more closely by remarking that a high value of the index is dominant when it is due to postauricular shortness and recessive if caused by frontal shortness. By distinguishing the heads not only by the form but also by the size, FRETZ discovered reversal of dominance and could point out that brachycephaly in large heads is mainly due to increasing breadth and decreasing height and in small heads to increasing breadth and decreasing length.

It was also owing to this distinction into small and large heads that FRETZ obtained a strong indication for "sex-limited heredity"¹⁾ of the headform, combined with a very weak patro- and matrocliny. He tested these phenomena by diagrams, starting from allelomorphous factors.

The manner in which the heredity of the head length is manifested points, according to FRETZ, to polymerism, viz. to the presence of 12 to 13 identical factors working in the same direction. He supposed that the headform also follows the polymeric mode of heredity; for the families in his material who behaved differently, FRETZ assumed prepotency²⁾, a phenomenon not following the Mendelian laws, being a manifestation either of an accidental property of the gametes or of the influence of one of the parents. The complexity of the problem made it necessary to assume also an intensifying factor.

FRETZ appeared to be an accurate investigator by realizing that the same value of the cephalic index, even if calculated from equal absolute measurements of length and breadth, need not point to genotypic similarity and that by the side of hereditary factors the headform is influenced by external conditions as well as non-hereditary variations, which may be of pathological origin.

He observed that up to the 20th year the cephalic index decreases slowly. The cranial index would at the most be one unit and a half less than the cephalic index: the average difference appeared to be 0.78 with a considerable variability. The average length of the head of men exceeds that of women by 1 cm., according to FRETZ, the difference in breadth on an average amounting to 0.6 cm.

A complete summary of the correlations found by FRETZ is not given here; it may only be mentioned that he did not find a correlation between cephalic index and capacity.

1) "Sex-limited heredity" is not the same as "sex-linked heredity".

2) Prepotency is not always identical to dominance.

He regarded the relatively greater dolichocephaly of long heads and the relatively greater brachycephaly of broad heads as a compensation of growth; this compensation was said to be influenced by the capacity.

The lower cephalic index of the female head in case of the same length as that of men and the higher cephalic index of the female head in case of the same breadth as that of men is, according to FRETZ, a sexual characteristic. He ascribed it to racial differences that in case of equal length of the head Scotchmen (TOCHER) are more dolichocephalic than Dutchmen and that in case of equal breadth red Indians (BOAS) are more brachycephalic than the Dutch. This fact induced him to warn against comparison of indices without such peculiarities being taken into consideration.

In case of similar breadths, the values of the cephalic index, according to FRETZ, show larger differences than with similar lengths of the head.

Between FRETZ and HAUSCHILD existed a difference of opinion which referred to genetics as such rather than to the headform.

Owing to the doubts of DIXON as to the dominance of brachycephaly, FRETZ began an investigation with new groups, which has not yet yielded results. However, dominance of brachycephaly was proved in case of intermarriage of a Dutchman with a Javanese woman.

By the side of the headform, FRETZ examined the colour of the eyes for the study of the laws of heredity (11, 17, 20, 24, 27, 28). For this purpose he extended his research to 5000 persons. A sharp distinction was required and not always easy: an eye containing only a trace of stroma pigment should not be registered as blue, the latter colour being due to retinal pigment. By this method FRETZ found among 1712 men 22.8 % of blue-eyed persons and among 2204 women 19.1 % ¹⁾.

Since the observations showed, as also HURST and WAARDENBURG had found, that children of parents with purely blue eyes are likewise blue-eyed, it seemed obvious that the blue colour should depend on a recessive factor. After trying and rejecting another representation, FRETZ took for the explanation of the heredity of the eye colour one pair of factors *A* and *a* for the presence and absence of "brown" and one pair *B* and *b* for the presence and absence of "yellow". The frequency of *A* in women prevailed somewhat more often over *a* than in men, while FRETZ supposes that the factors *B* and *b* are evenly distributed between the sexes. However, he considers it probable that the racial characteristic "blue eye" belongs to a population containing not only persons with purely blue eyes but also people with blue eyes in which a trace of yellow is perceptible. That at one time a race should have existed with purely blue eyes, to be represented by *a a b b*, does not seem likely to FRETZ. As is the case with so many other characteristics, in the eye colour the genotype cannot always be recognized in the phenotype.

Another Dutchman who studied the heredity of the eye colour was

¹⁾ That these percentages are smaller than those of BOLK must be ascribed to the method of observation.

COX (2), who for psychiatrists, for whom he considered the knowledge of racial characteristics necessary, suggested a method of investigation which he himself had applied genealogically. Trying to point out dominance and segregation, COX found the problem more complex than he had expected. However, he suspected (1) that the blue iris with yellow, orange and light brown pigment grains round the pupil and the brown-pigmented iris on a green background were homozygous.

Like COX, WAARDENBURG (1) paid attention to vascularity, colour of the background, and to the localization of the pigment of the iris. WAARDENBURG also took into consideration the nature of the pigment: the blue colour was supposed to be due to gross-grained pigment in the retinal layers, the brown colour to fine-grained pigment in the stroma, and the green and grey colour to the presence of lipochrome. On the ground of these characteristics and of the specific order of the connective-tissue rods, WAARDENBURG made a classification of types from which it appeared that each type of distribution of pigment independently is hereditary and that eyes which are richer in pigment are dominant over those which contain less: he was conscious of being unable to explain some cases in which children have darker eyes than the parents. This examination by WAARDENBURG confirmed the recessive character of the pigmentation of blue eyes and led to the conclusion that diffuse brown eyes as well as brown and blue eyes with a yellow-brown minor ring may latently possess the factor for blue.

In another publication (2), in which he compares natural and civilized peoples with regard to astigmatism, WAARDENBURG was inclined to assume a slight correlation between fairly strong corneal refraction, female sex and a rather narrow skull.

Some conclusions, referring to heredity, were drawn by BOUMAN (3) from an investigation made together with F. O. BRUYNING on 28592 Amsterdam school children, excluding those of Jewish extraction. In this material there appeared to be 30.8 % of Teutonic, and 10.3 % of Alpine elements, the remainder being mixed. Comparison of older and newer parts of the town indicated that on the whole the Amsterdam people stay in their own district. It is remarkable that in connection with a psychical peculiarity the migration to the towns is more considerable with the fair race but that nevertheless in a town population dolichocephaly and dark persons prevail as compared with the neighbourhood (MAYR, VIRCHOW). Amsterdam also follows this rule, according to BOUMAN, who, in order to explain this correlative connection confirmed by him between greater vitality and stronger pigmentation, was inclined to think that stronger pigmentation is an, in itself dominant, hereditary quality.

WILHELMINA KEERS studied a number of characteristics of the hair: form, colour, thickness, index, presence of marrow, scales, air fissures, and form of the marrow. Of these could be used for a study on heredity the hair form, the red colour of the hair and the presence

of marrow. On the ground of her data, mainly collected in large families, she concluded that straight hair occurs if the factors for waved and curly hair are absent. WILHELMINA KEERS found that for the study of the hair colour we cannot do without microscopical examination, because the same colour may show different microscopical images. On account of her observations, she could confirm BOLK's statement that hairs owe their colour either to dark brown pigment grains or to a diffuse red colouring matter or to these two together. The red colouring matter was found to be highly subject to the influence of age and illness.

The heredity of red hair probably results, as was suggested by WILHELMINA KEERS, from the action of multiple allelomorphic factors, which as a rule would behave hypostatically with regard to "brown", although epistasy might occur as well. There is probably a connection between red and reddish blond hair.

WILHELMINA KEERS often noticed a vegetative segregation in families with strongly pigmented individuals among their ancestors: the descendants then possess a mixture of more and less strongly pigmented hair.

The occurrence of marrow, which seems to depend on the intensity of growth of the hair, appeared to be hereditary; however, Miss KEERS could not ascertain in what manner.

From his family research ¹⁾ VAN BEMMELEN (3, 5) inferred that curly hair is hereditarily dominant over straight hair, that both fathers and mothers may transmit this character to their children and that it is independent of the facial type. In families where all the children have curly hair probably both the father and the mother contribute to it. The investigator is inclined to regard curly hair as an occasional manifestation of a racial modification. In individual development VAN BEMMELEN observed not only the transition from curly to straight hair but also the reverse.

SCHOKKING and SANDERS (7, 8) examined the same family with curly hair, the former pointing out dominance of this character expressed the supposition that its first occurrence in this family must be considered a spontaneous mutation. SCHOKKING stated besides that the colour of the hair and the tendency to curl in their heredity are independent of each other. SANDERS agreed with SCHOKKING that the transverse section of curly hairs is bean-shaped and that of straight hairs round, but he dared not positively confirm the statement that the heredity of curly hair depends on a single gene, since he observed this character in varying intensities, neither was he convinced of the first appearance of curly hair in this family as a mutation: he did not wish to exclude intermarriage.

The inaugural address of TINE TAMMES, entitled: "De leer der erfactoren en hare toepassing op den mensch" ²⁾ may be mentioned here; it does not give rise to a discussion in this place.

¹⁾ See p. 133.

²⁾ The doctrine of hereditary factors and its application to man.

The contributions to science by MARIANNE VAN HERWERDEN go far beyond the field of anthropology. An attempt to give an impression of her work within the scope of this book would, therefore, not only fail but would not be to the purpose either. Yet, the memory of this remarkable woman has a claim to it, because it was particularly anthropology in which MARIANNE VAN HERWERDEN was keenly interested. It is, therefore, very fortunate that others, among whom HERINGA in particular should be mentioned, elsewhere have succeeded excellently in doing justice to this figure.

It was her study on heredity which led MARIANNE VAN HERWERDEN to anthropology and kindred problems. Her interest in genetics was on the one hand expressed in studies on the heredity of man in general, addressing herself either to larger (3) or to smaller (1) circles, and on the other hand in studying the distribution of blood groups among the Dutch population. She realized that naturally, owing to the hereditary character of the blood groups, the anthropologist pays particular attention to the blood group index but that actually it does not take precedence over other anthropological characteristics (2, 5, 6). In this connection it may be remarked that according to BAIS and VERHOEF much may be expected of the determination of blood groups provided that other anthropological characteristics are taken into account as well. The method used by MARIANNE VAN HERWERDEN for blood group research (4) was praised by HIRSZFELD and recommended in other countries; the agglutinations were carried out in a central laboratory in collaboration with Mrs. BOELE—NIJLAND. Since the investigation did not aim at genetic results but at anthropological peculiarities of the population of the Netherlands and special areas (Volendam, Marken, the Texel, Jews; ex-inhabitants of Schokland), family research was on the whole¹⁾ avoided. The figures showed that sometimes considerable differences are found in the distribution of the blood groups in areas lying closely together. This phenomenon might be due to the settling of bearers of a special blood group in the past, followed by inbreeding.

Of 30000 persons the blood group was determined; the publications up till now (7, 8), however, only refer to special groups and at the same time deal

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1874—1934

*) HERINGA, G. C., 1935. Dr. M. A. VAN HERWERDEN herdacht in verband met haar werk op het gebied van celleer en algemeene biologie. *Nederl. Tijdschr. v. Geneesk.* LANGE, CORNELIA DE. 1934. In memoriam Dr. M. A. VAN HERWERDEN. *Nederl. Tijdschr. v. Geneesk.*

SCHRIJVER, F. 1935. Dr. MARIA ANNA VAN HERWERDEN; met lijst harer wetenschappelijke publicaties, bewerkt door Mej. C. A. B. VAN HERWERDEN. *Erfelijkheid bij de Mens.* 1.

TAMMES, T. 1936. Die Bedeutung von Dr. MARIA ANNA VAN HERWERDEN für die Genetik und die Eugenetik. *Genetica*, Vol. 18.

See also: ELGA KERN. 1928. *Führende Frauen Europas. Selbstschilderungen.* München.

¹⁾ If necessary, M. A. VAN HERWERDEN also paid attention to family research (*De verdeling der bloedgroepen in een groot gezin.* 1928. *Ned. Tijdschr. v. Geneesk.* I). She also introduced into the Netherlands the internationally accepted pattern of a genealogical tree (*Nederl. Tijdschr. v. Geneesk.* 1926 II).

with some other anthropological characteristics. From the data on 3085 undergraduates, who may not be regarded as representatives of the population in general, the percentages for *O*, *A*, *B* and *AB* appeared to be 45.7, 41.2, 9.6 and 3.5. That group *B* occurs somewhat more frequently in this material than e.g. in prisoners is attributed by Dr. VAN HERWERDEN to foreigners among the ancestors, of which fact 40 % of the undergraduates with blood group *B* made mention, against 20 % of those with the groups *A* and *O*. For the whole of the country the percentage for *O* amounts to 46.8, for *A* to 41.7, for *B* to 8.6 and for *AB* to 3. HERTZBERGER found among Jews for *B* 13.4 % and for *AB* 4.5 %. He thought that there is reason to expect that the Portuguese Jews with regard to the groups *B* and *AB* exceed the average for the Jews in the Netherlands.

It was repeatedly tried to find correlations between the blood group and other anthropological characteristics, such as the cephalic index and the colour of hair and eyes. In the case of the undergraduates it is only possible to point out a slight positive correlation between group *B* and the pigmentation (colour of hair and eyes together) and an indication of it between the latter blood group and the eye colour.

The blood group research among the population of the Over-Veluwe by PENNING forms part of an extensive treatise, in which prehistory, history and ethnology have an important position and of which the anthropological part also refers to body length, colour of hair and eyes, cranial index and cephalic index, while it is yet extended by the results of family research in two families.

The data of the anthropological investigation were obtained from 850 persons, over 18 years of age, whose grandparents had been born in the same part of the country. The blood group research in particular was made on 1074 persons. PENNING made use of the classification according to body length which had been suggested by the Committee of the Koninklijke Akademie van Wetenschappen¹⁾. He made a distinction between fishermen and peasants and found that the latter are taller than the former, the tendency to brachycephaly being stronger among the peasants and that to dolichocephaly among the fishermen.

The figures of the blood group research pointed to a different result according as to whether brothers and sisters were included or not, but the exclusion of more persons of the same family name appeared to make no difference. A connection between blood group and any other anthropological characteristic was not or hardly perceptible but, according to PENNING, there is some indication that group *O* is more closely related to the Nordic type and group *B* to the Alpines. He was inclined to regard to the East-Baltic type as a fixed product of interbreeding between the Nordic and the Alpine type. Of the Mediterranean race no representatives were found in his material. The blood group index (3.81) of the population of the Over-

¹⁾ See p. 131.

Veluwe was supposed to reveal a local character; it must be admitted that it differs fairly strongly from the figure given by HERS for the Hoeksche

Waard $\left(\frac{A + AB}{B + AB} = 4.5\right)$.

In the investigation by HERS we are struck by the fact that the percentage for group B in this area amounts to the rather high value of 9.3, whereas this figure is 4.8 for the village Puttershoek separately, where the pigmentation is more considerable than in the neighbourhood and the B-element may be mainly deduced from two families. Once more the cephalic index was determined and the colour of hair and eyes was recorded, but no correlations could be found with the blood group. HERS mentioned the occurrence of small local groups of people who, owing to lack of contact with others, may be distinguished not only with regard to the blood group, but who at the same time betray the influence of this circumstance from an anthropological, psychical and sociological point of view.¹⁾

Concerning the blood groups in general BIJLMER (4) expressed the opinion that the spreading might be geographical and that the principal races might be characterized by a prevailing A group. In order to answer the question whether the blood groups have originated as such or that afterwards from one original group more were formed, he considered the possibility of reversible mutation (TOLLENAAR²⁾).

Before concluding this survey of blood group researches, should be mentioned the name of Dr. A. B. F. A. PONDMAN of the State Institute for Public Health at Utrecht, who remains in the background in blood group research for anthropological purposes but whose merit in preparing test sera and putting them at the disposal of investigators is generally admitted by those who are concerned in this research.

The close relationship between genetics and anthropology led us by means of the blood groups to physiology. Studying what further has been done in the Netherlands in the field of physiological anthropology, we might first consider a treatise by VERHOEF on the cholesterol content of the blood. He obtained the result that this content for Dutchmen as well as for Javanese, provided the observations on the latter are made in Europe, lies between 0.180 % and 0.190 %. Since the figures for the Javanese in the East Indies (DE LANGEN) are much lower, VERHOEF concluded that the cholesterol content is highly subject to external conditions and useless as a racial characteristic.

A totally different part of physiology was dealt with by the lawyer KROON, when on 11000 Amsterdam cases between the 1st of December 1912 and the 1st of December 1913 he studied the distribution of birth throughout the months of the year in connection with that abroad.³⁾ His data indicated an

¹⁾ Cf. p. 87 (HAGEDOORN).

²⁾ 1934. Vakblad voor Biologen.

³⁾ See for this subject also: BOLK. *Nederl. Tijdschr. v. Geneesk.* 1902 II; VAN EYK *ibid.* 1904 I; BROEKSMIT *ibid.* 1903 II, 1905 II and 1909 I.

increase of conceptions in May, June and December and diminished conceptions from August to November. For the rest KROON was inclined to ascribe the monthly differences not so much to a difference in the capacity for conception as to external conditions.

WOLDA observed among wild birds by the side of each other the type of a large number of eggs laid once a year and the type of a smaller number several times in the year. Between these two types transitions were supposed to occur: change from the first type to the second, which he regarded as progression, WOLDA called acclimatization, change from the second to the first declimatization. Expecting that these phenomena would appear to occur not only in the species but also in the individual and that besides they would not be confined to the birds, he extended his observations to man with the result that he felt justified in stating that his supposition was verified in Dutch women. It may be important from an anthropological point of view that, according to the curves, the chances of conception are differently distributed throughout the months of the year in the Netherlands and in Sweden. It was also found that in Sweden the months of the greatest and the smallest number of births lie more closely together than in Holland, which WOLDA regards as a higher degree of physiological development in Sweden. The period of increased capacity for conception in Holland sets in each time after 19 months and in Sweden after 15 or 21 months. WOLDA regarded the greater probability of conception in December, indicated by the Swedish figures, as a racial feature.

Without denying the existence of biological foundations with regard to the monthly births, SANDERS (4) doubted whether birth rates of a country like the Netherlands admit of conclusions with a biological tendency. WOLDA on the other hand admitted that civilization is an active factor in acclimatization and declimatization but nevertheless a rhythm of a biological nature is expressed by the figures. SANDERS (6) also objected to the manner in which WOLDA drew conclusions and pointed out that statistics may indicate a regularity but cannot explain it. In his turn SANDERS (1) had with a study on birth and marriage in the Netherlands incited SCHUURMANS STEKHOFEN to criticism.¹⁾

After remarking in a separate publication (2) that since 1870 in the Netherlands the average duration of life has increased²⁾, SANDERS published a number of contributions (3, 4, 5, 6) on the peculiarities of the monthly birth rate, considering the endo- and exogenic influences on it both for town and country. Anthropologists will be interested to see that SANDERS studied the figures of 19 countries in and 10 countries outside Europe and observed that the birth frequency falls into a number of types which are not always the same for related peoples and for countries with the same climate and not always different for groups of different races.

¹⁾ SANDERS' reply may be found in *Nederl. Tijdschr. voor Geneesk.* 1922 II.

²⁾ See also SCHUURBEQUE BOEYE. 1935. *Enkele uitkomsten van de in 1930 gehouden volkstelling. Mensch en Maatschappij.*

REYS' conclusions from dynamometer experiments are as yet of little value to anthropology; it is true that they referred to a fairly large material, viz. 1112 Dutch men and 888 women, but they did not give rise to comparison of different races.

An elaborate discussion of the above-mentioned ¹⁾ work by STRATZ on growth meets with a similar difficulty; from a smaller article (5) on the same subject may be mentioned that, according to STRATZ, in all races many individuals cease growing before attaining the height which is in agreement with their build.

GREWEL discussed the anthropology of the second dentition, a physiological phenomenon on which sometimes prehistorical skulls may throw some light, as is stated by the author. GREWEL, who started this study on BOLK's advice, examined the moment of eruption of the various dental elements in a number of races. For the Netherlands he obtained his figures from the data collected by VAN BISSELING, VAN DER GRAGT and NINCK BLOK on 19355 children at the Hague ²⁾ and from his own investigation on 760 Amsterdam children. The sexual difference appeared to be manifest in an earlier and more rapid development in girls than in boys. As compared with the Scandinavians, the Dutch and Germans obtain their permanent teeth late. Both from an anthropological and genetic point of view he considered it highly important that, according to this research, external conditions exert a great influence on the moment of eruption of the teeth and that the type of second dentition in some races seems to correspond to the peculiarities found in case of unsatisfactory nutrition.

Leaving the domain of morphological and physiological anthropology and entering that of psychological anthropology means taking a step which, according to some anthropologists, leads beyond the actual field of their work. For example, BARGE (7, 8) remarked: "De rasiendeeling, gelijk die in de anthropologie gegeven is, berust niet op lichamelijke *en* geestelijke kenmerken, doch op lichamelijke alleen". However, he added: "Wel kan men a posteriori onderzoeken in hoeverre aan bepaalde lichamelijke kenmerken geestelijke kenmerken parallel loopen" ³⁾. WIJNAENDTS FRANCKEN expressed it even more strongly: "... en beter is het zeker den naam anthropologie te beperken tot somatische kenmerken met uitsluiting van alle geestelijke verschijnselen" ⁴⁾. That it is not an ascertained fact that anthropology has to deal with psychology ⁵⁾, is on the other hand apparent from the very

¹⁾ p. 103.

²⁾ Statistische gegevens omtrent den toestand van het gebit bij kinderen en volwassenen. Tijdschrift voor Tandheelkunde 1916.

³⁾ "The classification of races, as it is given in anthropology, is not founded on both physical and psychical features, but on physical characteristics only" and "But a posteriori it may be found in how far psychical characteristics run parallel to somatic ones".

⁴⁾ "... and it is certainly better to confine the name anthropology to somatic characteristics with the exclusion of all psychical phenomena".

⁵⁾ Cf. p. 3 LUBACH; SURINGAR.

positive recommendation to do so directed to the anthropologists by BIJLMER (2); TEN KATE (11) also admitted the value of psychological racial differences. Since some psychological studies were published with the obvious intention to be understood in connection with anthropology, they will be mentioned here, in order to do justice to these investigators.

BOUMAN (2) who supported the view that phylogenetically physioplastic art (palaeolithicum) precedes ideoplastic art (neolithicum), saw this succession repeated in an imbecile girl. Since this patient could hardly speak and understand very little, BOUMAN concluded that the articulate speech developing in the neolithicum had been decisive for the transition from physioplastic to ideoplastic art. In this way he found that the biogenetic law also applies to psychical life. To this conception objections were raised by HAVERMANS, who explained physioplastic art as a result of interested observation of men and animals by the artist.

Psychological anthropology was led into new ways by the researches of HEYMANS and WIERSMA; actually it is more correct to say that in this way it took shape.

In the first place HEYMANS and WIERSMA should be mentioned for contributing methods for psychological research. By the side of peculiarities of temperament, studied according to activity, emotionality and secondary function, these investigators took into consideration intellectual functions and abilities. The collected data were used for a study in connection with heredity¹⁾ and induced WIERSMA to try to find correlations with physical racial characteristics in 415 Dutchmen. Studying these characteristics, he realized that the Nordic component of the population is more clearly manifest in the North of the Netherlands and the Alpine component in the South. Examining the eye colour separately, he found that persons with blue eyes are characterized by greater activity, less emotionality, stronger secondary function, feebler primary function, a gift for mathematics, a good memory, while they are quieter, more reserved, more accurate, not soon satisfied with themselves, less sensitive to appreciation and more sensible. Of all these peculiarities, by which persons with blue eyes are supposed to distinguish themselves from brown-eyed people, only the difference in psychical after-effect (secondary function) was decisive and, taking into consideration the complex of physical differences between the representatives of the Nordic and the Alpine race, only this difference could be maintained as a psychical racial characteristic.

WIERSMA arrived at the conclusion that the bodily build, which is a characteristic of the races, is connected with a special psychical structure, while constitutional types were said to answer to special temperamental types; the

¹⁾ 1906, 1907, 1908, 1909. HEYMANS and WIERSMA. *Zeitschr. f. Psychol. u. Phys. der Sinnesorg. Beiträge zur Speziellen Psychologie auf Grund einer Massenuntersuchung*. Since these articles rather refer to the heredity of psychical qualities than to that of psychical-anthropological types, they will not be discussed here any further.

details of the investigation from which he drew this conclusion are of minor importance here.

WIERSMA added to his treatise a study on the physiological type, distinguishing the physiological functions into autonomic and automatic ones. The racial difference between the Nordic and the Alpine type, the physiological functions of the first having a slower, quieter and more monotonous course than those of the second, was more conspicuous with regard to the automatic physiological functions than with regard to the autonomic ones. The close relationship which may be expected between the psychical and the physiological type became, according to WIERSMA, apparent not only by comparison of the two races under examination but also by that between the various constitutional types.

Among those who particularly welcomed the classification, built up by HEYMANS and WIERSMA from their data, was F. H. G. VAN LOON, who repeatedly expressed his satisfaction with the system, the more so as he preferred individual examination to observations of the peculiarities of groups. In collaboration with THURNWALD, who wished to collect data also concerning the situation of the persons to be investigated, he extended the method of HEYMANS and WIERSMA in this direction. VAN LOON made use of this classification for a comparison of Malays with Europeans under tropical conditions, which consequently will not be discussed here any further. However, a discussion will be given of a study written by LEYDESDORFF on 202 Jews, living in the Netherlands and belonging to 40 families. Among the numerous psychical peculiarities, of which he examined the frequency in these Jews, we are struck by the fact that the investigation does not corroborate the current opinion that Jews rather frequently excel in music. For the rest the result may be best reproduced in the following table.

	Investigation LEYDESDORFF (Jews)	Investigation HEYMANS and WIERSMA
Amorphous	2.9 %	4.1 %
Apathetic	3.9 %	3.9 %
Nervous	11.4 %	7.2 %
Sentimental	6.4 %	4.7 %
Sanguine	3.9 %	3.9 %
Phlegmatic	13.4 %	18.2 %
Choleric	10.9 %	10.6 %
Passionate	29.7 %	24.7 %

It should be mentioned that in the correlations the study of LEYDESDORFF showed two striking deviations: in his material 31 % of the non-active were emotional and 69 % non-emotional and in that of HEYMANS and WIERSMA

59.9 % and 40.1 % respectively; among the persons with a strong primary function LEYDESDORFF found that 75 % were emotional and 25 % non-emotional against HEYMANS and WIERSMA 60.1 % and 39.9 %.

Concerning the psychical peculiarities of the Jews STEINMETZ differed in opinion from LEYDESDORFF. The Amsterdam professor gave the following qualities as being characteristic: great activity, less emotionality, very strong primary function or susceptibility to impressions, great after-effect or secondary function.

The adaptability of Jews was studied by WEINBERG on 105 Jewish school children whom he compared with 75 non-Jewish children. The Jewish children showed a slightly greater activity and stronger "energetic secondary function" (WIERSMA), which would make their adaptability greater.

In an investigation of the psychical qualities of a family by VAN BEMMELEN (4) the heredity was shown of the inclination to didactic activity; the same family suggested to VAN BEMMELEN that aversion to medical studies is hereditary as well.

On the Dutch national character several works were published of late years, some of which were excellent. However, since they are not founded on a systematic research, as suggested by the method of HEYMANS and WIERSMA, the mere mention of these works will suffice in this survey of the anthropology on the Netherlands. Of the authors who wrote on this subject may be mentioned: ROEST VAN LIMBURG ¹⁾, HUIZINGA ²⁾, KRUYT ³⁾, JOSEPHUS JITTA ⁴⁾, WATERINK ⁵⁾, and F. KOSTER ⁶⁾, while VAN SCHELVEN lectured on this subject in Paris ⁷⁾. Of the article by SCHUURMANS STEKHOVEN may be mentioned that according to this author the brunettes in the Netherlands live less closely together than blond persons, in connection with the brunettes being less tolerant ⁸⁾.

A number of investigators have lately been interested in the intelligence of the Dutch. Special mention should be made of LUNING PRAK, HUTTER, OORT, SWANENBURG DE VEYE, and STUIVELING. It would lead us too far to discuss these studies any further. It may suffice to call attention to a statement by STEINMETZ: "Verschillen in het procent van begaafden mogen zeker tot de kenmerken tusschen de rassen gerekend worden" ⁹⁾.

1) 1917. *Ons Volkskarakter*. Amsterdam. S. L. van Looy.

2) 1935. *Nederland's Geestesmerk*. Leiden. Revised edition.

3) 1934. *Het Nederlandsche volkskarakter en het socialisme*. Arnhem.

4) 1936. *Het Nederlandsche Volkskarakter*. Maastricht.

5) 1937. *Het Nederlandsche Volkskarakter*. In: JAN DE VRIES. *Volk van Nederland*. Amsterdam.

6) 1934. *Ons Volkskarakter*. *Het kind*. Vol. 35.

7) Of this lecture only a press-report was published. *Algemeen Handelsblad*, Ochtend-
editie Stad. 2 Dec. 1936.

8) Cf. p. 26.

9) "Varying percentage of gifted persons may certainly be reckoned among the characteristics of the different races". *De Rassenkwestie*. *De Gids*. 1907.

CHAPTER XI.

So far there has not yet been an opportunity to mention the point of view of Dutch anthropologists in the 20th century with regard to some problems of a general nature. Among them it was NYËSSEN who contributed a number of communications (2, 4) referring to the history of anthropology. He distinguished successively the periods of collecting, of examination and of interpretation, remarking that in the second period skeletal material was the main starting-point and that in the third period the observation of living persons was begun. NYËSSEN pointed out that in this period the investigation does not exclusively aim at knowledge of the various organs but that intention is paid as well to the constitution; besides, he mentioned as BOEKE's opinion that very likely eugenics will give a new direction to anthropology. NYËSSEN (3) considered it necessary that in anthropological research it should be decided first of all whether the material is really autochthonous.

On account of his experience that anthropological textbooks dealing with a special country are often incomplete and out of date, KLEIWEG DE ZWAAN (2) recommended the following subjects at a congress of the Institut International d'Anthropologie to be treated by the various national bureaux:

1. anthropological composition of the population of the country.
2. races which sooner or later have come into the country and settled there.
3. physical characteristics of the recent population.
4. physical characteristics by which the components of the population are distinguished.
5. differences between the population of the towns and of the country.
6. variations which in the course of time have taken place with regard to the physical characteristics.
7. influence of external conditions.
8. special investigation of isolated areas within the country.
9. intermingling of races within the country.
10. phenomena of growth in infancy.

Moreover, it would be advisable to take into consideration what pre-history might contribute to the knowledge of anthropology in a country. KLEIWEG DE ZWAAN suggested that it should be clearly stated what is already known in contradistinction to what has to be investigated. That is why he considered the composition of a bibliography necessary.

According to KLEIWEG DE ZWAAN (4), the time has not yet come for a decision concerning the origin of the Nordic race; however, a common descent with the Mediterranean race seems to him unlikely. In connection with the question whether the fair brachycephalics in the North of Europe (East-

Baltic race of NORDENSTRENG) are either representatives of a race by itself or the result of intermarriages, he considered an elaborate family research advisable in the North of Europe, in order to be able to examine phenomena of heredity. TEN KATE (11) added to this that many disputes on the classification of races — also among Dutch anthropologists — are due to insufficient observation and superficial knowledge of the literature. He suggested to distinguish in the Alpine race a type α with a face like the Dinaric type and a type β with a broad face and a rather short, slightly concave to straight nose. In the Netherlands type β is supposed to prevail.

To BARGE (4) we owe a description of methodics of physical-anthropological research.

Entirely in agreement with the wish of WIJNAENDTS FRANCKEN that the arithmetical calculations of skull measurements should be preceded by the drawing of a curve, BIJLMER (1) pointed out in which cases the theory of probabilities should not be used. Afterwards (2) he warned against the application of highly refined techniques in anthropological research: he feared that this might make anthropology into racial anatomy. It is to be regretted that WIJNAENDTS FRANCKEN has not entirely avoided this difficulty in his book which contains many interesting remarks. Rather than take this direction, BIJLMER preferred to keep to the main lines.

STRATZ (3) tried to found the classification of races on a complex of characteristics, mainly of a phylogenetic nature; the characteristics of the skull were, according to him, of high value in connection with other anthropological features, but by themselves they should not be conclusive for the determination of races. STRATZ had a high opinion of photographic examinations, not only of the living body but also of skulls. He even wanted to calculate measurements from photos. A photo of a selected case meant more to him than the result of the statistical method. It stands to reason that not all anthropologists agreed with this conception: TEN KATE (8) expressed his objections to the subjectivity in STRATZ' method.

It is remarkable that STRATZ' views on racial problems received less attention, for his point of view is in many respects different from the current opinions. Besides the three principal races, which he compared with chemical compounds, STRATZ (1) distinguished a number of primitive races, comparing them with chemical elements. He recommended a conscious natural selection also for man (3) and considered admixture with Jews advisable for the white race in Europe (2). The Jews were said to descend from the North-African branch of the Mediterranean race, in his own words "mittel-ländischen, weissen, früher indogermanisch, kaukasisch oder arisch genannten Rasse". The representatives of this North-African branch would from their first appearance onwards have been a conglomerate of primitive peoples. Their somewhat thick lips, dark eyes, strongly developed upper eyelids and the mulatto-like lineament (RATZEL) might be due to a Nigrific admixture. The European Jews would be distinguished from those of Asia Minor and the North of Africa by some peculiarities which STRATZ regard-

ed as an intensification of the characteristics of the white race¹⁾: high, narrow, convex bridge of the nose, large, lively eyes, sharp-cut features, strongly developed and curly hair, both on the head and the body, and narrow hands with mobile fingers. That also hulking, thick-set figures occur might be a phenomenon inherent in the white race and probably in all civilized races (BAELZ). Since external conditions on the whole prevented the Jews from obtaining work requiring physical strength, their intellect began to prevail over physical ability. In all races the Jewish type might be observed individually; STRATZ saw a connection here with his view that this type is not a racial character but the result of constant inbreeding. Royal families would show that particularly thick lower lips (HABSBURG) and large noses (BOURBON) predominate after inbreeding.

A counterpart of STRATZ' conception concerning the Aryan descent of the Jews²⁾ is the opinion of COX that the Alpines, contrary to the Teutons are not Aryan. We might even agree with COX, when, like HUGO DE VRIES, he compared human races, viz. the Teutonic and Alpine races, with biological species but, although his statement that on intermarriage they follow the Mendelian laws is correct, it would follow from this argument that there are as many species as there are individuals! On the ground of investigations on psychiatric patients, which showed that among these patients hybrids between the fair and the dark type occurred rather frequently, COX concluded that the abnormalities were due to the correlations falling apart. Considering this phenomenon more closely, he realized that intermarriage may give rise to good as well as bad results. He added to this: "Bij sommige rassen schijnt het eerste meer te gebeuren, bij andere het tweede"³⁾. COX distinguished two kinds of geniuses: 1. plus variations of their race, in which "all characteristics are hypotrophiated" and 2. hybrids, generally one-sided talents, the formation of which is very probable on intermarriage of the fair and dark types. Here would hold his remark: "Waar de hybriden het meest in aantal en verscheidenheid ontstaan, daar is de bakermat van kunst en wetenschap, daar vindt men de hoogeschole en universiteiten"⁴⁾.

A similar statement was made by BOUMAN (1, 4) and PIEPERS; the former arrived at this conclusion on the ground of a statistical study on 8000 biographies of gifted persons who lived in Europe between 1400 and 1800. By marking the birth-places of these persons on geographical maps, in such a way that each map showed the birth during 25 years, their relative density

1) Something very similar has been said by BRUTZKUS with regard to the blood group of the Jews in Germany. Congrès international de la population, Paris 1937.

2) Cf. M. A. VAN HERWERDEN (3): "Zelfs is er geen reden een Joodsch ras tegenover een Arisch ras te plaatsen" (There is no reason to place a Jewish race opposite to an Aryan race). See also C. C. UHLENBECK. Proc. Kon. Akad. v. Wetensch. Amsterdam 1935.

3) "In some races the first result is more frequently found, in others the second."

4) "Where the hybrids originate in the greatest number and variety is the cradle of art and science, there the colleges and universities are found."

became manifest in areas where intermingling of races occurred ¹⁾. This representation reveals how special sources of artistry originate, flourish and then disappear. The temporariness of the phenomenon might, according to BOUMAN, be due to influence of the surroundings, while he was inclined to



Grouping of the highly gifted in Europe from 1400 to 1800, according to the birth-places of painters, graphic artists, sculptors, architects, musicians, mathematicians, poets, authors and philosophers. Combined map according to K. HERMAN BOUMAN; cf.: "Problemen van ontarding en begaafdheid". Inaugural address 1916.

think that the nature of the art depends on the place: in Central Germany music reached a high degree of development, in the Netherlands and Flanders the art of painting. BOUMAN represented it as if the talent belongs to a group of individuals as a basis, on the apex of which the genius is placed. That genius apparently is not hereditary, not even during the comparatively short time that the favourable influences of the surroundings may be considered unaltered, might be connected, according to BOUMAN, with the small

¹⁾ BOUMAN made a similar map for Greece during the last millennium B.C. "Le miracle grec". Psych. en Neurol. Bladen 1934.

number of children of man in general and of highly gifted persons in particular.¹⁾

Whereas BOUMAN supposed that for the manifestation of high gifts cooperation of endo- and exogenic factors is required, DE LANGE was inclined to regard great men and women exclusively as products of their time: "Zoo is het ongetwijfeld zeer onwaarschijnlijk, dat de geweldige picturale praestaties van de bewoners van Noord-Nederland in de 17e eeuw aan genetische oorzaken zouden zijn toe te schrijven. Het is bijna niet aan te nemen, dat deze aangeboren picturale gaven na eenige generaties bijna geheel zouden verdwijnen om dan in de 2e helft der 19e eeuw plotseling weer op te duiken." ²⁾

BERNELOT MOENS, who considered both psychical and physical characteristics hereditary, expected good results from intermingling of races, if not only somatic properties are taken into consideration but also psychical qualities of the components having part in the crossing. For this purpose he suggested a classification of mankind into five groups according to the degree of altruism and self-control.

Mr. and Mrs. HAGEDOORN—VORSTHEUVEL LA BRAND and BIJLMER (3), all of them geneticists, admitted the good chances of intermingling of races by the side of the bad ones. FRETTS went into the subject more deeply (26): he observed that in so far as crossing of races is regarded as crossing of qualities, it may be expected that the hybrid will be inferior to the parent who is considered to possess the higher cultural value. However, the hybrid might be inferior to the two parents, if it is assumed that crossing of mutually very foreign qualities has an unfavourable influence owing to disharmony. For this reason FRETTS disapproved of crossing of highly different races, which might bring about unexpected and undesirable combinations. On the other hand, VON RÖMER pointed to the favourable results of such crosses by means of some genealogies.

NYËSSEN (1) declared that, if crossing of highly different races has unfavourable results, this must be the case also with related groups. According to NYËSSEN, one race should not be placed above another, because: "it is impossible for a member of another race to enter into their soul life and to judge impartially". However, since a hybrid as such would be inferior to a racially pure form, he regarded absorption of dark brachycephalic components by the Frisian population as a source of racial degeneration. Taking into consideration that the Frisians do not propagate themselves sufficiently

¹⁾ BOLK (33) also emphasized this antagonism between the mind and the body.

²⁾ "Undoubtedly it is very unlikely that the enormous pictorial achievements of the inhabitants of the Northern Netherlands in the 17th century might be ascribed to genetic causes. It is hardly possible that these inherent pictorial gifts would almost completely disappear after some generations to reappear all of a sudden in the latter half of the 19th century."

and that on the other hand the birth rate of the Alpines is somewhat higher, NYËSSEN was alarmed about the future of the Frisian population.

Before we proceed to discuss what NYËSSEN has said about its anthropological present and past, it has to be considered which conceptions exist of the origin and composition of the Dutch population as a whole.

Prehistorical skeletal material has hardly been found in the Dutch soil. The remains of the oldest skull (pleistocene) were recently discovered near Hengelo. They comprised the frontal bone and the parietal bones which, according to VAN DEN BROEK (12 and appendix), belong to a middle-aged man of the Cro-Magnon race (*homo sapiens fossilis*). The cranial index is said to be less than 76.65.

VAN DEN BROEK concluded that the fragments only distinguish themselves from recent man by some more or less primitive peculiarities of the frontal bone. The length-breadth index of this skull differs considerably from that found near Ryckholt (St. Geertrui) with an index of 88.3 (FRAIPONT, STOCKIS and DAVIN). This discovery comprised in addition to the neurocranium the lower jaw and a thigh bone; all these skeletal fragments were considered to belong to a 20 to 25 years old woman, who lived in the neolithic period. Apart from some deviations, this skull is said to show a great resemblance to the type of Grenelle.

The remains of two individuals found on the Veluwe and described by NIEUWENHUIS are likewise neolithic. One of the skeletons, possibly of a woman, of which the squatted posture was still perceptible, is fairly complete, but unsuitable for measurements. NIEUWENHUIS observed that the skull seems to be dolichocephalic, the forehead receding with heavy eyebrow arches, the lower jaw, with sound teeth, obviously used for chewing coarse food, has a heavy basic ridge and large mental foramina. He considered the possibility that the other skeleton, which he was inclined to ascribe to a man, had first been buried elsewhere: the bones were scattered. According to NIEUWENHUIS, these skeletons deviate in structure from recent Dutchmen. VAN GIFFEN and VAN DEN BROEK (10) remarked on this discovery that the nature of the grave (Glockenbecher type) points to a culture which, wherever it occurs outside the Netherlands, must be connected with brachycephalics.

From the point of view of methodics in opening prehistoric graves CRAWFORD¹⁾ referred with appreciation to BUTTER who managed in such a way as to make it possible that anthropological measurements are taken on traces of decayed skeletons.

Skeletal fragments discovered near Arnhem probably date from historical times. Together with BROEKMAN VAN DEN BROEK (11) concluded that the skull, with a cranial index of 74.07, cannot be distinguished from recent man; neither did the geological data of the place where it was found indicate a great age.

1) *New Technique*, Antiquity 1933.



Skull from Hengelo.

VAN DEN BROEK, who repeatedly ¹⁾ gave evidence of his interest in prehistoric man, in a survey of the prehistoric inhabitants of the Netherlands (4, 9, 10) expressed his opinion that the "hunebedden" in the Netherlands are continuous with those of Northern Europe. These "hunebedden" containing dolichocephalic as well as brachycephalic skulls, might be the manifestation of a culture which reached its culminating point about 2000 B.C. Its members, whom the recent population of the Netherlands from an anthropological point of view would mainly resemble, would have come from the East. To this Germanic culture a stream from the South had been added in the late megalithic period. According to VAN DEN BROEK, discoveries in the South of the Netherlands from the iron age point to Gallic influences, while by the side of this, urns of the Harpstedt type might be connected with a stream of Teutons from South-Eastern direction. In contrast with KLEIWEG DE ZWAAN (4) and TEN KATE (11) the Utrecht professor thought that the Mediterranean race has no part in the composition of the Dutch population (7). His study on body length ²⁾ has shown that the tallest recruits in the Netherlands occur in the North-West and the smallest in the South, a medium size being found in the East. In connection with what has been said before, VAN DEN BROEK (4) assumes that in the North-West of the Netherlands live the representatives of the Germanic race and in the South those of the Alpine race; with regard to the population in the East he hesitated to accept BOLK's statement that it might be of Saxon origin. VAN DEN BROEK further remarked that migration to the large towns, reclaiming of areas and colonizing within the country have a disturbing effect on the anthropological distribution of the population.

The scarcity of discoveries of physical-anthropological material in the Netherlands contributes to the fact that the opinions on the origin of the population, for the greater part founded on historical and archaeological data, are not completely in agreement. HOLWERDA thought that the earliest inhabitants of the Netherlands, the "hunebed" builders, were dolichocephalic Mediterraneans who already c. 1000 B.C. in the North had "deteriorated" to a fair race. A similar change of colour was accepted by PIEPERS who did not ascribe it to loss of pigment but to fading of it. A second component of the population was, according to HOLWERDA, formed by brachycephalic Alpines who settled in the Netherlands after the Mycenaean-Grecian flourishing period and built the dome-shaped graves on the Veluwe. The intermingling of these two components of the population, which when they arrived in the Netherlands were only partially pure representatives of their races, would have started immediately after their settling. The Romans also had, according to HOLWERDA, a share in the com-

1) 1924. De voorhistorische mensch. Haagsch Maandblad.
1924. De praehistorische mensch. Nederl. Tijdschr. v. Geneesk. I.
1926. Praehistorie van den Mensch. 's-Gravenhage.
1936. Oudste geschiedenis van den Mensch. Oosthoek. Utrecht.

2) p. 102.

position of the Dutch population. The dolichocephaly on the Dutch coast could not be traced back to the earliest inhabitants but to the Franks.

HOLWERDA blamed the anthropologists, and particularly BOLK, for the fact that, while they do not contribute to determination of time, they neglect historical data; he expressed the opinion that archaeology and physical anthropology should give the answer to history on the question concerning the origin of the population. To this view objections were raised by PIEPERS ¹⁾ who declared that history and philology should cooperate equally with archaeology and anthropology. BIJVANCK supported the view that anthropology should be led by archaeology in so far as the various neolithic cultures in the Netherlands point to different peoples; however, this author was aware that people and race are by no means synonymous. He arrived at the conclusion that the conception, that in the Netherlands a Frisian, a Frankish and a Saxon component of the population occur by the side of each other, need not be completely abandoned but that, in order to explain the physical and psychical anthropological differences observed in the population, also data from older times should be taken into consideration. However, for the understanding of these differences BIJVANCK considered the distinction between Alpines and Nordics too simple.

A detailed discussion of what J. DE VRIES has said on the origin of the Dutch people would lead us too far.

VAN GIFFEN remarked that discoveries of skeletons from older cultural periods point to simpler, more sharply distinguishable phaenotypes than those from later times. Being inclined to think that the researches so far not yet admit of a conclusion concerning the oldest inhabitants of the Netherlands, he placed SCHEIDT's conception against that of BOLK ²⁾. Also on account of cultural remains, VAN GIFFEN concluded that through the Netherlands, viz. through the province of Overijssel passes the boundary between an area connected with the North of Europe and another belonging to the West of Europe. The discovery near Ryckholt would besides point to an invasion from the South, while discoveries on the Veluwe, which from an archaeological point of view are highly varied, would be anthropologically connected with the Nordic race.

BARGE (7) distinguished representatives of the Nordic and the Alpine race in the present Dutch population, to whom in the East Dalo-Nordic and probably also East-Baltic brachycephalic elements might have been added. Before 800 A.D. the population in the East of the Netherlands would have been almost purely dolichocephalic. HUIZINGA observed that in the province of Groningen from an anthropological point of view the population was still Frisian till the end of the 15th century, although the language already betrayed Saxon influence. He agreed with BOLK that the Frisians in the end also

¹⁾ A discussion of the book by PIEPERS would lead us too far. A (crushing) review was published by DE WILDE. *Nederl. Tijdschr. v. Geneesk.* 1913.

²⁾ p. 72.

anthropologically, so by admixture, were influenced by the Saxons, who themselves were supposed to be a conglomerate, at any rate in the Groninger Ommelanden: for Friesland HUIZINGA considered this by no means historically proved. For this part of the country NYËSSEN (3) also made an elaborate study of this problem. In the first place wishing to become acquainted with the anthropological peculiarities of the terp builders in this area, he made a distinction between Friterpia and Groterpia. NYËSSEN himself has not taken any measurements but obtained his data from the literature. He found that among the old Friterpians the Nordic skull occurs more frequently than among the Groterpians, observing that the Nordic representatives in the first group showed more a low type of their own, whereas in the second group they rather resembled the rowgrave type. Within Friterpia in eastward direction the rowgrave type would become more frequent, the variability increase, the neurocrania become shorter and the splanchnocrania narrower and shorter. The anthropological difference between the Friterpians and the Groterpians would point to a connection existing already before the middle ages of Friterpia with the holocene of the West and of Groterpia with the Eastern pleistocene. From the middle ages Friterpia did not yield any material; that of Groterpia did not differ from the older material, according to NYËSSEN. On comparison of the Frisian terp skulls with recent skulls, the dolichocephalic and mesocephalic specimens in both groups appeared to belong to the same type, but the brachycephalic ones showed differences which made NYËSSEN draw the conclusion that the greater frequency of brachycephaly in the recent material is not due to evolutive increase of the cranial index but to the influence of allochthonic elements. The determination of the race of this brachycephalic component of the population, which had come from the East, had to remain undecided: skulls from Zealand are shorter, narrower and higher; neither can they be Saxon, because these are dolichocephalic, according to NYËSSEN. On the ground of his theory, discussed above, concerning a difference, even in prehistoric times, between the inhabitants of the West and the East of the Netherlands, NYËSSEN thought that there is a connection between the composition of the present population, as well as the increasing brachycephaly in the West, and the long contact of the Nordic population of the holocene with the more strongly mixed population of the pleistocene.

On the isle of Urk NYËSSEN himself collected anthropometrical data; for the present he confined himself to the publication of a single table (5).

Regional anthropological investigations have been made also in the South-West of the Netherlands. DE VRIES REILINGH arranged the body length of the recruits according to the villages of the island of Goeree-Overflakkee. He found that the young men of the West (Goedereede) are taller than those of the East (Overflakkee) whom he regarded as more strongly mixed. Together with Dr. STRUCKER he proceeded to take skull measurements, but had not enough material at his disposal to arrive at

positive conclusions. DE VRIES REILINGH was inclined to think that the population of Goedereede contains a Frisian element.

WAP determined the cephalic index and the colour of eyes and hair of



Survey of the craniological researches in the Netherlands, according to NYESSEN, after: De Nederlandsche arts als anthropoloog, 1927. Nederl. Tijdschrift v. Geneeskunde II. 844 adults and 317 children at Middelburg. He concluded that, if for Zealand the statement holds good that women preserve the racial type better than men ¹⁾, the population of this province would be connected with the Mediterranean race.

¹⁾ This is not in agreement with LUBACH's opinion (p. 52).

Thus this survey of what in the Netherlands has been achieved in the field of anthropology is concluded with a chapter which, instead of describing the current opinion on the origin and composition of the population, placed the various views on this subject by the side of each other. It will become apparent that research cannot yet be regarded as finished. Concerning some plans, which perhaps in future may be realized, something will be said in the following pages; here we may consider the paths along which anthropology in the Netherlands has moved since the beginning of the 20th century. Taking into consideration that in those years one worker particularly came to the foreground, so much even that he may be regarded as the leading anthropologist in the Netherlands for over a quarter of a century, it will be understood that it was this man, BOLK, who at that time gave the impetus and the direction to anthropology. Direction presupposes movement, and, without neglecting what might be immediately studied, he did not remain tied to well established methods of investigation but led anthropology along new paths. Of the subsections of the Committee of the Royal Academy for anthropological research that for biochemistry, consequently for a modern research with regard to anthropology, was not the least active. It was BOLK who called the Committee into being and inspired this subsection for the work. In addition to Bolk in those years his pupils VAN DEN BROEK, BARGE, MIJSBERG, KLEIWEG DE ZWAAN, and others showed a keen interest in anthropological problems. They as well as many other workers dealt with various parts of anthropology: parts of a whole which BOLK united in his person. In this respect also BOLK was an exceptional figure. Descent of man, origin and composition of the Dutch population, and changes which in the course of time it may have shown in its qualities, are the subjects to which the Dutch anthropologists in the 20th century devoted their energies, in so far as they were not occupied with researches in the colonies or refused to pause for any boundaries, like ARIËNS KAPPERS. It was not only tried to build up a synthesis from known facts but also to collect new data. Among the latter there are some which have an undeniably modern character, such as the results of psychological and blood group research.

APPENDIX.

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PERIODICALS, INSTITUTIONS, INSTRUCTION.

A special anthropological periodical does not exist in Holland. In so far as the Dutch anthropologists do not give their publications the form of a dissertation or send them to periodicals abroad, they are for the greater part published in the *Nederlandsch Tijdschrift voor Geneeskunde*, in the transactions and proceedings of the *Koninklijke Nederlandsche Akademie van Wetenschappen*, in "*Mensch en Maatschappij*", in the *Tijdschrift van het Koninklijk Aardrijkskundig Genootschap* and recently in the *Acta Neerlandica Morphologiae*. There are besides some genetic periodicals, in which anthropological articles were published, such as "*Genetica*", "*Afkomst en Toekomst*", the volumes I and II being called "*Erfelijkheid bij de Mens*", and "*Erfelijkheid in praktijk*", the organ of the *Nederlandsche Genetische Vereeniging*. The *Nederlandsche Anthropologische Vereeniging* also publishes articles, but studies on physical anthropology have not occurred of late years.

Of the anthropological institutes in the Netherlands the Committee for the physical-anthropological investigation of the Dutch population has to be regarded as the most official. It was founded in 1925 by the *Koninklijke Nederlandsche Akademie van Wetenschappen* at the instance of BOLK and forms a link between a historical-anthropological committee, a committee for the length, a committee for the colour, a committee for the index and a biochemical committee. It was remarked before that Dr. VAN HERWERDEN, as a member of the last Committee, undertook the blood group research and published several publications on this subject¹⁾, either alone or in collaboration with others. After her death Dr. BIJLMER undertook to work out the collected data. The committee for the length published a study by Prof. VAN DEN BROEK in 1927, on the increasing body length of the Dutch population²⁾. In GREWEL's dissertation the wish has been expressed that the Committee will lead a comparative-anthropological and social-anthropological research on the moment of eruption of the dental elements.

The previous organs of the *Maatschappij tot Bevordering der Geneeskunst*³⁾, dealing with anthropological subjects, and the present *Nederlandsche Anthropologische Vereeniging*⁴⁾ were already discussed.

¹⁾ p. 112.

²⁾ p. 102.

³⁾ p. 34, 42.

⁴⁾ p. 61. It may also be mentioned that this society lent financial assistance to investigations by KOHLBRUGGE (2) at Volendam and Marken.

The society "Het Nederlandsche Volk", founded in 1913, which intended "den toestand van de bevolking van Nederland in elk opzicht te leeren kennen, en te bevorderen dat die kennis dienstbaar gemaakt worde aan de belangen van ons volk" ¹⁾, left its possessions to the Nederlandsche Euge-netische Federatie when in 1929 it was disbanded.

In 1922 the Nederlandsch Nationaal Bureau voor Anthropologie was founded under the instigation of the Institut International d'Anthropologie at Paris. Between this institute and the Netherlands there had already been a special relation since a Dutchman placed a fund at the disposal of the Institut, thus enabling it on each occasion of its congresses to grant a prize for deserving anthropological or prehistorical work. Among those who received this "prix hollandais" was Dr. BIJLMER.

As it was SASSE who gave an impetus to the formation of the Nederlandsche Anthropologische Vereeniging, KLEIWEG DE ZWAAN must be mentioned as the person to whom the Bureau owes its origin and development. This society aims at "een zoo ruim mogelijke bevordering der bestudeering van en het onderricht in de anthropologische wetenschappen" ²⁾. The field of its activities is physical anthropology and anthropography, ethnography and ethnology, folklore, the study of heredity and eugenics, sociology and criminology, prehistory and archaeology. Its official organ forms part of the periodical "Mensch en Maatschappij". The "Bureau", by the side of scientific lectures and courses in various places in the Netherlands, also organizes excursions, sometimes abroad, while it lends financial assistance to anthropological research and study tours and in 1931 proceeded to arrange an exhibition. A culminating-point in the existence of the "Bureau" was the reception of the third congress of the Institut International d'Anthropologie at Amsterdam in 1927. On this occasion Dr. VAN HERWERDEN proposed that an international committee should be appointed for the serological, anthropological and genetic study of the blood groups. She had the intention to communicate to this committee the desirability, expressed by Dr. ALDERSHOFF, to consent to the proposition of the hygienic committee of the League of Nations to adopt the terminology of VON DUNGERN—HIRSZFELD. The ethnological section, at the instigation of VAN LOON, suggested the formation of an international committee to make preparations for a systematic comparative study of racial psychology. VAN DEN BROEK (4) once more put forth the desirability of including the anthropological investigation of the Dutch population in an international research with uniform methods.

Finally this congress passed a vote carrying 33 signatures and intending to press the necessity of instruction in anthropology in the countries where this had not yet been arranged, for the sake of general culture and social

¹⁾ "to become acquainted with the condition of the population of the Netherlands and to try to make this knowledge of service to the interests of our people."

²⁾ "The greatest possible promotion of the study and instruction of the anthropological sciences".



Meeting on October 29th, 1932, on the occasion of the first decennium of the
Nederlandsch Nationaal Bureau voor Anthropology.

- | | |
|--------------------------------------|--|
| 1. Dr. M. A. VAN HERWERDEN. | 7. Dr. TH. G. VAN VOGELPOEL. |
| 2. Dr. D. DE LANGE. | 8. Dr. A. J. VAN BORK-FELTKAMP. |
| 3. Prof. Dr. K. H. BOUMAN. | 9. Dr. A. C. HAGEDOORN-
VORSTHEUVEL LA BRAND. |
| 4. Prof. Dr. A. J. P. VAN DEN BROEK. | 10. Dr. H. J. T. BIJLMER. |
| 5. Prof. Dr. J. P. KLEIWEG DE ZWAAN. | 11. Dr. H. POSTMA. |
| 6. Dr. P. V. VAN STEIN CALLENFELS. | |



The third Congress of the Institut International d'Anthropologie at Amsterdam in 1927. 1. LOUIS MARIN, 2. Prof. WENT, 3. COUNT BÉGOUEN, 4. Dr. BRUGMANS, 5. Prof. PAPILLAULT, 6. Prof. CAPITAN, 7. Prof. KLEIWEG DE ZWAAN.

and moral understanding as well as peace and medical and pedagogical results. The vote further intended to attain equality in those countries where the teaching of anthropology is passed over in favour of other subjects. In consequence of this vote Prof. KLEIWEG DE ZWAAN, in his capacity as president of the Nederlandsch Nationaal Bureau voor Anthropologie, sent an address to the then minister for Education, at the same time mentioning that the Bureau voor Anthropologie in the East Indies had pointed out the necessity of anthropological training for physicians working there.

So far at the Dutch State Universities the medical students are taught some anthropology by the professors of anatomy but only in the University of Amsterdam there is a professor for this science, while in the same University there is also a private teacher for anthropology and the study of heredity in man. On the latter subject a private teacher also lectures in the University of Utrecht. The Nederlandsche Eugenetische Federatie aims at the foundation at one of the Dutch Universities of a special chair for the study of heredity in man.

This Eugenetische Federatie deals with a subject which in this survey cannot be discussed; however, it has to be mentioned once more because, particularly owing to the trouble taken by this federation, in 1933 was founded the Nederlandsch Instituut voor Erfelijkheidsonderzoek bij den Mensch en voor Rassenbiologie. This institute is divided into three sections, viz.: one for biogenealogy under the guidance of Prof. VAN BEMMELEN, one for medical statistics under the guidance of Dr. SANDERS and one for racial biology under the leadership of Dr. BIJLMER. The first of these sections, which is housed in the State Record Office at the Hague, has made the greatest progress. Mainly in connection with the heredity of features (2, 6), curly hair (1)¹⁾, handwriting and psychical tendencies (4)²⁾, VAN BEMMELEN studied a number of genealogies and arranged an elaborate archive of portraits. Several times he succeeded in tracing a common ancestor for persons with similar features. Repeatedly he points in the genealogies to the well-known phenomenon of "Ahnenerverlust".

Those who are interested in family research and want to contribute to it may make their notes in the book of persons designed by KOOIMAN and FRETS, composed with the aid of the Central Committee of the cooperating societies for the study of heredity in man. This Committee must be regarded as a predecessor of the Nederlandsche Eugenetische Federatie. Here were represented the Nederlandsch Nationaal Bureau voor Anthropologie, the Nederlandsche Genetische Vereeniging, the Vereeniging ter Bevordering van het Geneeskundig onderzoek voor het Huwelijk and the Erfelijkheidscommissie.

As societies which are of importance to anthropology should be mentioned also the Nederlandsch comité voor de wetenschappelijke studie van

1) p. 110.

2) p. 118.



Allegorical representation of the Central Committee of the cooperating societies for the study of heredity in man, comprising the Nederlandsche Genetische Vereeniging, the Vereeniging ter Bevordering van het Geneeskundig onderzoek voor het Huwelijk, the Nederlandsch Nationaal Bureau voor Anthropologie, the Erfelijkheidcommissie of the society "Het Nederlandsche Volk", and afterwards the Nederlandsch Nationaal Comité ter bestudeering van Bevolkingsvraagstukken.

het Bevolkingsvraagstuk and the above-mentioned Nederlandsche Genetische Vereeniging, in particular its section "De Mensch".

In 1936 was founded the Stichting voor het Bevolkingsonderzoek in de drooggelegde Zuiderzeepolders ¹⁾. This society, which has begun its observations in the Wieringermeer, naturally attaches considerable importance to anthropology and hereditary research.

It is a well-known fact that on examination of Dutch recruits the body length is measured; determination of the body weight and the circumference of the chest is likewise compulsory. Dr. BIJLMER is going to analyse these data.

In some schools in the Netherlands the weight and body length of the pupils is regularly registered. At Amsterdam, for example, this is done in the school of the Nieuwe Schoolvereeniging.

¹⁾ Nederl. Tijdschr. v. Geneesk. 15 Aug. 1936.

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