THE PASSING OF THE FRISIANS

ANTHROPOGRAPHY OF TERPIA

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BY

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To
Prof. Dr. EUGÈNE DUBOIS
and
Prof. Dr. S. R. STEINMETZ

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INTRODUCTION

The science of Anthropology has now arrived at a turning-point in its history. It is no longer a science of mere statistics and systematized data, but has become what it always professed to be, a branch of general biology. Therefore the present moment is especially fitted for looking back upon past achievement.

Whoever casts a glance at the work of anthropological research in Holland, will probably feel some disappointment at the meagre results obtained, as compared with the immense amount of labour spent on the subject. Yet it is encouraging to remember that all pioneer-work requires great and prolonged exertion in preparing the ground, whereas perhaps only later generations will harvest the grain.

What can be the reason that anthropological research in Holland is still so backward? Let us try to indicate some of the causes, and at the same time attempt to find means to insure greater success in future. Perhaps we shall be able to obtain good results with the old material.

In 1911 a lively discussion arose between the Dutch Anthropologists Professor J. H. F. Kohlbrugge, Dr. H. Ten Kate and Dr. J. Sasse, in which the Sociographer Prof. S. R. Steinmetz joined, on the subject of the constancy of the race type. It was taken for granted that the type must show itself in one invariable shape of the skull, and Prof. Kohlbrugge was severely blamed for his scepticism on this point, and accused of giving the young science a bad name by undermining one of its chief cornerstones.

In the following year a similar dispute arose among our Eastern neighbours, in consequence of the well-known investigation of Boas [1]). Evidently a general revolution in thought was taking

[1]) Changes in Bodily Form of Descendants of Immigrants 1910 & 1912.

place, which was not to be prevented by silencing one of the protagonists.

If a similar dispute should arise at the present time, it would bear quite another character, and the parties would no longer take up the same determined attitude for, or against variability, as Dr. Sasse and Prof. Kohlbrugge did then.

In fact, the revolution as to the significance of the skull-indices, which had been predicted by Johannsen in 1907, was soon to come into effect; and now we are in the thick of it. The problems arising from the environment theory are no longer important, and are giving way before new problems in connection with Mendel's heredity-modus. But these again, improbable as it may appear, will in their turn be set aside by other problems, as further laws of heredity [1]) become known, and finally lose their importance and disappear. Problems also have their times of ascension and decline.

Setting Problems

Progress in a science depends on the setting and solving of problems at an ever increasing rate. But, just as it was only very gradually that accurate observation, systematic combining, and objective reasoning obtained a foothold, after a period in which accuracy and logical argument were not taken so seriously, so a clear insight into the problems to be solved, was a fruit of comparatively late growth; which goes to show that our anthropological science is still in a youthful stage.

One of the Dutch Anthropologists who began his first publication, which threw a new light upon the Anthropology of Holland, by setting a problem,was Arend Folmer. His colleague August Sasse was also accustomed to illuminate his discussions from time to time by a sharply formulated problem; but these were some of the more general anthropological questions, towards the unravelling of which these writers have contributed but very slightly. One of the chief causes of the clearness of Prof. Bolk's Anthropographic Review of Holland (1908) was his way of deliberately giving prominence to certain leading problems.

Anthropology, being an exact science, should strive after accuracy as far as possible. In mathematics we begin with setting a problem, and after a clear statement of the various data, we pro-

[1]) M. W. Hauschildt Grundrisz der Anthropologie 1926 p. 20.

ceed to formulate accurately what we desire to prove. But in Anthropology this method is seldom put into practice, and consequently one may have come to the middle of a work on the subject, without a clear conception of what particular problem the writer wishes to clear up by his arguments.

It would not only improve the reasoning, but also the system of inquiry, if in the beginning a clear outline were given of the various problems to be discussed.

A seemingly obvious problem, which was given a prominent place by Rudolph Martin, and which should properly be answered by a philosopher, is: What is Anthropology? In Holland this question has been answered by S. J. Brugmans (1763—1819), Joh. Mulder (1769—1810) and Gerard Sandifort (1779—1848) in quite another way than by Gerard Bakker (1827) and the Brothers van der Hoeven. The Definition given by Martin: "Naturgeschichte der Hominiden" [1]), to which he adds the unnecessary qualification, that this includes its extension in time and space, at once gives rise to the counter question, what is meant by Natural History? For many scholars understand it to be merely descriptive, and in that case Anthropogenesis would be excluded. Moreover, Martin excluded the race-psyche, though he brought it in again by another way. F. Lenz (1914) defined Anthropology as the science of hereditary differences in man, and W. Scheidt (1925) agreed with him, without however stating whether he included the psyche or not. Afterwards it appeared that he did. And we consider this the only acceptable standpoint; for soma and psyche cannot be separated, and both are indispensable for determining the race type [2]).

We therefore offer the following definition:

"Anthropology is the systematic, ordered continuity of problems, presumptions and true [3]) judgments, connected and bound up with the physical and psychical qualities of man as a hominide,

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[1]) Eugen Fischer took over this part in Anthropologie, Kultur der Gegenwart 1922 p. 1.

[2]) With Jens Paulsen (1927) and others we consider the definition of Anthropology as the science of descent and races, too limited. The fact alone that there is naerly as much reason to investigate the type as the race, constitutes already a serious objection.

[3]) In a Positivistic sense: „Truth exists only in the sphere of Experiment and Observation, apart from the appreciation of values." Prof. Kohnstamm Schepper en Schepping 1926 p. 92.

and his characteristic agreements with, and differences from the animal forms akin to him".

The idea expressed by "hominides" embraces the chief types, just as the reference to kinship includes anthropogenesis.

It is not at all our purpose merely to add a new definition to the great number already existing, but by this definition, in which we have mainly followed the philosophers E. Becher (1921) and W. Wundt (1907), we desire to emphasize the fact that in anthropological science *the problem not only constitutes an essential factor, but even takes a leading place* and may certainly not be neglected, as has been done so generally hitherto by Dutch Anthropologists.

System From the preceding definition it also appears that system is of great importance for our branch of science. With every new inquiry we ought carefully to consider what system to apply. Yet several of our investigations *seem to have been undertaken in the expectation that the correct system would develop of itself.*

As in the early days of all sciences, our anthropologists have been simply guided by common sense. But to render our work as fruitful as possible it is necessary to proceed by method in any direction. The value of many a protracted inquiry performed in Holland, has been less than might have been expected, on account of an *insufficient knowledge of method, and also of statistics.*

Nothwithstanding the *paralyzing influence of the arithmetical average* has been frequently pointed out, yet it has been almost exclusively employed up to quite recent times. Seldom was correlation sought after, or the calculation of probabilities applied. The use of curves has been resorted to comparatively seldom, probably on economical grounds. And yet a Dutchman (v. Musschenbroek) was one of the first who used curves. Sometimes there was a pretence of accuracy, which did not really exist, in calculations carried out to several decimals. Clever statistical artifices have now and again been performed, of which G. W. Bruinsma (1906) gave an example from the Belgian Army statistics, in which it was demonstrated that young men of 19 were taller than those of 20 years of age. If the factor influencing the statistics had been carefully examined beforehand, many erroneous conclusions would have been avoided [1]).

[1]) A plea for increased knowledge of the statistical method was recently published by Dr. E. W Walch, virogously supported by Dr. G. W. Kiewiet de Jonge, in Genees-

In many cases also *racial connection was presumed on insufficient grounds*. For instance, it would be very easy to conclude from Prof. Josselin de Jonge's Cancer-tables (1926), which show a maximum number of cases in Friesland, closely followed by Groningen, whilst cancer occurs least in Limburg, that the prevalence in the former provinces is due to the great number of Nordici, and the relative immunity to the "vital superiority" of the Alpines in the latter. This conclusion might even be supported by pointing to England and other Nordic countries, were cancer is very prevalent (Pittard 1926). But in doing so we should overlook the fact that *synchronism is not causation*. Not to mention the various factors that influence statistics, such as mistaken diagnosis and incorrect data. Mistakes of this nature have repeatedly occurred with us.

New processes, such as the method of determining differences of race by blood reaction, make but slow headway with our investigators, as compared with the workers in our Indies [1]), who are in advance of the mother country in the sphere of Anthropology.

The interest for new branches of science is not very great in our conservative country. Dutch science is still in the classic period, as if the history of human culture were scarcely older than five or ten millennia. The 500 millennia, that have preceded the period of recorded history lie almost entirely outside her range of vision. The progress of prehistoric study in France and elsewhere, goes on almost unnoticed here, and the work of Palae-anthropology lies neglected. In our universities Anthropology and Prehistory are still quite unjustly regarded as minor studies. We have institutions for investigating the soil and the rivers, canals and ditches by which it is traversed. Every sand-hill has been most carefully measured, and the atmosphere above, and the stony strata beneath, diligently studied. But no interest is taken in the study of man himself, who conquers the air with intrepidity, and drives the mineshaft deep into the bowels of the earth. Only when laid on a bed of sickness, is he considered worthy of special attention.

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kundig Tijdschrift voor Nederlandsch Indië, 1927, Part I: The Importance of the statistical method for Medical Science, and more especially of Hygiene.

[1]) W. J. Baise & A. W. Verhoef, Anthropological blood-investigation of different races in Neth. India. Gen. Tijdschr. v. Ned. Indië, 1927, p. 7—11.

The Dutch Government is still blind to the great value of the population, the richest treasure of the realm. Far away in the Colonies, wild tribes are investigated, but no attempt has yet been made to study the people of the mother country. Consequently, anthropological studies are still left to the amateur, with all the drawbacks attendant on dilettantism.

As regards the general neglect of method, we note with pleasure that Joh. Sasse (1862—1916) proved a favourable exception and made praise-worthy efforts to find new systems. He promoted the use of Eykman's system, which was still little known abroad. In spite of general backwardness, we are rejoiced to be able to point to much progress and activity of late years, especially in the field of the laws of heredity. The enquiries of G. P. Frets on the head-form seem to be full of promise.

Induction

What is the most reliable method of anthropological inquiry, from a psychological point of view?

On the one hand numerous data are collected, analyzed, and compared, about the individual. On the other, a similar process is applied to observations about groups of people. And through analysis and comparison of these data and observations, we come by induction to a series of general rules as to the bodily and psychic habitus [1]) of individuals and groups. Then, starting from these common properties, we try to find a causal connection and rational sequence, in order to build up a general theory of the soma and psyche of the hominides.

All this shows that Anthropology is an empirical science, dependent in every way upon induction; and every investigator should endeavour as far as possible to proceed from the particular to the universal. He must not forget that our science is still in an early stage, in which the universal is still too insecurely founded to serve as a reliable basis. Or, to put it differently, that *it is dangerous to make use of the results obtained by others, without submitting them to criticism, or further investigation.*

Especial reserve should be used in adopting conclusions from parallel sciences. These are based on no firmer foundations than

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[1]) Martin speaks of the collective expression of the so-called Völkerseele. This Soul of the Race may be compared with the notion held by the American „Behaviorists" as Hartley, Watson, Holmes, and others, and against which W. Mc Dougall protests in „Men or Robots?" 1926.

those of Anthropology, though they may be offered with greater confidence.

The amateurish character of numerous anthropological treatises is partly a result of these borrowed theories, whose reliability could not be tested by those who made use of them. Many an error might be prevented by remembering Fustel de Coulange's words: "Il y a des assertions qui ont commencé par être des hypothèses et qui, a force d'être redites, sont devenues des axiomes" (Holwerda).

Taine said of Stuart Mill that he had chopped off his wings to strengthen his legs. Many Dutch Anthropologists, however, preferred to retain their wings as long as their legs were so weak. We should always consider that every theory must be built up upon a basis of positive knowledge, and that every science is continually striving after greater objectivity. [1]) Since August Comte, all science has been greatly advanced by accurate observations, and especially by the application of correct systems. Anthropological investigations in Holland can only be placed on a sounder basis by such means. Induction means not only observation, but above all, the reduction of the results of observation to general rules. One of the chief causes of the decline of "the dry science of Anthropology"[2]) as Prof. Donders called it, but which has the great advantage over Anthropometry intra vitam of greater accuracy, lies undoubtedly in the fact that so many Anthropologists have confined themselves to observing and comparing, *but relegated the actual process of induction to the future.* Just as Thibethan scholars hoped to obtain merit by covering thousands of leaves with the words: "Om mane padme hum", in order merely to whirl them round in a praying mill, so some of the older Anthropologists thought they were doing scientific work by writing down thousands of measurements and indices, and leaving the rest to chance. In this way libraries have been crammed with figures, which can only be of value when they are properly consulted, but this is very rarely the case.

Therefore it is advisable to confine oneself to such figures as one can work out personally by induction. In 1893 A. Sasse protested

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[1]) Baillaud, Bertrand, Blaringhem, Borel, Lanson, March, Meillet, Perrin, Salomon Reinach, Zeiler, De la methode dans les Sciences 1924 p. 20.

[2]) Anthropology post mortem.

against the plan of von Töröck, to take thousands of measurements of the skull. He stipulated that the scientific value of each figure should first be demonstrated. We should prefer to go a step farther, as Prof. Bolk generally did, and only include in the demonstration such data as are strictly necessary. Then, if the remaining data are collected in an appendix, there would be sufficient material for later investigations and for control.

Publicity

To the demand for induction, another one must be added, viz, for complete publicity. In compiling our historical survey we have found this requirement not always complied with.

Anthropological investigation requires long schooling. Röse (1905) who tested his own work from time to time in performing his mass-investigations, was not always satisfied with his results; and R. Martin experienced the same thing. Röse also found that workers who offered him spontaneous assistance, did not always deserve entire confidence, though animated with the best intentions. The fact is, that the real difficulties of the technical work are only apparent to the practised and serious observer. Only the expert perceives with what care the material has to be worked out, in order to advance from the particular to the universal. In this connection, we need only relevate how the lack of technical knowledge made the first inquiries of C. J. De Man (1818—1909) so unreliable, and how the great pains taken by his medical collaborators in Zeeland, mostly bore no fruitful result, in consequence of insufficient technical knowledge. Do not such cases present sufficient ground for demanding publicity?

In a science which requires the production of a great number of calculations and other data, it makes a considerable difference whether these can be readily controlled without laborious roundabout methods [1]), or have simply to be accepted as they stand, because the investigator has in a great measure blocked the way to further inquiry.

We may not suppose that any investigator, for reasons contrary to the interest of science, by omitting the necessary data and calculable measurements, would render control of the reliability of his conclusions unavailable. We think these remarks are

[1]) As a gratifying instance of an inquiry that presented facilities for controlling the working out of material, we may mention the investigations of Prof Dr. J. P. Kleiweg de Zwaan on Central Sumatra and the Island of Nias.

equally applicable to workers abroad, and need not be confined to the science of Anthropology only. In other countries also there has been too much neglect in clearly stating the sources of material and data. The revelations made by Martin[1]) in connection with the inquiries of Vaughan Stevens, are probably not without numerous analogies in other branches of science (Steinmetz), though they may not always come to light.

For carrying on the inquiry, it is of the highest importance to be able to test the value of the material we use. Without the necessary facilities for doing so, we should reserve our judgment in connection with every inquiry. In no case should one be *guided by the greater or less authority* of the investigator. The example of so eminent a scholar as Rudolf Virchow, who committed repeated blunders in connection with the Anthropography of Holland, speaks for itself. But to his honour it must be added that Virchow generally laid his cards open.

Whenever there is no means of controlling his data and calculations, the confidence we place in their correctness is really a kind of belief on authority. This reminds us of Prof. Bolk's words in his discussion with Prof. E. Dubois about Virchow (1908): "I am a Dutchman, and possess the good characteristics of scientific Holland, that we know no belief on authority". And as we Dutchmen keep science at such a high level, *we* also *favour the greatest possible publicity in our work.*

Anthropography

According as Anthropology considers man either by the standard of his relationship to the hominides, or with the object of determining the somatic and psychic characteristics of the individual by analysis and induction — not for his own sake, but in order to form morphological groups — we speak of *a.* "General Anthropology" and *b* "Special Anthropology".

But if the results of general and special anthropology are applied to persons forming a particular group, for the special purpose of statistical description and characterization, we practise c. "Anthropography".[2])

[1]) R. Martin Die Inlandstämme der Malayischen Halbinsel 1905 p. 163—174.

[2]) Anthropology is in some senses a topsyturvy science. If we speak of "index cephalicus" we often mean the index of the skull and not of the head. If we speak of "length-breadth-index" our real meaning is: "breadth: length-index';; if we say "jugo-frontal index", we mean in fact "fronto : jugal-index", etc.

The name "anthropologist" is often incorrectly used also.

The scientists who in the XVII century and later studied the ergologic side of differ-

Rudolf Martin described Anthropography as "the description of the separate races of man". But this is not quite satisfactory. If we are concerned with an anthropological investigation of the Dutch, the Slavs, the Jews, or the Kelts, i.e. a conglomerate of races, with a description of their physical and psychic habitus, we most correctly use the term "Anthropography".

Eugen Fisher (1923) defined Anthropography as the synthetic treatment, and the descriptive presentment of the separate anthropological groups (species, races, varieties) of extinct and living man. So he conceived of it as a special doctrine of the different races, promulgated in a series of zoological monographs, especially written for the purpose.

Yet even this definition fails to include the anthropological description of definite groups that are connected by all kinds of bonds, such as culture, language, history, or a common dwelling-place or form of government. It won't do to place this description outside true science by calling it "applied anthropology", for it is just these monographs which will prove of the greatest value for our studies. Lest any one should mistake the word "Anthropography" as used in our sense for that of Rudolph Martin, we might perhaps use the term "Homography". But there is at present but little fear of confusion in the application of the term Anthropography [1]).

The following pages are mainly devoted to "Anthropography".

The three stages of every anthropological inquiry, following on the setting of the problem, may be roughly outlined as follows: 1. *Collecting material*, 2. *Analysis and inductive working-out of the material*, 3. *Methodical formulation of the results obtained, the conclusions drawn, and the problems immediately arising therefrom.* These three stages of operation we shall call: 1. "Material", 2. "Working", 3. "Interpretation".

Let us now attempt to show, by a citation from the literature of

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ent ethnic problems, bore the name of "ethnographer". However, their work was chiefly of a more descriptive nature. After these ethnographers had been collecting much material during several centuries, came the "ethnologists" to discover the general laws of primitive society.

But the scientists studying our topsyturvy branch of biology, who made a somatologic description of people in different parts the world, though they were really "*anthropographers*" have been called "ethnologists", and later bore the name of "anthropologists", which gives them something more than their due.

[1]) We do not think this would lead to confusion with „anthropo-geography" (Ratzel) which only inquires into the influence of geographical environment on man as a social being.

the Anthropography of Holland, what we consider to be the chief obstacles to the evolution of our science, viz. the lack of clearly outlined problems, an inductive method of inquiry, systematic

Situation of the Terp country

working, accuracy of observation, and objectivity in drawing conclusions. For this purpose we have chosen the Anthropography of the Terp-region of Friesland and Groningen. Any other material would have served as well, but this region has been fairly well studied, also by scholars abroad. The population of the Terp-

region, moreover, forms a separate anthropological group, and we may therefore give an incentive towards the division of Holland into anthropographic districts, which is still so greatly needed. Perhaps our efforts will enable us to contribute something toward the solution of *the problem of the supplanting of the Homo Nordicus*, a subject so full of interest at the present time. Possibly we may also arouse general attention to the lack of interest shown by Dutch Science in this problem, notwithstanding our science takes so honorable a place among her sisters, and has built up such noble monuments in various fields of inquiry. H. Dingler (1926) in his book "Der Zusammenbruch der Wissenschaft", points to the decline of Greek philosophy as the reason why mankind turns away from science and takes refuge in the world of sentiment. But, may we not ask, is it any wonder that people lose confidence in science, since it falls short in so important a matter as the decline of one of the leading races?

The three Stages of Operation in history

Before discussing our subject proper, it is advisable to review in rough outline the history of Anthrography in the Netherlands, and note in what degree the three stages of operation have been observed.

Period of the Pioneers

We count those among the pioneers who, although their object was not anthropological Research, yet have obtained results of real value for this science.

On his travels through Europe Andreas Vesalius (1514—1564), physician to Charles V, was oppressed by the problem: "How do the various peoples of Europe differ from each other with regard to bodily form?"

A remark of Hippocrates [1]) about the macrocephaliae near the Sea of Azof, to the effect that their headform was originally due to artificial means, and afterwards became hereditary, had given rise to this question in his mind and led him to find a solution. Whereas Vesalius had observed a flattened occiput with broad heads among the Germans, he saw round polls among the Genoese, Greeks and Turks. The material on which he based his conclusions cannot have been very extensive. Before his travels to Palestine, he certainly cannot have seen many Turkish skulls. And as to his assertion

[1]) De aere, locis et aquis.

about the headform of the Germans, there is no reason to suppose that he really went so far as to make systematic observations, as he did in the field of anatomy, where he did pioneerwork indeed. Had he really done so, he could not but have remarked that there are also long and round heads among the Germans.

Moreover, Vesalius had heard sometimes that Turkish and some other children wore bandages round their heads, and he knew that in Germany the infants were frequently tied down in their cradles. This caused him to conclude that "among the Genoese, Greeks and Turks the bullet form of the head is brought about by bandaging, and the flattened occiput and broad head of the Germans is due to the fact that the infants always lie on their backs in the cradle, and also that their hands are tied to the cradle".

So we may conclude that his material was insufficient, his working left much to be desired, and his interpretation was mainly incorrect. But both Vesalius and his comtemporaries were perfectly satisfied with this one-sided solution.: "In consequence of the different treatment of the infants, there is a difference in the headform between the various peoples of Europe."

Just as we were ourselves, until recently,contented with attributing the phenomenon to a difference of race, which is, in fact, one-sided likewise.

The skull-material, on which Petrus Camper (1722—1789) first founded his conclusion of a difference of race, was very restricted, and Schaaffhausen (1880),like Blumenbach, asserted that his "Calmuck" turned out to be a negro. Nor was the pelvis-material very numerous that Camper had collected on the example of the English obstetrician Smellie. It contained, however, the pelvis of a negress, who had been dissected with her child by Camper. Its measurements in Rhineland inches differed considerably from the pelvis of a European (1758), but agreed more with that of a Buginese woman. Although he had observed that the dimensions of European pelves varied a good deal, yet Camper decided that nature had granted tropical women an advantage which our women can only obtain by a defect, viz. strain. So it appears that Camper did not expect very much from his material, and his treatment, however praise-worthy in his own day, was not very accurate, whilst his interpretation showed but little objectivity.

The Period of the Collectors

The period of J. v. d. Hoeven (1802—1868) shows considerable progress. Since Brugmans (1763—1819) especially, a good deal more attention has been paid to the collecting of material. From all parts of the world skulls have been transmitted to the various Museums of Europe, though rather as curiosities than as objects of study. Yet Van Der Hoeven did not extend his inquiries very far, for he considered the negro race „sufficiently known" (1836), since Soemmering had dissected three bodies of negroes, Albinus (1697—1770) had made a study of the skin of a negro, and Blumenbach had produced carvings of negro-skulls. By making use of hypotheses taken from other branches of science, he came to the conclusion that Hottentots and Kaffers were not to be classed as negroes. But a single Kaffer skull caused him to revise his opinion to some extent. Relying among other things on linguistic analogies, he decided, after studying the skulls of a Magyar and an Esthonian, that the Magyars and Finns were related. But an Unaljaska skull formed sufficient grounds for him to deny the relationship between the inhabitants of the Aleutes and the Eskimoes. Yet, for those times, such a small number of skulls was nothing unusual. Did not Retzius determine the racial characteristics of the Slavs from four skulls?

Evidently the working out of the material was unsatisfactory, for on investigating 20 European, 10 Negro, and 10 Mongol skulls, the difference between the averages of "Kaukasians" and Mongols proved to be slight. Consequently, Van der Hoeven was obliged, chiefly by studying the habitus of the crania, to show that a difference of race could indeed be observed in the skull (1838). This must be regarded as an important result for those days. This proof of the paralysing effect of the averages seems to have taught Van der Hoeven but little, neither did he discover from his operations that the "Mongols" are as much a conglomeration of races as the "Europeans".

The Period of Working

In the latter half of last century the demands on the material were far from rigorous. The number of skulls has considerably increased however, though but little notice was taken of the other parts of the skeleton. August Sasse (1832—1893) possessed a considerable quantity of material, but did not use it very exhaustively. Once he received 25 skulls from the little garrison-

town of Geertruidenberg in Noord-Brabant. Three of them have been unaccountably lost. With respect to the remainder Sasse informs us in his French treatise (1875) that they were obtained from "la cimetière de cette ville. "Remarkably enough, he omitted this fact in his report of 1874 written for the Dutch Medical Society. Afterwards Prof. Bolk wrote on skulls which had been dug up out of the ramparts of the town, rendering it highly probable that they were allochthonic [1]). This seems to be confirmed by the extremely mixed character of these crania, the index cranicus varying between 68,3 and 87,1, with a great difference of type.

Whilst Vesalius already took much pains to acquaint himself with the exact history of his material, Dr. Sasse paid little attention to the matter. How little the inquirers of that time troubled themselves about the pureness of their material, appears from the many descriptions of convent crania. So A. Sasse describes some crania from the Ursuliter and Cellebroer convent in Amsterdam (1871). J. Zeeman gave a description of skulls from the churchyard of St. Joris (St. George) at Amsterdam, De Man, from Fort Rammekens near Flushing, and Folmer from the walls of the Walloon Church at Amsterdam; whilst Joh. Sasse acknowledged that his skulls from Terschelling might be derived from shipwrecked mariners.

As we have called the period of Vesalius, Albinus, and Camper "the Period of the Pioneers", and the first half of last century (till 1864) "the Period of Collectors", because under the influence of the spirit of Linnaeus' *Systema Naturae* craniological material was zealously collected and arranged, so we may call the latter half of the XIX century "the Period of Working", as special attention was paid to this matter during that time. But then the beginning of the XX century deserves to be designated as "the Period of Interpretation".

The Period of Interpretation

This period was strongly dominated by the American geographer William Ripley, who, in a series of lectures on physical geography and anthropology (in the American sense of the term) at Columbia University, attempted to give a survey of the influence of the physical environment on primitive society. After the

[1]) Even if they were derived from the churchyard, that would be no proof of their being autochthonic.

example of John Beddoe in his "Anthropological History of Europe", he finally produced a fascinating Anthropography of this continent. He took for his motto the words of Taine: "Human History may be resolved into three factors — Environment, Race, and Epoch." He frequently applied a method, which is also much used in geology, and had been divulged by Wilhelm von Humboldt a century earlier, of following up the lines of the dispersal of Keltic and Basque tribes by means of a few topographical names[1]). In the same way some of our investigators attempted to take on wings in this American period, and to determine the Anthropography of whole districts from the breadth: length index of a few skulls and little more other data. If possible, one liked to have at one's command an impressive quantity of material, without caring much about its reliability, or taking much pains to work it out, as in the preceding period. Analogiciss were drawn from all the related sciences. The evidence was not always carefully sifted, the selection was seldom very critically done, but every effort was made to attain the highest possible results from the interpretation.

It is only necessary to consult the passage entitled "The Netherlands" [2]), treated together with the Tyrol and Switzerland in the chapter on "the Alpine Race", to experience as great surprises as Ripley did himself during his lectures. Here the Netherlands are wrested from their West-European anthropological environment and classed in one group with the people of the Alps, simply on account of their comparatively small proportion of pure Alpines [3]). Ripley's opinion that a considerable proportion of the inhabitants of the West of Holland were Alpines [4]) was chiefly based on the skull-material of Dr. A. Sasse, the discoverer of the Dutch brachycrania. And also on crania of Dr. de Man, who was also highly interested in the short-heads, but neglected the mesocrania

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[1]) Prüfung der Untersuchungen über die Urbewohner Spaniens vermittels der Vaskischen Sprache, 1821.

[2]) Ripley p. 293—299.

[3]) „The Alpine Race: Switzerland, the Tyrol, and the Netherlands". How entirely Ripley lost sight sometimes of all objectivity, appears from his remark that „Virchow attempted in 1876 to prove craniologically that the Frisians were not Teutons at all, but were of a more primitive or Neanderthaloid derivation" p. 296. Virchow, who had studied the Neanderthal skull pathologically (1872) mooted the question (p. 356) whether this skull might not belong to the Frisian group. But Ripley reverses the matter and implies that Virchow asserted all Frisians to be Neanderthaloid.

[4]) Ripley finds „similar contrasts of population to exist in the Netherlands" as between the „Nordic and Alpine" portions of Belgium.

like the other Dutch anthropographers before and after. Sasse's material from Holland and Zeeland was the most extensive, but that from Friesland was quite insufficient, whilst from the Eastern provinces he had hardly any. On these wholly insufficient grounds Ripley determined an index of 81—88 for the inhabitants of the coastal provinces, and 79—80 for the rest of Holland, where he declared the population to be "almost entirely Teutonic". This comes certainly as a great surprise, for according to his classification of the Netherlanders, one would have expected to find Disentis or Sion skulls there.

Although Ripley's classification of Holland among the countries of Europe is entirely contrary to the statements in his anthropography, it has doubtless made a great impression on many readers, and it is the more remarkable that this grouping of the Dutch with the people of the Alp-countries has not been contradicted.

Dr. J. Sasse supplied the Anthropologist from Lyons, L. Mayet (1902) with details for his anthropographic survey of Holland. In that year he made a journalistic-anthropographical trip to this country, the results of which he afterwards published [1]). But Mayet also failed, like Ripley, in his cartographic survey. And so did Beddoe in 1893, excellent as his work otherwise was. Since then, however, thanks to the vigorous initiative of Prof. Bolk, much new material has been collected for the better knowledge of Holland, and consequently we now view this country from a different angle to that of the beginning of the Ripley period. In 1908 Prof. Bolk published the first survey of the Anthropography of Holland in a suggestive form, bringing the subject for the first time to the notice of a wide circle of intellectuals.

As an instance of Ripley's strong influence upon him, we find that after working his own material, which indeed strongly contradicted Ripley's classification, Prof. Bolk came to a similar interpretation.

In its early days every science is characterized by lack of sharply outlined theories, and much confusion of thought. To a certain extent this is the result of faulty and imperfect terminology. [2])

[1]) L'Anthropologie Criminelle en Hollande et Belgique 1902.

[2]) „Il arrive souvent que la pensée essentielle de l'auteur n'est pas comprise à cause

How much confusion is likely to arise thereby between the measurements of the head and the skull, we see in Prof. Bolk's Anthropological Survey, where in certain cases there is no determining whether the skull-index or the head-index is meant [1]).

Prof. Bolk made it his task to prove that, as a general statement, the assertion that the Dutch people are of Germanic origin is untrue. Evidently this motive was partly didactic [2]). We must bear in mind that the term "Germanic" is a cultural-historico-philological concept and not an anthropological one, in spite of its being used as such by older writers. Of course it has been scientifically demonstrated since a long time (J. v. d. Hoeven and A. Sasse) that Alpines are met with among the Dutch, as also in the surrounding lands. Therefore it cannot have been Prof. Bolk's sole purpose to prove this fact, though perhaps he did wish to show that in agreement with Ripley's classification [3]) they form a considerable part of our people. To do so, it was necessary to show that an important number of the 4600 Dutchman measured were brachycephalic.

Prof. Bolk divided his material into 5 groups according to the head-index: Dolichocephalae (188), mesocephalae (1692), brachy-

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des termes employés en anthropologie, termes et expressions trop vagues et trop peu définies." K. Stolyhwo 1923.

For want of exact terms Dutch anthropologists for instance did not distinguish clearly between *autochtonic* (homophyle) material, derived from individuals belonging genetically to the group described, and *allochthonic* (allophyle) material derived from individuals that we must consider as genetically belonging to some other group. Virchow, Phys. Anthrop. der Deutschen p. 9, uses the term „allophyl".

[1]) In connection with the numerous difficulties arising from the use of "index cephalicus" by the side of which "index cephalometricus" (J. Sasse) could find no acceptance, for the breadth: length-index of the head, we have written "index cranicus", wherever possible, to indicate the skull index, whilst we used "index cephalicus" exclusively to mean the breath : length-index of the head. For the same reason we speak of "brachycranic" when we mean "short-skulled" and "dolichocephalic" to mean "long headed". Instead of the incorrect and tautological expression "this skull is mesocephalic" we prefer to speak of "this mesocranium", and to avoid saying "this head is longheaded" we speak of "this dolichocephalon".

[2]) Beddoe already observed that the conclusions about the headform were not always objective. So in France, Obédenare championed the roundheads, whilst Lapouge and De Candolle sang the praises of the long-heads, 1891, p. 118.

[3]) Like Ripley, Prof. Bolk paid no attention to the Mediterraneans in Holland, which Ch. Fraipont (1922) defined as the third race in Belgium. In contrast with Ripley, who attached racial value to the linguistic boundary-line (note p. 16), this author says: "Il n'y a pas chez nous une réelle frontière racique". And later he declares: "cette frontière linguistique, qui n'est point une frontière racique".

cephalae (2214), hyperbrachycephalae (483) and ultra-brachycephalae (23).

According to this division the number of persons with an index cephalicus below 80 was 1880, or 40,88 %; and the number with an index ceph. over 80 was 1720 or 59,14 %. Prof. Bolk's conclusion was as follows: "It may be said therefore in round figures that our population comprises 60 % of round-heads and 40 % of longheads" (p. 163).

This investigator also arrived at the same result in another way. The general average he found to be 80,32, "therefore a figure lying above the limit between long- and short-headedness." After demonstrating that the number of genuine longheads (ind. ceph. up to 74.9) was exceeded by the number of hyper- and ultrabrachycephalae, Prof. Bolk came to the conclusion that the figures showed convincingly "that the characteristic type of our people approaches nearer to the round- than to the longheaded type" (p. 164). This agreed with Ripley's division, and confirmed what Prof. Bolk desired to demonstrate by his discussion [1]).

It appears, however, that these results were based on a faulty treatment of the material. Prof. Bolk mixed up the head-index and the skull-index so often, that he ended by deceiving himself. In discussing the terpskulls (p. 151) he found the limit of short-headedness to be 80, and with Broca, Deniker and others he stated the relation between the head-index and the skull-index as follows: "In general we may say that the skull-index is equal to the head-index less two units (p. 160). "Consequently the limit between long- and short-heads would be 80 + 2 = 82.

Yet on page 162 Prof. Bolk writes: "More than once we have stated that the limit between long- and short-heads lies near index 80." In this way he made the mistake of placing the limits of the groups of skull-indices at the same figure as the limit for head-indices, although he had first adopted a difference between them of 2 units.

Now if, on Prof. Bolk's principle, we fix the limit at the correct figures, viz 77, 82, 87 and 92, we get, instead of the results given

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[1]) Is it a mere accident that the „motto" so often cited by Prof. Bolk, formed part of an assertion of Ripley's, in which his interest for the Netherlands people was an outcome of his interest for the Scandinavian brachycephalae?"

on pp. 162—63, the following groups: 582 dolicho- and 2381 mesocephals, and 1444 brachy-, 178 hyper- and 5 ultrabrachycephals.

This shows at a glance the great excess of dolichos and mesos, and the insignificance of the hyper- and ultrabrachycephalic element.

If again we take the dolichos and mesos together in one group of longheads, as Prof. Bolk does, we come to 1884 + 1692 + + 538 + 555 = 2973 longheads. The number of the shortheads is then 1627. According to these measurements the longheads constitute 64,63 % of the population of Holland, and the shortheads only 35.37 %, or in round figures according to Prof. Bolk's statistics, in 1908 the population consisted of 65 % longheads and 35 % shortheads.

E. Fischer (1923) adopts as the average index cephalicus of the Homo nordicus 76—79, and of the Homo alpinus 85—87, which agrees pretty well with the figures generally accepted among anthropologists. The limit between Nordici and Alpines of 79 + 85 = 82 would tally with Prof. Bolk's limit of 80 + 2 = 82, so that the result of 65 % long- and 35 % shortheads seems fairly reliable. Though this gives us no right to assert that the Nordici and the Alpines occur in our population in the ratio of 2 to 1, as we shall afterwards demonstrate.

If however we reckon the brachycephals from 81 upwards, as is generally done according to Rudolf Martin's standard [1]), we find among the individuals measured at the request of Prof. Bolk: 188 + 1692 + 538 = 2418 longheads, which leaves 2182 shortheads. According to Martin's division, there are therefore 56,65 % long- and 43,35 % shortheads. Consequently, in this case, also according to Prof. Bolk's measurements, the majority of the Dutch people prove to be long-heads.

From the above we can only infer that a good many of Prof. Blok's conclusions as to the skull-form of the Dutch, require revision. As this investigator has, moreover, sought a close connection between headform and pigmentation, we cannot but suppose that his opinions about the Anthropography of Holland have been seriously biassed by the mistake in the figuring.

Contrary to Prof. Bolk's intention, but according to his data, *the*

[1]) The craniologist Welcker arch. f. Anthr. Bd. XVI p. 127 considers "that the mesocephaly must justly be reckoned from 77 to 82 inclusive".

average breadth : length-index of the Hollanders (80. 32) *lies within the limit of the longheads,* whether we fix the limit at 82, with this investigator and E. Fischer, or at 81 with R. Martin.

Further the number of genuine longheads, those below the limit of 77, which is 582, proves to be not less than that of the hyper- and ultrabrachycephals, or above 87, as Prof. Bolk supposed. This number is only 183,and therefore the genuine dolichocephalic element is more than three times as strong as the genuine brachycephalic element. Also if we reduce the limit by one unit to 76 and 86, the dolichocephalic element is in the majority.

On other grounds also, Prof. Bolk's results, probably obtained from selected material, require revising, e.g. his measurements of 1908 of the Province of Limburg, "the most brachycephalic part of Holland". These figures were already placed too far in the Alpine direction, contradicting those of the Belgian Anthropographer Houzé (1882), who had found the Limburgers to be the most Nordic element in Belgium. The headform of the Alpine race is hyper- and ultra-brachycephalic, and these numbered only 3.9% of those measured. So Prof. Bolk's data of 1908 do not afford a very strong foundation for his opinion (1923) that, ,,according to his investigations performed at that time, the race inhabiting Central-Europe — Homo alpinus — constitutes about one third of the Dutch people" (p 716), though this pronouncement differs greatly from the preceding one. [1])

It is noteworthy that in his discussion of 1920, in which he worked more than twice as many measurements as in 1908, Prof. Bolk expresses no opinion on this matter, and his treatment of the figures is not of such a nature as to justify far-reaching conclusions.

As long as no proof of the contrary is forthcoming, we are entitled to presume that Holland forms no exception to the principally Nordic environment to which it belongs, together with Great Britain, Northern Belgium, North-western Germany and the Scandinavian countries [2]).

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[1]) That after Bolk's investigation other Anthropographers were also convinced of our round-headness, appears from Prof. Kohlbrugge's disconcerting treatise of 1911 in which he writes," We brachycephalics do not bite and chew any longer" (p 769). This sentence caused no contradiction.

[2]) The figures given by Prof. Bolk (1920) are to some extent difficult to bring into accord with those of the environment, because, if the figures for the index cephalicus agree, those for the index cranicus are too high.

CHAPTER I

HISTORICAL AND GEOGRAPHICAL SURVEY

Geologic Formation

At the close of the latest Glacial Period the greater part of the North Sea region was still land, the water from the melting ice flowing off into what now forms the Straits of Dover.

About the commencement of the Holocene, or Alluvial Period, the North-Sea grew gradually broader; and, probably in consequence of a widening of the Straits, a shore-bank was thrown up, extending from the North of France to Denmark. On this bank the Dunes were gradually piled up by the action of the winds.

Between the Dunes and the Pleistocene (diluvium) there remained a shallow lagune, in which the Holocene (alluvium) has been formed, which still, for the most part, lies on the surface. The Dune region was much wider than at present, and probably lay farther West.

In this lagune were successively deposited on the Pleistocene strata, layers of sand, peat, and blue sea-clay. Afterwards the rivers filled it with fresh water, and the existing bog-peat was formed. According to various geologists such as Rutot, Blanchard, Schütte, Van Baren, Tesch and Wildvang, a considerable portion of the Holocene was habitable about the beginning of our era. It is certain that the Dune region was then inhabited, as is proved by the Settlements at Domburg, Ouddorp, Waalsdorp, Voorburg, Katwijk, Egmond and various other places.

Yet the sea was beginning to wash away parts of the peat-layer and to replace it by sea-clay of younger formation, probably in consequence of a positive change of the sea-level and the widening of the Straits of Dover. The inlets of the sea were narrow, however, so that at first only a small part of the plain was flooded, and the hunters and fishermen who had settled there lived in comparative

safety. The "Nobilissima Insula Batavorum", as Pliny calls it, suffered but little from floods, as has been shown by Holwerda in his investigations at a Batavian homestead near Dorestad. Van Giffen showed that this was also the case with different Terps of Groningen and Friesland.

Judging from the crockery, coins and other datalia [1]) found in the Holocene, the situation seems to have changed in the course of a couple of centuries (R. Schuiling 1912). After the death of Constantine the Great the plains of Flanders and Zeeland became inundated, and the Wadden Shallows and the Lake of Flevo were enlarged. In the fourth century the Betuwe contained hardly any dry land (Holwerda, v. Baren 1924). All this may have been brought about by secular changes in the level of the sea, but opinions differ greatly on the subject.

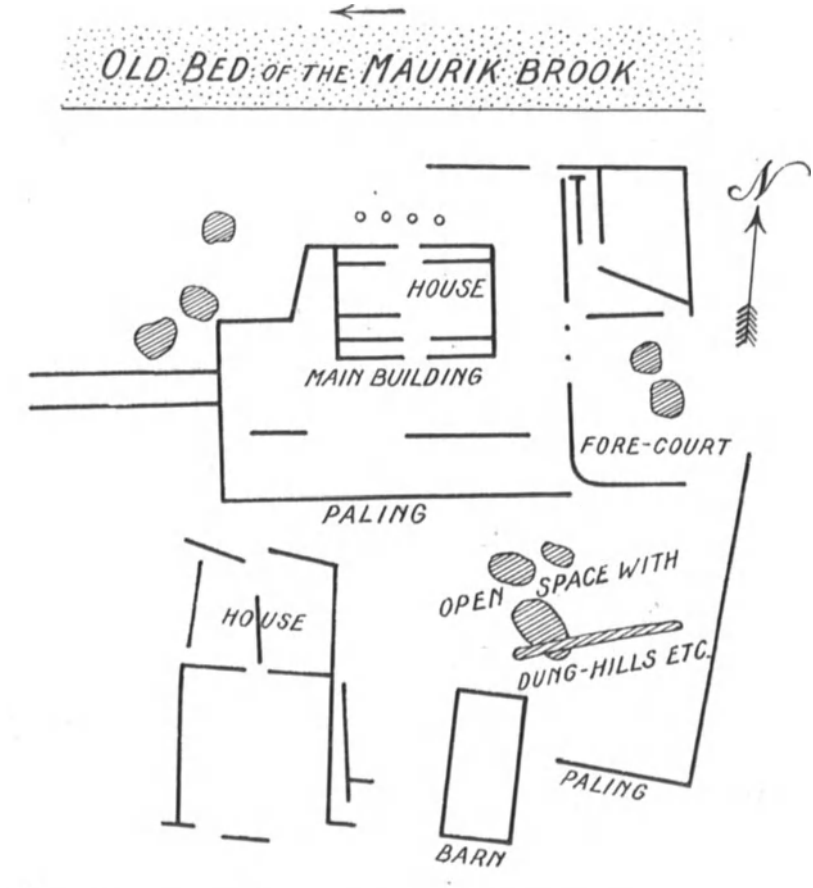
Investigation of the Mounds

The result was that the inhabitants were forced to seek safety on refuges, which are called "*Terps*" in Friesland, "*Wierden*" in Groningen, "W*oerden*" in the Betuwe, and "*Hillen*" in Zeeland, and which are to be found all over the Holocene, extending from Flanders to Jutland. We will use the general term "Terps" for these refuge-hills.

One of the first investigators to draw attention to the mounds of the Betuwe was the Rev. Heldring of Hemmen, who built the Vluchtheuvelkerk (Refuge-hill-church) at Zetten. Afterwards he was greatly assisted in his researches by his friend the Conservator in Leyden L. J. F. Jansen, a far better authority on the subject. As early as 1838 "Farmer Gerhard" related in the "Geldersche Volks Almanak" how he set out with the sexton to dig up the bones and other antique remains from the Woerden. On one occasion, when the sexton uncovered a large mass of bones, Heldring could not refrain from uttering the following lament, which was far from flattering for the peasants of the Betuwe: "Alas, they have disappeared, those men of a heroic race so highly esteemed by the Romans! In those days pure morals, brotherly troth, conjugal love and chastity all prevailed in these parts; and with what delightful touches have they not been described to us! But they exist no longer, those sturdy men. The later generation that now dwell here have grown quite different".

[1]) All means for the fixing of dates, such as articles of handicraft, or ergologica, and biological remains.

The entire clay-region between the Veluwe and the higher sandy ground of Noord-Brabant was dotted with Woerden. Heldring was of opinion that the Woerden on theBetuwe were chiefly used as grave-yards. Holwerda declares that it is not impossible, that the



PLAN OF THE BATAVIAN HOME-STEAD. NEAR MAURIK

Batavians buried cinerary urns in the vicinity of their dwellings, but, so far, no proof of this has been forthcoming. Heldring informs us that a great many urns have been found on the other side of the Rhine in the Guelders-Utrecht Hills, and he thought the dead were burned and buried there.

In order to give an idea of the civilization of these Netherlan-

ders, we give a reprint of the groundplan of a Batavian farmstead, the foundations of which were unearthed by Holwerda near the village of Maurik in the Betuwe in 1917. The results of this inquiry are entirely at variance with the notion, formerly entertained, about the inhabitants of Holland during the first centuries. They were represented as semi-savages, clothed in skins and living in osier houses of wickerwork resembling beehives [1]) and built on little hills amidst marshy forests subject to frequent inundations.

The foundations that have been brought to light, show on the contrary, buildings laid out on a grand scale, consisting of wooden frames, with walls made of plaited branches, plastered with clay. Holwerda found several pieces of dried clay bearing distinct impressions of the enclosed branches. It is very probable that stone was also used sometimes as building material.

The main building was 13 metres wide by 9 deep. A passage ran through the middle to a covered court or shed behind. Besides these, there were two more dwellings and a smaller building. These were not surrounded by defensive walls or even ditches, but unprotected against man or beast. There farmers dwelt during the latter decennia of the first century and the greater part of the second, as has been concluded from the remains of pottery found there. Their houses stood on the ground level, and scarcely on the higher parts. If they had been exposed to floods, such a construction would have been impossible. Consequently, at some later period, rather sudden changes must have occurred in the level.

As a groundplan so complete and distinct has been discovered nowhere else in the Netherlands, not even in the Terps, we gave a detailed description of it, since it throws an entirely new light on the state of civilization in these districts about the beginning of our era, and, perhaps, also on the kind of homesteads constructed in our two northern provinces, which gradually developed into Terps.

This points to the probability that the study of the Terps may cause a complete revision of the first chapters of our history.

The first investigator of the Terps was perhaps W e s t e n d o r p, who described many skeletons found in the terp of Oterdum (1820) when Heldring was investigating the Woerden of the Betuwe. Dr. R. A c k e r S t r a t i n g h of Groningen, and Dr. R.

[1]) Traces of foundations found in the Woerd at Ressen seem to point to circular buildings. (Van Giffen, Annual Report 1926).

Westhoff of Warfum declared that it was necessary to study the formation of the whole Holocene region, in order to grasp the full meaning of the Terps (Schuiling 1912).

For the next half century, however, the knowledge of the Terps remained stationary. In what way they were studied appears from a letter dated 16-1-1871, written by Jhr. J. E. H. Hooft van Iddekinge to Mre. Boeles Sr., in which he writes: "Pleyte und ich, wir beschäftigen uns mit unseren Studium über Hollands vorhistorischer Zeit und seine damaligen Bodensbeschaffenheit. Wir lesen Strabo und alle alten Schriftsteller und vergleichen alsdann mit Karten und mit dem was gefundenen Altertümer uns lehren, die Konjecturen all unserer Vorgänger und gelangen auf dieser Weise immermehr zur Überzeugung, dass man bisher elendiglich gepfutscht, gefaselt und phantasiert, aber nie scharf kritisch untersucht hat. Stratinghs Aloude Staat ist noch das beste" [1]).

It need scarcely be said that this kind of archaeological inquiry could not advance the knowledge of the Terps.

In 1871, at the Congress of Bologna, Maître Dirks had stated as his opinion: "Les Terpen sont des terramares historiques", after Westhoff had already drawn attention to the piles in the foundations. In 1881 Dr. Luigi Pigorini, Director of the Prehistorical Museum of Rome, paid a flying visit to the Terp at Aalsum. Although he did not himself observe a pile-construction [2]), he compared the Terps to terramares, discovered a water-basin in the centre, and fixed upon the second Iron Age as the period of their earliest construction.

Now everybody was convinced that the Terps had borne pile-dwellings.

"Only in this century", wrote Schuiling in 1912 [3]) "are we beginning to see that in the study of the refuge-hills the archaeologist must collaborate with the geologist and biologist: and that it is not enough for the archaeologist to arrange and label his pots and pans, but he should also carefully note whereabouts, and in what company, they were found in the terp. Nor is it enough for the geologist merely to build up theories upon the positions of layers of dung and other strata, but he must compare his results

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[1]) Mre P. C. J. A. Boeles De Friesche Terpen 1906 p. 47.
[2]) Bulletino di Paletnologia Italiana Ann. II p. 230—241.
[3]) Tijdschr. Aardr. Gen. IIde serie XXIX p. 601.

with those of the archaeologist and the zoologist. In fact, all should acquire a knowledge of geomorphology in its modern sense, in order to draw rapid and safe conclusions."

Such knowledge was scarcely to be expected of the lawyers and medical doctors, to whose efforts Holland had in a great measure left the investigation of the Terps during last century. Yet, in spite of all, such men as Dr. Acker Stratingh have achieved good results in the sphere of geology.

In 1912 the geographer P. R. Bos issued a circular containing 30 questions about the Terps, which deserves the attention of all interested in the investigation of them. This led to the article by the Elema's [1]), the best older study that has appeared on the construction of these refuges.

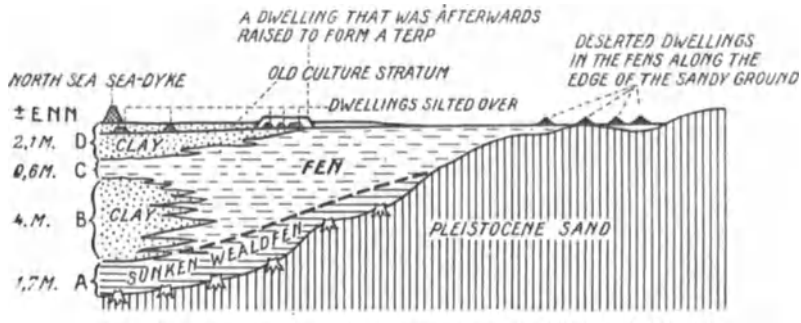
Of importance are the investigations of the biologist Dr. A. E. van Giffen, the collaborator in Friesland of Mre. P. C. J. A. Boeles, the Conservator of the Frisian Museum at Leeuwarden, who has done much for the archaeological study of the Frisian Terps, and caused the diggings to be properly controlled. The principal achievement of Van Giffen in this sphere, was that he tried to extend the inquiries over the whole region from Flanders to Jutland. In this way he worked together with German geologists like Schütte, Dodo Wildvang, Prof. J. Martin[2]), and in Zeeland with Hubregtse on the Island of Schouwen (1922). This enabled him to see Terps in course of construction and in actual use in Sleswick-Holstein and to learn many details that throw light on the construction and occupation of the Frisian Terps two thousand years ago. Whilst Prof. van Bemmelen was forced to leave many question unanswered, the archaeological finds of Mre Boeles, and especially the bio-archaeological investigations of Van Giffen, effected a change in the situation.

Construction of the Terps

The Terps were founded on the "kwelder" or more recent deposit of sea-clay, seldom on fen (Rinsumageest, Bornwerd). And not on the blue clay (4 to 5 M. below A. P. = sealevel) nor on the diluvial sand below it [3]). With the aid of the Glyceritum [4]) the

[1]) J. Oost Elema and J. Elema (father and son),
[2]) Beiträge zur Frage der säkularen Senkung der Nordseeküste.
Jahrb. f. Alterth. u Landes gesch. Bd. XVII 1908.
Zur Klärung der Senkungsfrage ibid Bd. XVII 1900.
[3]) Stratingh, Elema; Van Bemmelen p. 39; Van Giffen.
[4]) The flora of the Kwelders, of which Glyceria maritima is the most important.

ground round the Terp afterwards became silted up, so that the base or sole of the Terp now lies as deep as 3 metres below the grass level. The high proportion of carbonate of lime proves that the



SECTION OF THE EAST-FRISIAN ALLUVIUM EXTENDING FROM THE COAST TO THE EDGE OF THE PLEISTOCENE BETWEEN THE RIVER LEY AND THE NORTH-EAST COAST OF THE DOLLART (AFTER DODO WILDVANG)

Terp has been erected upon the original sea clay, and not on a soil raised above sea-level during a long period, for then the ground is lixiviated by rain water and wanting in lime, so that the dark-coloured clay is changed into red-brown "knik" (Van Bemmelen, Dodo Wildvang 1926).

Van Giffen pointed out what a great influence the care for drinking-water had on the building of the Terps. They are frequently erected in rows along fresh waters, as is especially noticeable in Friesland. The oldest Terps are probably situated West of the Middle Sea, and both in Friesland and Groningen in the interior. But the real centre of the Terpculture is Westergoo. The younger Terps are situated nearer the coast. A number of younger Terps have also been raised between the older ones. The Terps in the drained portion of the Middle-Sea are also of more recent date. Prof. Van Bemmelen has ventured to define 4 phases in the history of their origin. But these merge into one another so much that the value of his subdivision is slight. As, properly speaking, there was no building of the Terps during the first phase, nor in the last phase either, we may assume two periods of construction. In the first, they were slowly banked up with dung and other refuse, and in the second, the construction was carried on vigorously with clay.

To his first phase would belong the Terps described by Pliny[1]). Schütte adopted the view that Pliny only saw the extreme outposts along the rivers of that time [2]). The inhabitants were poor fishermen who plied their trade on the flats. They probably lived in dug-outs, or sunk huts, merely covered by a roof, which would also serve to collect water. In the second phase the Terps were raised a little higher, but in the 3rd and 4th centuries a height of 1.35 + A.P. would still afford complete protection against inundation. The inhabitants now owned cattle, and the manure afforded a good material for raising the level. It was easy to handle, drained off the water, and gave a good foothold, which was of great importance on slippery embankments.

The oldest Terps passed through the first and second phases, though there is much doubt about the first phase. It is possible that some of them were at once raised to their full height. The height above the base varies considerably. The Terp at Leens (West- 5.5 Hectares) rises 5.5 Metres above its base; the one at Hoogebeintum no less than 11.65 M. at its highest point. The layers of straw and manure, bones, potsherds and cow hair at Leens are 3—4 M. above the base, or 1.5—2.5 M. below the crest; at Warfum from 4 to 5.5 M. below the crest, and 3—2 M. above the base. These layers of manure are chiefly found in the lower 2—3 M. Such layers occur in the majority of the Terps. Whereas in Groningen and the North-east part of Friesland the layers of manure extend throughout the whole Terp, there are no continuous layers in the Terps of Western Friesland. Probably in these older Terps the breeding of cattle was not yet so general as with the builders of the later Terps in Groningen. The grave-yards often lie outside or above the layers of manure, sometimes at the same height (Leermens). Certain glassy slags of a dirty green colour (van Bemmelen) have been found, probably only in the lowest strata.

Analysis shows them to be composed of a molten mass of bones, plants and clay. Dr. Westerhoff supposed them to be caused by the cremation of bodies, but more likely they must be attributed to the domestic fires. Part of the lowest strata has also turned black through the infiltration of organic substances from above, but mostly the colour is blue with vivanite (oxydule), with brown

[1]) Historia Naturalis Liber XVI (1) 1.
[2]) Zur Frage der Küstensenkung Jahrb. f. Alterth. u Landesgesch. Bd. XVIII 1910.

patches caused by ferrisulphates, and black ones caused by charcoal. The layers of manure are composed of cow-dung and straw or reeds, rushes, flax, various kinds of grain, and many birch twigs. Some Terps have been partly banked up with sods.

In between, there are a great number of piles and trellis-work of oak, fir, elm, etc. Probably they are the remains of dwellings and stabling. Prof. Van Bemmelen compared the dwellings to the shanties of navvies. The houses had low walls of wickerwork and

Frisian Dwelling (after v. Giffen)

high roofs. The Terpbuilders lived in spacious dwellings, more like the modern farmhouses. The "Schnitterzelts" of North Friesland, which were occupied until quite recently, probably exhibit the old type.

The surface of the Terp base (Terp "sole") is generally unequal, with large ponds which are sometimes surrounded by raised banks, excavations for dwellings, manure pits, wells, ditches connecting the wells and the ponds, and cattle-pens.

The huts, perhaps, continued to be movable during a long period. Dr. Holwerda [1]) held the opinion that the Terps served in summer as refuges for man and beast, who removed to the sandy ground in the stormy season. The close connection between the Terps and

[1]) Bijdragen etc. II, 3, 231.

the Pleistocene has also been pointed out by van Giffen in 1913. He found at Peeloo (Drenthe) in 1925 numerous remains of culture exactly resembling those from the older Terpstrata. Cremation was probably in vogue during the second phase, though no urns were found in the lowest layers at Toornwerd. Messrs E l e m a were of opinion that the ashes were not preserved, to which Holwerda agreed. The latter investigator tried to find the connection between the large number of gravefields in the Pleistocene, and the dwellers on the Terps. As, however, during most of the levellings no records were kept as to the height and depth of the strata, much is still unknown about the Terps, and we are even still in doubt about such important questions as that of burial or cremation. Opinions also differ regarding the age of the two earlier phases, though it is pretty generally agreed that the history of the Terps begins later than 1000 B. C., as was supposed by Messrs Elema.

Mre. B o e l e s, judging from the fibulae, thought they must date from the last centuries B. C. Holwerda thought the antiquities did not allow of an earlier time than the first century B. C. and later investigations confirmed this in a great measure. In his last publication V a n G i f f e n expresses the opinion that the true date of commencement was, at earliest, in the 3rd or 4th Century B. C., but that the clay region only began to be occupied on a large scale at a later date.

Possibly the fact that the layers of manure are least extensive in the old Terps of Westergoo, may be an indication of this.

In the third phase the inhabitants, who had grown more and more agricultural, have gradually raised the Terps considerably, and they did so less with manure and more with yellow clay. Black earth is not found, however, in the parts cast up in this period, which largely consist of yellow earth. Among it there are occasional small yellow and greenish-yellow layers of ferriphosphates and the drippings of cattle, besides beds of ashes, heaps of mussel-shells and humus layers, but no cinders (v a n B e m m e l e n). Large quantities of bones, which have seldom been found in the Terps with thick layers of manure and homogeneous earth strata, point to the keeping of cattle, but bones of wild game are extremely rare.

The period of hunting was almost past. The absence of large

quantities of manure perhaps points to its use for agricultural purposes. It is true that manure was little used in other districts yet, because the people exhausted the ground by getting what they could out of the land, and then removing to another spot. But the terpdwellers, being settled in one place, could not do so, and were obliged to have recourse to manuring sooner than others.

Agricultural pursuits, followed by a desire for more comforts, led to the banking up of the Terps. But the time at which this took place varies, as it depended on the local height of the tides. The manure and shards lying frequently in secondary finding-places, renders it difficult to determine the dates. In Ezinge the banking up with manure was begun early and went on till the 2nd or 3rd century. After that time there were occasional further raisings until the period of the dykes. The Terp at Hoogebeintum was not higher than 1 M. + A.P. in the 5th and 6th centuries. The Hatsum Terp was only extended in the Carolingian period. Those at Warffum, Uskwerd, and Holwerd had already attained their present height by the 8th century. Probably the various raisings were all completed before the 8th and 9th centuries. According to Van Giffen the last important raising of the old Terps took place about 800.

In the 4th and last phase farmsteads and villages were built on the Terps. Only a few Terps were uninhabited. A great number bore churches, surrounded by churchyards. Dykes served to protect them from the seawater; probably not before the middle of the 9th century. But dykes were not generally in use until just before 1000. The investigations of the grave-field on the hill at Godlinze made this probable. Still in the early Carolingian time there were no sea defences, and probably this continued so, even until the end of that period. Some few of the Terps bore "stinzen" (castles) and many others convents.

Demolition of the Terps

The demolition of the Terps as early as the middle of last century, shows that the great value of the terp-ground for purposes of manure was understood. The numerous water-ways in the Frisian polderland facilitated the removal by means of boats; but East Friesland (Germany) having fewer canals, most of the Terps have been spared there. At first the boatmen dug away

SKELETON OF HEAVILY BUILT MAN IN
MANURE-GUTTER OF HATSUM TERP

SKELETON IN HOCKER POSITION,
TERP KLAVERBLOEM AT TZUM

the ground on their own account, and the numerous antiquities of gold and silver, found chiefly in the black mould, fell into their hands, so that but a few have been preserved.

But these are of only little value to science, because in most cases the finding-places are unknown. For this reason, "the thousands of objects preserved in the Museums of Friesland and Groningen can throw but little light upon the construction and history of the Terps, even if the name of the Terp where the object was found is known, nay, even if the depth at which it lay is stated" (van Bemmelen). The rate of demolition has greatly increased, since the treasury began to make a calculation of the cubic contents, and the official mapping of the Terps has drawn more attention to them.

At the present time steam-power is applied to the digging, and the day is not far off, when the last Terp that is not preserved for the sake of the buildings upon it, will be sacrificed. Fortunately, on the initiative of Mre Boeles and some other investigators, the digging has been more or less controlled since the commencement of the present century. For lack of funds, the control so far leaves much to be desired. Moreover, during last century the control was carried out with but little accuracy, as many points of inquiry which now arise, where not considered then. Consequently, for that reason alone, a good deal of the material should not be prized too highly.

"The Terps have undergone the same treatment as all earlier excavations, e.g. at Pompeii and other places of (archaeological) interest. Care has only been taken to collect the antiquities" says van Bemmelen. "It was only understood in the latter half of last century that the results of digging should be studied as a whole.... An investigation of any Terp *during the digging operations* has not yet been made."

Van Bemmelen wrote this in 1908, when already a great part of the Terps had disappeared. Van Giffen (1913) stated in connection with the very numerous woodwork: "So lange es nicht möglich ist wissenschaftliche systematische Ausgrabungen vor zu nehmen, werden alle derartigen Funde nur eine sehr beschränkte Bedeutung besitzen". The importance of older finds, about which we have only got information from bargees, navvies and other uninstructed persons, cannot be considered of much value.

The Terp-Society

Of late years a more decided line is being taken in the investigation of the Terps. At the request of Mr. J. E. Scholten, the well-known manufacturer at Groningen, the Terp-Society was founded at Groningen in the winter of 1916 by Dr. J. F. van Bemmelen, Professor of Zoology in the University of Groningen, Mre. P. C. J. A. Boeles, Conservator of the Frisian Archaeological Museum at Leeuwarden, and Dr. J. W. Vollgraff, Professor in the University of Groningen. The object of the Society is the scientific investigation of the Terps in the Netherlands. Several leading

Interior of North-Frisian roofed home

personages in the Northern provinces joined the Society, and later on the Honorary Presidency was graciously assumed by H. R. H. Prince Henry of the Netherlands.

Mr. Scholten placed the Terp at Wierhuizen, which had already been partly levelled, at the disposal of the Society, and there the first systematic diggings were undertaken under the guidance of Dr. A. E. van Giffen, who also directed the further inquiry. This investigator came to the conclusion that the terp-sole had been inhabited during the pre-Carolingian time, evidently from the 2nd century onwards. There were absolutely no traces of pile-dwellings. The first settlement was founded on the fluviatile clay,

which now lies at a level of — 40 cM. N.A.P. (Netherlands Standard Level) The ditches and gutters were not filled with sea-clay until the Carolingian period. This gives support to the opinion that the surrounding country was only then beginning to assume a marine character. Consequently the construction of dykes cannot have been of any importance. The terp-sole gives positive indications of a change in the level within historic times, and the whole character of the landscape has been entirely changed during that period.

Later investigations have shown that the dwellings on the Terps were much like the square houses still in use in the district, in which two rooms are placed one behind the other. The large roof reminded one of the house dating from the Bronze Age, discovered by Kiekebusch at Buch near Berlin [1]). So these dwellings were much smaller than the farm that was discovered in the Betuwe by Dr. Holwerda.

In 1918 excavations were carried out in the Merovingian-Carolingian gravefield near Godlinze. In 1921 and following years a Terp at Hatsum near Dronryp was examined, which proved to contain a number of Roman roof-tiles. The construction was similar to that of Wierhuizen, in the style of the so called "nucleus-building system", where the Terp is supposed to have originated in one or more small nuclei, in contrast to the "enclosing dyke system" which pre-supposes a surrounding embankment within which the dwellers on the higher ground were safe from inundations. Either theory may serve to explain the origin of extensive Terps.

The Hatsum Terp dates, as such, no further back than the beginning of the 2nd Century A. D., and was only strengthened, heightened and extended in the Carolingian period.

This work was already in the press, when we received the latest Report of the Society for Terp-Investigation.

In the years 1924—26 two Terps were examined, De Gouden Kroon near Achlum and De Parel near Tzum. Like most of the Westergoo. Terps, they were found to contain no continuous layers of manure. De Parel contained a central nucleus-hill and traces

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[1]) Kiekebusch Praeh. Zeitschr. 2, 1910, p. 371.

were found of a fresh water pond [1]). This Terp was extended in the Merovingan period and contained earthenware with geometrical ornamentation, indicating Hallstatt influences. The Gouden Kroon exhibits a regular construction in stories, and is probably older.

De Terp Hatsum II was also examined and found to contain ware with geometric and Roman designs, as was also the case in the nucleus of Ezinge Wierde. This again confirms that the Terps were repeatedly raised in the first four or five centuries of our era.

In the clay near Bedum a settlement was found in the open country, silted over at a later time, which may be compared to the grave yard at Dingen near Bremerhaven. Dodo Wildvang already found many such settlements in East-Friesland. It is supposed to present an example of the earliest habitations of the clay-region, but the report gives no data as to its age. The traces of foundations in the Ezinger Wierde confirm the opinion that the Terp-dwellers lived in roofed houses, such as were used in the clay land of North-Friesland up to recent times.

The skeletons and urns found in this graveyard, which had been destroyed like the one of Westeremden, show that the difference between the Frisian and Saxon civilization was slight, especially in the later Terps. The graveyard was typical of the later Terp-period (550—750 or 800 A. D.).

Judging from the crockery, van Giffen, like H o l w e r d a long before, locates the centre of the Terpculture somewhere in the great bend of the River Meuse in Holland [2]) and on the German lower Rhine about Emmerich and Wesel. It bears a strong influence of Hallstatt and la Tène, and belongs to the la Tène period. The investigator gives a few particulars that make a connection between the Terps and the lower Rhine probable [3]). Further confirmation is also desirable for his opinion that the Betuwe Woerd-culture arose farther South in the land of the Catti. He says that this is borne out by the circular shape of the huts said to have been found at Ressen [4]). As the confusion of the survey already shows, we are as yet in the beginning of the Terp-investigations,

[1]) In North-Friesland called a Fething or a Dobbe.

[2]) The part of the lower course streaming westward, so below Mook.

[3]) He refers to Alfr. Pletke: Ursprung u. Ausbreitung d. Angeln u. Sachsen in C. Schuch hardt, Die Urnenfriedhöfe in Nieder-Sachsen. Bd. III.

[4]) 4 K.M. North of Nijmegen.

and not so far that great lines can be drawn with any certainty.

Age of the Strata

In connection with Holwerda's investigations, van Giffen published a statement which is also valuable as a help for fixing the stratographic dates. The Terps lying West of the Middle Sea are rich in the oldest pottery. This has been ascribed by Boeles to an earlier Keltic people. Van Giffen first thought of a connection with the Hallstatt Culture of South Germany. But afterwards he clearly perceived a connection with the East and North-East (Jutland) and in 1919 he found indications of a movement preceding the later migration of the Saxons to the West, especially to Britain [1]). The incrusted shells prove that the pottery was baked on the spot, just as was the painted ware. The terra-nigra-like pots, however, have been imported from regions under strong Roman influence, as Belgium [2]). From earthenware with Roman and geometrical ornaments, Holwerda concluded that the Terps were already in existence within one century B. C.

However, on geological grounds, this would not accord with the notion that the Terps were only occupied in Summer-time: yet the similarity of the pottery of the older mounds and the Pleistocene certainly does make it more probable. The proto-Saxon pottery also belongs to the oldest kind, which again points to a connection with the Pleistocene. Possibly also to Saxon influence coming from the East; from which we perhaps may conclude that at a very early period Saxon tribes mingled with the Terp-dwellers. At Ezinge the Saxon invasion did not become noticeable until the Terp had attained its present height. In fact the oldest historical reports, which are from a much later time, make no distinction between Saxons and Frisians [3]). The rough Frisian pottery has also been found at Arendsburg, near Katwijk and in the Woerden of the Betuwe (100-600 A.D.). According to Holwerda, the early Saxon ware dates from the 4th, 5th and following centuries. The imported Frankish ware has been found in grave yards together with ornamented cinerary urns.

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[1]) 5th Century, Schuckhardt, Alteuropa 1919 p. 329—330. 5th Century. Schuckhardt, Alteuropa 1919 p. 329—330.

[2]) Now Van Giffen looks for the focus of the terra-nigra-like ware to the South west of the Betuwe, and he considers this culture to be younger than that of the Terps.

[3]) Melis Stoke: „Die Neder Zassen heten nu Vriezen" (1 vs. 76).

At that time the home potteries chiefly produced only long-handled pans.

As the late Carolingian objects are found in the top-layers of the Terps, the latest construction is put at A. D. 1000. But the age varies considerably. Some of them go back a few decennia before the beginning of our era. In others the oldest ceramics found belong to the second century, and in others no pottery older than from the third to the seventh centuries has been found. In the latest the manure beds cease, and no manure beds appear since that period. But in the oldest Terps this final limit lies much farther back, even as far as the third century.

This great difference in the periods at which the manure beds ceased, indicates that they were laid more for economical, than for hydrostatic or constructional purposes. It also follows that those that lay in secondary places are of no great value in determining accurate dates. As the chronological value of stone implements, fibulae and other objects which were often kept a long time as family possessions, and which may have been introduced by traders or brought from other parts, is not very high, the dates can only be determined by consideration of the strata together with the objects found in them, the geologic structure, the environment, etc.

Age of the Skeletons

Such is the case also in determining the dates of the somatic remains, concerning which we have so far received but very incomplete information.

Still some, dates may be fairly accurately fixed by the above method, so that we need no longer fall back upon such old-fashioned reasoning as "The oldest inhabitants of the Terps were Nordici, and therefore tall. This skeleton is that of a tall man, so it belonged to one of the earliest Terp-dwellers."

And yet, where burial gifts and other ergologica are wanting, we have to rely on other circumstantial evidence, such as the height of the finding-place etc. Frequently the upper strata are full of human remains. In one case a farmer stopped tilling his field from a sense of reverence. Deeper down, however, the number rapidly decreases. In the deepest strata there are so few that no reason can be given to explain why the number is so small. Some investigators have suggested cremation, but hardly any indica-

tions of this have been found. Van Giffen says of the oldest Terp urns: "sie haben meines Wissens nie als Graburnen Verwendung gefunden".

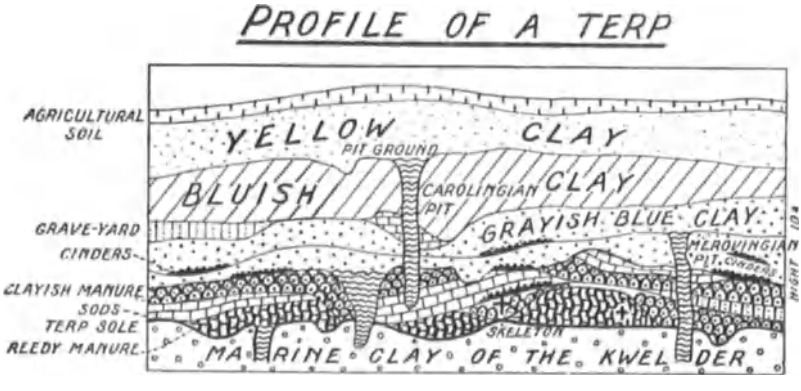
Probably in the first centuries the bodies were buried somewhere in the vicinity of the houses, and when the Terps were extended, parts of the graveyards were covered by the new embankments. When the Terps are levelled, the digging does not go much further down than the humus layers under the base of the Terp. Therefore the oldest skeletons may still be left undisturbed; especially as the humus on the uninhabited places above the old graveyards will not be very rich. Skeletons buried in other places now lie very deep, in consequence of the silting up of the soil, so that there is but a small chance of their ever being found.

The grave-field near Godlinze proves perhaps that the bodies were at first buried outside the terps. This would explain why in the Toornwerd Terp 30 or 40 skeletons were found at a depth of only half a metre below the surface, whilst not more than 3 were found at a depth of 1.5 metres. In the Terp at Ezinge, which covers an area of 25 Hectares with a height of 5 metres, a large number of skeletons seem to have been found in the top stratum (Folmer), but in the lower strata, in two years time, only 2 have been dug up, one of which was mutilated. The lowest and oldest skeletons mostly lie apart. If a large number are come upon lying close together, they are almost certainly of comparatively recent date. Such grave-fields have been found in Friesland at Hoogebeintum, Mount Sion, Ferwerd and Beetgum, and at Wirdum, Oterdum, Lutje-Saaksum, Leermens, Termunten, Eenumer Hoogte, Ezinge, Westeremden and Godlinze in Groningen.

Wherever a grave-field was found, it was always situated on the South East slope of the Terp. On that side the soil consists of purer clay, but on the North-west side it is sandier. This may be attributed to the waves dashing up in the North Western storms, and the desire to protect the dead from them. Although by no means everything has been cleared up about the disposal of the dead, it is fairly certain that the usual custom was to bury them. But the manner in which this was done varies considerably in the same strata. So B o e l e s states that a grave-field was found deep under the grey clay of Hoogebeintum Terp, which, judging from the burial gifts, belonged to the 5th and 6th centuries.

Here the bodies were buried either in log-coffins, plank-coffins, or on beds of straw. Besides this, cinerary urns were also found there, all of old Saxon origin (5th cent.) with the exception of 3 Frankish ones. Van Giffen was of opinion that the skeletons found among them belong to the earlier inhabitants, or possibly point to an increasing Christian influence.

The problem is more difficult because the urns and skeletons are buried almost in the same place. Only at Aalsum (Groningen province) were there separate burying-grounds for urns and skeletons in the same Terp. Probably the Terpians raised mounds



for the burial of their dead, either here and there on the outskirts of their settlements, or outside the Terp. The invading Anglo-Saxons respected these burying-grounds and interred their own urns in them. Through Frankish influence the Frisians and Saxons afterwards resorted to Christian burial. From the latter time also date most of the antiquities found in the Frisian Terps, such as the famous "Wieuwerd treasure", probably derived from a Merovingian chieftain.

The finding of human remains from a given time does not prove that burial was practised at that period (Holwerda). In consequence of the large number of pits and ponds, and the slippery Terp-slopes, the risk of accidents occurring was considerable. Mutilated corpses like the one of Ezinge and that of Hattum I, with a halter (3rd cent.), seem to show that crimes were not excluded; at least if we are not to presume religious custom (partial cremation as pars pro toto). There is also the possibility of victims of raids by pirates (Chauci, Vikings).

Skeletons from heathen times generally lie irregularly, or turned towards the South, accompanied by many gifts, a custom which was afterwards long opposed by the church. Skeletons from Christian times have few gifts and generally lie in a West-East position with the faces to the rising sun. This is confirmed by the Merovingian Carolingian grave-field at Godlinze in Groningen. This grave-field is the more interesting for us, because it strongly resembles that of Looveen (community of Beilen) on the Pleistocene of Drenthe with respect to the arrangement, nature, and direction of the urn- and skeleton-graves. It is also the only one that has been carefully examined, and can be dated with some exactness.

The urns dating from heathen times point to a North Eastern source. It is probable that this ware, with its indications of a sandy soil, was brought oversea by invading Anglo-Saxons, or perhaps from a region still farther North. Many other similar small grave-fields along the coast prove that there was invasion from oversea.

The skeletons that have been dug up prove to have been buried without further ceremony. Only in one case was a skeleton found lying upon a little layer of charcoal — probably the remains of a log-coffin hollowed out by fire. All the bodies lay at full length on the back. Only one remarkably heavily-built man had the legs crossed. Possibly there were signs of deliberate mutilation, traceable, also in skeletons lying in the deeper strata. But it is often difficult to decide if it were really so, because in many cases whole rows of heads have been cut off by the plough. Yet in many cases it was possible to make out the direction in which they were laid. Those lying North to South were the deepest. Those lying more or less East-West were found higher up, but all on one level. Where skeletons pointing in different directions were found in the same place, those pointing East-West crossed the North to South bodies at a higher level, and therefore they have been buried later.

The investigations established with great certainly that this grave field was in use from 600 to 825, and perhaps even later. Evidently it was laid out by the Godlinzen Terpdwellers before they added the finishing top-layer to the Terp, as was so generally done.

Now, if the Terp attained its present height and extent shortly after, the people would then have resorted to burial.

Liudger (743—809) was preaching in these parts about that time,

and exhorted the people to bury their dead, but he was forced to stop preaching in 783, because Widukint had conquered Friesland as far as the Lauwers.

"Die Kirche will, nachdem sie de Lebenden für sich gewonnen, auch die Toten um sich geschart sehen; die Hofbewohner haben die Leichen aus der grosseren Nähe ihrer Wohnstätte nach dem ferner liegenden Dorfe zusammen zu bringen" [1]). Consequently, when churches were erected on them, the Terps became burying grounds for good and all.

As good burying grounds, the Terps have kept up their long existence to the present day, not only because in times of flood newly buried coffins are sometimes apt to be floated out (H. C. Folmer), but because people object to be buried in the surface water. Even when the church and the surrounding buildings had disappeared, some of the Terps were still used as burying grounds, even by the people from a considerable distance round about.

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[1]) Meyer v. Knonau Alamannische Denkmäler Mitt. Ant. Ges. Zürich 1872—'73 p. 22.

CHAPTER II

REVIEW OF THE ANTHROPOGRAPHICAL LITERATURE

A. *Terpmaterial*

The first craniologist to investigate a large number of Terp skulls was Dr. A. Sasse. His modern material was autochthonic, but as this cannot be said with certainty of his Terpmaterial, we shall not discuss the results of his inquiry for the present, but hope to do so on a later page.

A. Folmer

As during the first part of the 19th century so little attention had been paid to the study of the Terps, it is the more to be appreciated that in the early eighties, when so very little was known of their construction, and still less of their builders, Dr. Arend Folmer was already carrying out anthropographical investigations on the spot.

Even A. Sasse did not perceive the great value of Folmer's inquiry, for in his report of 1882 he asserted that he would have preferred a study of the present inhabitants of Groningen in the manner of his own cranium studies.

Fortunately Folmer paid no attention to him, but went on collecting ever more material, to confirm the assertions made in his first publication.

It is necessary to regard his work in the light of his time, in order to appreciate the achievement of a man who was able to instruct the archaeologist Pleyte in his own special branch.

In spite of our high appreciation of Folmer's investigations, we must begin with criticism.

Knowledge of the Terps

Taking into account the almost complete ignorance of the older stages of civilized life, prevailing at that time, it was impossible even for Folmer to produce a treatise capable of satisfying the

demands of modern science. For instance, living as he did among the Terps, yet he was not able to direct or control the diggings with the eye of a trained geomorphologist. It was a mere piece of good fortune for him to be present at the digging out of a skeleton, and we may not attach too much credence to what he only reports from hearsay.

From Folmer's descriptions it is somewhat doubtful whether he has carefully studied many Terp-profiles. His assertion that the cap consists of black homogeneous earth-layers, whilst its actual colour is yellow or bluish-grey, and its composition far from homogeneous, makes it probable that he had no correct idea of a Terp-profile. Again he says. "Beneath the said bed of clay, therefore, we find the remains of the oldest culture, the so-called manure beds, which by the great weight have been pressed down below the level of the surrounding soil, and whose colour is generally green [1]) with spots of brown, blue and coal-black."

Now the colour of these layers of dung is not green, but black and brown, whilst the intermediate layers of clay, as already said, are generally blue, grey and dark grey. The cinders are generally greenish [2]) and possibly they were helpful guides to Folmer, but these form but a small part of the layers, and are not even found in all Terps [3]). Probably Folmer's idea that the layers were green arose from his continually finding this green material in skulls from the lowest strata [4]), or his opinion of a Terp profile was influenced by the strongly different profile of the Lutjesaaksum Terp.

Generally speaking, Folmer gives but little information about the finding-places of the relics he has collected, nor is it very accurate, so that it is difficult to control him on this point. But yet we must just glance at the objects he has found.

Classification according to depth

What value are we to attach to his division of the skulls into three groups: 1. Skulls from the lowest strata. 2. skulls from the higher strata. 3. modern skulls?

Does this division accord with the chronological one? As later appears, he drew the boundary-line somewhere about the year

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[1]) Possibly Folmer meant by the green Terp-substance the decayed manure; otherwise its repeated occurence in the skulls is difficult to explain.

[2]) J. Oost Elema and J. Elema p. 200; v. Bemmelen p. 55.

[3]) From personal inquiry we learn that Van Giffen is not sure what Folmer meant by this green Terp-material.

[4]) J. Oost Elema and J. Elema p. 201.

1000 (1885 p. 339 and 1887 p. 407) So, at the period when the actual history of the Terps was closed.

Therefore the deeper strata contained the remains of the Terp-builders, and those nearer the surface the Terp-dwellers. Folmer did not give an exact final date, although he declares that the modern crania belong to the 19th century. As he calls the skulls of the second group Mediaeval, we can only suppose that he drew the line at about 1500; from which it follows that the periods were not of equal duration.

By a close examination of the lay of the strata, it is now possible to classify the Terpskulls with some more certainty in connection with the varying heights of the Terps, and the great differences in their construction, but Folmer could give us no exact notion of what he understands as "deep" and "shallow" layers.

In fact he did not keep to his own classification. In discussing the diggings at the Terp of Lutjehuizen (1883) he writes: "It is remarkable that the skulls show the old Germanic type, though I saw them dug out of the upper homogeneous earth layers which had perhaps served to heighten the Terp after a great flood, whilst only at a much lower level were human remains again found in strata that reach down far below the level of the surrounding land, and must therefore be considerably older."

So here Folmer describes skulls that had undoubtedly come out of the top strata. Folmer placed these in the first group because they bore a Nordic type, but he says nothing about the colour or other physical indications. This shows that he sometimes distinguished simply by the form, without attending to the strata where the skeletons were found. As the first group certainly contained anomalous types, which some investigators consider as belonging to a pre-Nordic substratum, this mode of selection by the form only, was a dangerous experiment.

According to Folmer's division of the periods, the second group included skulls of a later occupation only. But measured by his standard of depths, there were perhaps also some skulls of the Terpdwellers amongst them. Besides these, there are skulls from the Mediaeval villages and convents. Like the other Anthropographers of his time, Folmer also included allochthonic convent-skulls among his material, although these must be considered as worthless for anthropographic purposes. And as the practice of bu-

rying in the Terps was continued up to recent times, it is not wholly improbable that some quite recent skulls may have got among the group. Therefore his second group was heterogeneous both in origine and time. But Folmer was gifted with a fine sense of discrimination, and we may take it for granted that his right judgment corrected the faults of his system.

Physical indications

As has been said, Folmer not only classified according to the depth, but also according to physical indications. What did these consist of? He writes as follows: "With an eye to this, and also from other physical signs, we can approximately determine chronologically such objects as were not found in our presence" [1]). On the preceding page Folmer had described these physical signs: "the black, greyish and brown colour of the bones, and especially the presence of a green substance in the cavities". He was evidently chiefly guided by the colour of the bones and the kind of earth adhering to them, though he does occasionally refer to other marks, such as the weight and the brittleness.

The colour of the bones coincides with that of the strata where they are found. If taken from ferrinous ground they are red; if from laterite earth, yellowish to red; from the piledwellings, dark brown; from flinty ground, whity-grey. Bones from the manure beds of the Terps are brown, or greyish white without any glaze. Those brought up from the moist dung in the pits are black, and from the deepest clay-strata with their high proportion of vivianite, dark and bluish. Skulls from the deeper layers of sand, are yellow or yellowish white, and from the topmost yellow Terp-strata, yellowish white. Though Folmer was seldom wrong in his determinations, yet he hardly ever observed any connection between the colour and the earth layers [2]).

The weight and hardness of the bones also vary according to the different layers in which they occur, as the degree of porosity of the strata had a great influence on the state of the skulls. Thus the lowest earth layers have a strong conserving influence; whilst the yellow terp earth makes the bones brittle. So it may happen that a skull from the lowest strata appears much younger than a bleached and exfoliated calvarium from one of the upper layers. Consequently no exact conclusion can be drawn from the state of the

[1]) Ned. Tijdschr. v. Geneesk. 1890 I p. 598.

[2]) "Between physical condition of the bones and nature of the soil", 1881 p. 38.

bones as to the date or duration of burial. Bones that have been buried during an equal length of time, may appear quite different through varying circumstances. Occasionally Folmer does not seem to consider this fact.

As for the adhering substances, Folmer seems to have trusted a good deal to the green cinders, which most probably point to greater depth [1]). Later on he changed his mind, however, and classed a few skulls with green adhesive matter among skulls from the surface layers, although in one instance the colour was brown [2]). He also did so with a skull from the blue clay, which often belongs to the middle strata. Yet he made but a very limited use of skulls that he had dug up himself, and of which he knew fairly accurately the strata in which they were found.

The bones from the lowest Terp strata are more bleached, and consequently whiter, than those from the upper strata. This enables one to distinguish bones found in these layers from those of almost the same colour from the deeper strata of sand. The sodden crania from the lowest strata are often excellently preserved. From Folmer's remark that "the sodden damp bones, which are mostly found quite unexpectedly in our boggy ground, can only be prevented from disentegrating, and restored to their original hardness, if they are dried with the encasing earth still attached", (1888) we are inclined to suppose that in many cases he examined skulls from the lower strata.

We could not quite agree with Folmer's classification. However Folmer made his first group very large, which limits the risk of mistakes in a great measure. Judged by our modern knowledge of the Terps, it must indeed have included all the Terpbuilders, though those of the first centuries A. D. were probably in the majority. The number of skulls in the second group was far smaller, and they are all recognizable as belonging to the Middle-Ages, without any doubt. Consequently there is very little chance of any important confusion between the two groups. After a careful examination of each specimen, we came to the conclusion that the greater number indeed belonged to the group to which Folmer had reckoned them. It was rather easy to eliminate those that appeared to be doubtful.

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[1]) J. Oost Elema and J. Elema 1907 p. 301.
[2]) 1890 N. T. G. I p. 603.

Deformation

A matter to which but little attention has been paid in the study of Dutch skulls is the deformation in consequence of ground pressure. More especially in ground where the moisture varies, as in the middle and upper strata of the Terps, the organic substances in the bones are dissolved, rendering them slightly plastic. The pressure of the earth-layers not being resisted by any pressure from inside the skull, the neurocranium may take a different form, and even change from dolichocephalic to extreme dolichocranic.

When discussing the matter, Van Giffen expressed doubts whether a skull could change post mortem in the clay so greatly as to effect the indices. Prof. Barge was also of this opinion, and wrote: "Zur Annahme einer unter Einfluss des Bodens entstandenen Difformität hat uns kein Schädel veranlasst." But Folmer wrote: "Moreover they are often crooked, a peculiarity which must probably be attributed to posthumous changes". Yet it was only in his last publication but one that Folmer differed in this matter from the two other researchers. Before that time he had not mentioned the change, though, if his statement was correct, it cannot but have influenced his measurements.

„Brachyzation".

Long before Folmer, it had been observed all over Middle Europe that the skull had become shorter and broader during the last millennium (brachycranization c.q. brachycephalization or briefly "brachyzation"). Later this phenomenon has been observed over the greater part of the continent of Europe, also with respect to the former long-headed Slavs in Russia and in the late "Danubian Monarchy". In Sweden and Denmark it was found that the number of dolichocrania steadily increased from the Neolithic to the Iron age, and has steadily diminished again in more recent times (R. Martin). Consequently it appears that there can be little doubt of the fact. Its influence had been so great that the people were formerly designated as dolichocephalic, but at the present day as brachycephalic, although most of them just touched the lower and upper limit of mesocephalic. Had Folmer succeeded in proving that such was also the case with the oldest inhabitants of our Northern Provinces, it would have been simply a confirmation of the general phenomenon. But in Folmer's time the cause of it was still more hidden than at present, so that the question arises, whether he has materially contributed to the clearing up of the mystery.

In Folmer's first study, dating from 1881, he distinguishes between skulls from the lower, and the upper strata, but without troubling to determin the periods of the two groups. Nor did he give a clear description of either. But this was scarcely to be expected, considering how little was then known about the Terps. „Eenige Crania".

His work was preceded by an informative archaeological introduction by Pleyte. Folmer began by posing the following problem: "In what particulars did the build of the body of the oldest inhabitants of a country differ from that of the present population; and can any bodily marks be found on the human remains pointing to a lower state of development, and characteristic of coloured races?"

This question throws light on the idea, prevailing in Folmer's time, that men who lived but two millennia before us, must have been quite different beings. It was thought that one need go back only a short period to observe bodily differences.

Folmer put yet another question: "In how far will primitive people that do not mix with other races differ in bodily shape from their progeny in a given time?"

The second problem arose out of his finding a couple of skulls at some distance from a Teuton sword, and observing that these skulls differed materially in shape and colour from others, which almost certainly had belonged to monks of the 13th and 15th century. It is remarkable that in this way, by comparing autochthonic with allochthonic material, Folmer was led to take up the study of Anthropography.

Folmer followed V i r c h o w (1877) in thinking that the Frisians had continued to reside in the same locality for several centuries, and had very rarely absorbed foreign elements. Therefore he applied himself to the solving of this problem with the result that a couple of skulls in the Saaksummer Wierde (Terp) not only caused a stir in the quiet little candle light world of Dutch archaeologists, but also raised a tip of the pall that lay over the earliest inhabitants of the country.

The series of Old Terp-skulls, upon which Folmer based his bold conclusions was not by any means large. There were only five in all; one of which was too much damaged to allow of measuring the index cephalicus. That from the Terp of Enum, could be historically defined with some exactness. It was a brachycranium

obtained from an immature male. The skull from Westerwytwerd was a mesocrane;so there were only two dolychocrania which could be affirmed with certainty to have been dug up from the deep strata. It was indeed a bold stroke to draw such far-reaching conclusions from these few specimens, after pointing out their resemblance with the Domburg and other collections of row-grave skulls. It was to be expected however, that these conclusions would afterwards be confirmed; as Folmer's interpretation was analogous to that of finds in other Nordic graves.

Folmer drew a comparison between these skulls and a second group, obtained from the higher strata. He had not dared to include in the first group a dark brown skull from Stedum (ind. ceph. 78.9) chiefly because it had carious teeth.

Caries as an indication

Among the men of Domburg caries was but rarely met with, and among the Anglo-Saxon invaders of Britain, who were of the same stock, Mummery found fewer cases of caries than among the Britons of Roman times. Since the Neolithic period, however, the disease has ever been on the increase in England, and the same thing appears to have been observed in other parts of Europe also [1]).

M. von Lenhosék (1919) subjected the two last-named authors to severe criticism, and expressed the opinion, in opposition to Schwerz, that prehistoric man already practised tooth-extraction. Judging from the number of teeth lost intra vitam, he came to a high percentage of skulls infected with caries, especially among those of the Great Migration Period. So the cariosity of the teeth does not tell much about the age of a skull.

At a later time [2]) Folmer did include skulls with carious teeth found in the lower strata, which shows that he no longer attached much importance to this mark. Three skulls were found at a depth of a few feet on the southern slope of the Lutjesaaksum Terp. It was not impossible, therefore, that they might have come from the deeper strata. Moreover, a convent had stood on that spot, which tends to increase the uncertainty; especially as these three skulls were brachycrania. Folmer apologetically describes them as "bordering on brachycephaly" (ind. cran. 82). One of the skulls

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[1]) Pickering. The Prevention of Dental Caries. Mummery. Congress of Dental Surgery. Tijdschrift v. Tandheelkunde 1912. See also Bolk. N.T.G. 1912 I No. 19 p. 421.

[2]) N. T. G. 1890 I p. 604, 600.

was even platyrrhine, but Folmer called this striking form "individual". The hyperbrachycephalic skull from Schaphalsterzyl, discussed by Folmer's son Christian in his dissertation of 1897, may have belonged to some warrior, and was left out of the discussion.

In a study of a small group of only four specimens, Folmer found sufficient grounds to conclude "that the second group agrees with the present-day skulls obtained from the Islands of Marken and Urk" [1]). About three of them opinions are still divided as to whether they belong to the inhabitants of the country or not, the evidence being far from convincing. But his acquaintance with these was very superficial. After comparing them with Virchow's Warga and Zuyder Sea skulls and Sasse's Zaandammers, an extremely mixed company, he ventured upon the still bolder conclusions, "that the present-day skulls obtained from various parts of Friesland have acquired almost the same headform. With regard to the head index this form has undergone no important change during the last four centuries" [2]).

Therefore, on the one hand, Folmer neglected to compare the two groups carefully with each other in order to determine the difference, and on the other hand, by comparing them with foreign material of which he could not judge the value, he arrived at conclusions on grounds that cannot be considered sufficiently supported. This would lead to the theory that between 1000 and 1500 the Frisian skull had undergone an entire change, whilst before that period it had remained uniform. This view need not be gone into any further as Folmer himself retracted it to a large extent.

One of the most interesting skulls is the brachycranium found at Heidenschap (Slochteren) embedded under the bog in a very deep layer of clay. Unfortunately, too little is known about the geological formation of the place. "The uniform black colour, which always covers the teeth", as Folmer says [3]), seems to point to high antiquity, and it is a pity he obtained no further particulars about it. Folmer remarked that he found nothing to confirm the assertion founded on the Blumenbach skull, which was known as the Batavus genuinus. But elsewhere he says: "On the contrary, in most of them the extraordinary receding slope of the forehead (fons

[1]) Folmer 1881 p. 66.
[2]) Folmer 1881 p. 68.
[3]) Folmer 1881 p. 77.

reclinata) which appears strongest in the Kimswerd skull, reminds us of the description of the Batavus genuinus of Blumenbach" [1]).

It was the skulls of Kimswerd and the Speelmanstraat that reminded Folmer of the Batavus genuinus; those of Hallum and Hallumermieden had low foreheads. Therefore, as he observed with regard to the cranium from the Terp at Boxum, "For the first time we find here a resemblance to the Neanderthal shape" [2]). We were far less surprised at this than Folmer himself. We had already more than once observed transition forms. But we should not forget that, at that time, people had not a clear notion of the distinguishing marks of the Neanderthal Man, and they were inclined to recognise a resemblance in a flat crown, and even in a low forehead. Also there was a rage for seeking out Neanderthalers in those days, as appears from Joh. Sasse's writings.

„Two Groups of Terp Skulls".

It was to be expected that Folmer's work would not give entire satisfaction. The fact that he was not critisized, except very mildly by A. Sasse, is perhaps a proof of the high appreciation accorded to his merits. In 1883 he produced new material and defended himself against Sasse. In his third publication, "Two Groups of Terp Skulls" he draws a comparison between seven skulls "of undoubted very great antiquity" from the province of Groningen, and ten specimens of a late Mediaeval graveyard at Lutjehuizen. One of the Old skulls, the cranium of Scharmer, was found between great vaults of masonry [3]), so that it probably dated from after the 12th century and cannot be classed with the Oldest group. Moreover, Scharmer was situated in the peat-country outside the Terpdistrict.

Folmer suggested that the Lutjehuizen skulls had been obtained from a village population, isolated at a time when wants were few and the roads almost inpassable. The foundations and layers of rubbish may derive from a church, for in Mediaeval times stone houses were rarely met with in villages, and there was no monastary at Lutjehuizen. These ten belong to the most interesting portion of Folmer's collection. On account of the slight variation in the measurements and proportions, he considered them as belonging together.

As in Folmer's studies several problems were insufficiently kept apart, it is especially this one that leaves much to be desired on the

[1]) Folmer 1881 p. 81.

[2]) Folmer 1881 p. 87.

[3]) At Scharmer was situated 't Kruisdragersklooster (convent) of Sancte Helene Regina, founded in 1350 (ter Laan, Nieuw Groningsch Woordenboek).

score of clearness, and several other matters. Regarding the question of kinship with the Neanderthaler, Folmer thought his skull not low enough, and disagreed on this point with Spengel and Virchow, who was supported by Welcker. On the question whether there was a Batavus element in the Frisian skulls, Folmer expressed no clear opinion, neither did he arrange his material in a way to make it easy to decide the problem.

Nor was this the case in his treatise of 1887. Folmer said that the type of Batavus genuinus was not found, either by himself or Sasse, and therefore it could not be the type of the Netherland skull. Nor were skulls of the Neanderthal type at all numerous. So Folmer examined his old specimens again, and added to them from the skulls in the museum of the Frisian Society. For this purpose he arranged them in the way in which Kollmann had divided the skull material of Europe, into 5 groups. „Ethnologie van Friesland".

So far Folmer had been chiefly guided by the depth at which the skulls had been found, but now he also gives divisions of time agreeing with the depths. 1°. The 10 early centuries of our era, 2°. the late Middle Ages, 3°. Modern times. But these divisions are by no means sharply outlined. Folmer speaks of "Old" and "Oldest" without paying attention to his first groupings. In many cases he stated no depth and said little or nothing about the physical conditions, and but little about the burial gifts. The data contained in the literature are only seldom of sufficient weight to overrule objections. In the collection of 39 skulls from the deep layers, no fewer than 4 resemble Neanderthal forms, or remind one of Batavus genuinus, and in two others the sloping forehead is very striking. But Folmer evidently saw no reason to group them together, and "to arrive at greater clarity by analyzing the criteria and applying the comparative method". The above division into 5 groups was of little use in segregating the Batavus type. Yet *six* skulls with points of resemblance to that type in a group of 39 are surely worth noting.

Again Folmer supplied new material from the higher Terpstrata. Three had probably belonged to friars of Wytwerd Convent [1]) and must be put aside as allochthonic, whilst the three Frisian skulls, as Folmer stated himself, are probably derived

[1]) Ter Laan says that the Wytwerd Convent S. E. of Uskwerd, founded 1300, was a nunnery (Nieuw Groningsch Woordenboek).

from inmates of the convents. Consequently Folmer had only the 10 skulls from Lutjehuizen at his disposal. Their mean index cranicus (75.18) was however as high as that of the 39 oldest Terp-skulls. Folmer's conclusion that we saw "a new brachycephalic population arise in the Middle Ages by the side of the old people whose head index showed but slight mixture." was still quite insufficiently supported in 1887.

The number of Leeuwarden skulls amounted to 12 only — all calvaria. Folmer declared them to be of the 19th century, but gave no further particulars. Of this small set, one of which was said to show Neanderthal-form, one specimen was a child's skull. There were also three skulls of young persons, and a senile female. This group, which contained not a single dolichocranium, included even one brachycranium with an index of 88.6.

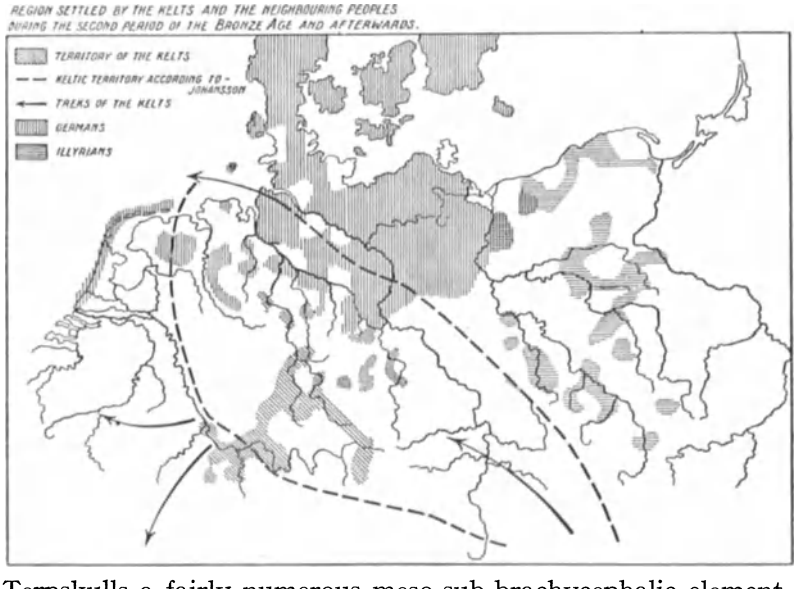
Generally speaking, his interpretation of the material is far less accurate than his description. It appears to us that a superficial comparison between a small number of recent skulls and a limited group of Hunsingooërs intra vitam, is of no more value than one between the skulls of such heterogeneous groups as Leeuwarders, Terpdwellers, Hollanders, Germans, inhabitants of Pompeii, negroes and Chinamen. The inhabitants of China, for instance, differ so widely from a craniometrical point of view that a few figures of a small group mean as little as those of a score or two "Europeans". As comparative material — even when reduced according to Schmidt's method — they are practically useless. Yet Folmer thought this group of figures bore out "Virchow's assertion that the Frisian skulls are characterized by small height". And he adds: "a glance at the colums of the Terp skulls shows us, however, that this characteristic is not inherited from the original inabitants of the country" [1]). But the groups of Modern Leeuwarders and the Oldest Terpskulls differ so widely in numbers, and the genetic relationship between them is so loose, that no such far-reaching conclusion may be drawn from a difference of 2.4 in the averages of the height: length-index.

In summing up, Folmer again pointed out that the dolichocrane people have disappeared, and have given place to an almost brachycrane type. "A similar change in the shape of the skull in South Germany gave rise to the supposition that some Germanic

[1]) N. T. G. 1887 p. 431.

tribes had brought a broad, short form as sub-types, from the East into Europe, and as a result of crossing, they had distributed brachycephaly throughout districts originally inhabited by dolichocephalic Germanic tribes. Therefore the Frisians, being originally mostly dolichocephalic, did not belong to them."

After what we have stated previously, we need not say that we do not agree with this. There was certainly among the oldest



Terpskulls a fairly numerous meso-sub-brachycephalic element. It is true that there were more dolichocephalics among these skulls, but a great number tended towards mesocephaly, whilst the average index of the group was 75.1.

Equally unsupported is Folmer's opinion that the reduced height has not been inherited from the Terp-builders, for, as we have seen, they included an element with a characteristic low crown. It is not impossible that this element should have come to the fore. So far, in any case, Folmer had not produced any material to prove the contrary.

In a few general remarks of 1888 he opposed the notion, which now has been suggested from archaeological quarters, that the Kelts (Shore-Celts) inhabited the coastal regions before the Germans [1]). „De hedendaagsche Ethnologie".

[1]) As a confusion of opinions about the Kelts existed between the older Anthropographers, we give a map of their dwelling places after Schuchhardt, a.o. See p. 250.

He agreed with De Man in thinking that the latter had not arrived until the land was more habitable. "At the time of the monasteries, the brachycephalics appeared only occasionally, but at last they overwhelmed the whole population, though in a weakened, altered form". But the material produced by Folmer was too small to back up this opinion.

„De Groninger en Friesche Terpschedels"

In 1890 Folmer published a paper on 38 skulls which he had collected during his past three years. The 8 skulls from the surface layers, against the interpretation of which we have already stated some objections, have an average skull index of 76.8, i.e. only 1,6 unit higher than the very oldest ones. This again shows that the difference in index cranicus between the two groups was not very important, though they may be separated by a period of a thousand years.

„Nederlandsche Schedels"

The 19 calvaria and calva from the deepest strata of the Frisian Terps have mostly been obtained from Westergoo. The mean index was 74, which is over 2 units lower than that of the Old group from Groningen. This group included only 4 meso- and subbrachycrania and 2 brachycrania, so that, there also, the short-headed element was not lacking.

Folmer's last treatise bears the title "On Dutch Skulls", which he adopted in order to enable him to include the eight skulls from the Walloon Church at Amsterdam. As nothing is known with certainty about these remains, which were found between an outer- and inner-wall, they can only serve to illustrate with what untrustworthy material the older investigators occasionally contented themselves. It must no doubt have been a matter of satisfaction for Folmer that in his last publication he was able to report the increase of his recent material by 24 Leeuwarden skulls.

In short, we must observe that, for various reasons, we are seldom able to agree with Folmer's interpretation. His descriptions and measurements of Terpmaterial are, however, generally very useful, though we may sometimes have cause to make objections.

In deed, after carefully sorting them, we shall make a grateful use of these measurements in our investigation of the Terpdwellers.

H. C. Folmer

In his dissertation (1897) A. Folmer's son Hendrik Christian published the following thesis: "Virchow is mistaken when at

the close of his work: "Die Physische Anthropologie der Deutschen, etc." he concludes from a study of the shore-population of the North Sea: "Dasz dieser Gesammttypus nicht in dem Maasse ein einheitlicher ist, wie man es bis dahin angenommen hat."

This assertion he afterwards defended in certain publications, in which he chiefly upheld his father's opinion, founded almost exclusively on the latter's material. He pointed out that Virchow, who presumed the Frisians to have always remained an isolated people, had taken no account of the time to which his material belonged, and had mainly used skulls from later periods.

H. C. Folmer formulated his results as follows: "Ueberall sind die Alten Germanen an den Nordseeküsten vollkommen identisch mit dem Reihengräber-typus und stehen demselben gleich, sowohl in Längen-breiten-Index, wie in Längen-Höhen-Index, und in absoluter Höhe". At the same time Folmer referred to the Domburg skulls of Dr. de Man, the Merovingian of Dr. Schoor, the 38 Terpskulls of his father, the oldest skulls of Gildemeister, and the Dedersdorf Cranium described by Virchow.

"Ebenso wie in Bayern und Wurtemberg die dolichocephale Germanen verschwunden sind, so sind diese auch in Friesland durch Misschung nicht mehr vorhanden. Auch in Friesland haben die dolichocephale Elemente sich in die brachycephale aufgelöst".

Yet, like his father, H. C. Folmer had not sufficient material at his disposal to support the latter part of his assertion. — Further, H. C. Folmer described 2 new dolicho- and 2 mesocrania from the deepest Terpstrata.

Bolk

In Prof. Gallé's work "Het Boerenhuis, etc." 1908. Prof. Bolk supplies information about certain Terp-skulls that he examined. They numbered 81, or nearly as many as those of Folmer, who described more than 90 skulls. Of these, 65 were preserved in the Leeuwarden Museum, and 16 in the Anatomical Museum at Amsterdam.

It is a pity that Prof. Bolk gave only a few particulars beyond the breadth: length-index. As he gave no information of any kind regarding the depth of the finding place, nor regarding colour or other physical indications, almost every means of controlling the age is lacking. As has been shown in the preceding remarks, it is absolutely necessary, before comparing Terpskulls with recent

ones, to dispose of sufficient stratographic and archaeological data to be able to determine the period to which the former belong. In connection with our earlier remarks on Folmer's publications we believe that this material is extremely mixed. (ind. cran. 68.17—86.4) But with certain reservations it may be useful for comparison with recent skulls.

A J. A. Barge

The greatest work that has appeared on the subject of terp-skulls is the voluminous and very interesting book published in 1912 by Dr. A. J. A. Barge, professor in the University of Leyden. In 1913 it appeared in German in a more concise form. We shall, however, take the more extensive Dutch edition as our guide.

It would probably have added to the value of the book if Prof. Barge could have taken into account beforehand the extent of the problem that had led him to institute his inquiry [1]). As the titles of the chapters, such as "Historical Survey A, Historical Survey B, Index Cephalicus", etc. also fail to enlighten us, we are to the last left in uncertainty as to what was the professor's main object.

Further, it would perhaps have tended to greater clearness if the Frisians and Markers had been kept apart from the very beginning, although they have been mixed together by Rudolf Virchow and some other authors [2]). In the half century which has passed since the important work of Virchow came out, his example has not been wholly without influence in these Low Countries, though the Dutch authors have sometimes confined themselves to contradicting or to borrowing some of his thoughts.

In his historical remarks, in which he gives a clear and concise review of the results of the various researches, Prof. Barge also touches on the question of Batavus genuinus. It is true that certain older writers have erroneously sought a connection between the Neanderthal problem and the Frisians and Markers, so that until quite recently the question has filled literature with errors (Ripley, Pittard). Yet, since Schwalbe wrote, it has been generally regarded as an exploded myth. Consequently, as was to be expected, Prof. Barge was not able to throw much light on the question. But with Batavus genuinus it is quite another matter.

[1]) The writer, it is true, does refer on page 23 to four questions, but says of them only. „But very little has been elucidated".

[2]) It does not appear clearly from Prof. Barge's discussion whether the people of Marken are "Frisians" or not.

Had a new strong light been cast upon it, the value of his inquiry would have been considerably increased.

In order to find out the main purpose of Prof. Barge's investigation, we turned to the last pages of the book. In this part the author deals chiefly with the low skull type, and after considering it from various points of view, he discusses, as Virchow did, the problem of the artificial form of the platycephalon, specially the deformation of the skull by the caps worn by women and children.

Various other writers [1]) have pronounced on this supposed artificial deformation, e.g. Spengel and Prof. Bolk. The latter had already expressed himself as follows: "Zweifelsohne ist diese Form einer künstlichen Deformation zu verdanken, wovon jeder, der diese in anthropologischer Hinsicht so merkwürdige Insel besucht, sich überzeugen kann" [2]).

As far as we know, however, Prof. Bolk has not furnished any material to confirm this opinion, which is given without any reservation, although, in his judgment it would have been easy enough to do so. But what seems very easy is often very difficult. So perhaps also in this case.

Presumably Prof. Barge had the intention of supplying this want. But it is a pity his inquiries were not more extensive. In the report of his interview he does not give the name of his sole informant, who afterwards proved to have been the skipper of a barge.

We may not attach undue importance to such an opinion of "the man in the street", and it would have been far preferable if Prof. Barge had obtained full information by personal inquiry, before coming to the conclusion that "From one thing and another it appears pretty conclusively that the hypothesis of the Marken skull being due to artificial deformation is the only correct one" [3]). Indeed, at the close of his book Prof. Barge writes as follows: "The question is an inveresting one, whether this abuse of artificial deformation, which has been carried on for years, has had a lasting influence on the skull in Marken. [4]) It could only be solved if one could have the disposal of a collection of genuine Marker

[1]) J. le Francy van Berkhey III, 1173, p. 1219—1221.

[2]) Ueber die Verbreitung der Rothaarigen in den Niederlanden Z. f. M. Bd. XI XI H 1.

[3]) p. 233—234.

[4]) This part reminds one of the Macrocephalae of Hippocrates.

skulls that for some special reason had been spared from birth the pernicious action of the cap. In how far such a "Reinkultur" will ever be available for examination, is difficult to foretell, but it does not seem likely in the near future."

It does not serve our present purpose to go into a careful analysis of these closing words. We can only say that it is to be regretted that Prof. Barge has left — for another half century? — to the future the solving of a problem, which might have been cleared up now to a great extent. At this moment we are not much farther than at the time when Virchow gave it to the Anthropologists to solve. Yet we are perhaps farther behind still, as many an enquirer is of opinion that it is already cleared up. By his reference to the possibility of this being a case of the heredity of acquired properties, the investigator has still further complicated the problem.

It would certainly have tended to heighten the clarity of his arguments regarding the problem of the Netherlands low skull in general, and more particularly the problem as to whether the low skull of the Zuiderzee population is an artificial deformation, which the professor has handled so capably in his exhaustive inquiry, if the question of the Batavus genuinus had been kept rigorously apart from that of the Neanderthal man. If it had been possible for Prof. Barge to study this type accurately among the Frisian skulls and elsewhere, he might have thereby tested his theory of artificial deformation by means of a cap [1]).

As we have already remarked, a careful study of the material is of the very highest importance for the work of Anthropography, in order to decide among other things whether it is autochthonous. Ever since the attention of all craniologists was directed to the three little islands in the Zuiderzee, by the discovery of Batavus genuinus, there has been a great demand for these curiosities. Not by any means can all the specimens brought to market be regarded as reliable. As we have shown in our preceding pages, even the term Terp Skull is very elastic. The greater number of the heterogeneous company have come into our hands "ab intestato", so that we have to subject their origin to a very careful inquiry.

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[1]) Prof. Barge refers, among other things, to the opinion of Hrdlicka about the skulls from Burlington County, pp. 22—23 and 219, which he thought to be derived from Dutch colonists.

It is much to be regretted that Prof. Barge has not done so. Almost the only information he could give about the origin of his crania was that they had come out of the Terps. As he says: "This is undoubtedly certain, but it is all that can be said about their origin" [1]). This negligence of the finders and workers renders it impossible for us to profit so much from these extensive inquiries as we should like to do.

In connection with this want of information, Prof. Barge conceived the ingenious idea of increasing the value of his material in a round-about way. For this purpose, he took it for granted that Folmer had succeeded in etablishing the probability of a gradual change in the Frisian skull having taken place in the course of the centuries. He writes: "Instead of arriving at a new confirmation of Folmer's theory by means of personal inquiry, we feel obliged to accept it for the present as proven; and in that way, by reversing the reasoning, to determine the age of the skulls, at least approximately and only relatively."

Whatever wide prospects are opened by Prof. Barge's method, it must not be forgotten that it entails very great risks. Folmer has indeed pointed out that probably the breath: length-index of the modern skull gives a higher figure than that of the Terp-builders. But he never went farther than to make it "probable". Besides this, Folmer compared groups of unequal value, viz. Terpians and Modern townspeople.

A somewhat more reliable method would have been to examine the physical state of the bone-tissue. But in order to arrive at correct conclusions by this means, carefully dated skull material is necessary; and this Prof. Barge had not got. He merely stated that the skulls were brittle and of a dull yellow colour. These facts show them in all probability to have been obtained from the topmost strata.

One specimen is said to have come from the Terp at Sions [2]). It had a glossy surface, and its colour was dark brown. Prof Barge decided that there was no reason to lay this skull aside as being of non-Frisian origin, but ascribed these peculiaritiesin its appearance to a local variation in the composition of the soil.

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[1]) Friesche en Marker schedels 1912 p. 56.

[2]) There is a Terp at Lyons, and a „Mount Sion". Prof. Barge probably meant the former, as this name occurs in the edition of 1913.

Now this skull was probably the only one derived from the deeper strata.

Prof. Barge also stated with regard to the place of origin, "2 are derived from the Terp at Winsum, 5 from the Mariengaarde Terp at Hallum, and most of the others must be assigned to the Terp at Klooster Anjum".

The Mariengaarde Terp was the burying ground of the Praemonstratenser Convent, which is renowned far beyond Friesland. It was founded in 1163 and was first occupied by nuns and monks, and later by monks only. We find the following particulars about the burying ground: "The churchyard of Mariengaarde, which had been desecrated, was again consecrated by the suffragen of the Bishop of Utrecht. "Dr. Boeles found nothing but objects from monastic times in the Terp.

The Terp at Klooster Anjum was also the burial place of the monastery St. Mariaasberg founded in 1256 [1]). So it appears that most probably many of the 34 skulls were allochthonic convent-skulls, and almost certainly late Mediaeval. Therefore Prof. Barge should have commenced by showing that, in spite of well-founded objections, these skulls were really autochthonic. But that would be a very difficult problem, even if he had the necessary material for comparison.

As Prof. Barge has made use of other material, with which he was acquainted from literary sources, we will attempt to determine whether this may have been of assistance in forming reliable conclusions.

The first part of the chapter on the Frisians, entitled "Index Cephalicus" contains a summary of the material used by Prof. Barge with the main object of arriving at a correct appreciation of his own skulls. It was to be expected that he would in the first place compare them with Frisian skulls of the same period, in casu with Mediaeval ones and which he certainly knew to be autochthonic. This he did not do, but collected some seven existing groups of Frisian and Groningen skulls, each one of which in itself presented a number of unsolved problems. To begin with, the very important question, whether from an anthropological point of view, the skulls from Groningen may be classed as equal with those from Friesland. On this weighty point Prof. Barge expresses no opinion.

[1]) Oudheden en Gestichten van Friesland, 1723, II, Vol. II, p. 129—130.

The groups on which this investigator grounded his arguments were as follows:

a) The 19 Terp-skulls described by Dr. A. Sasse in 1874. In 1877 Virchow justly declared them to be of questionable value for the Anthropography of Friesland, as they were probably for a great part allochthonic (p. 163).

Then Prof. Barge presents to us 5 of Folmer's groups, but without accurately stating from which of Folmer's publications they were taken. After some trouble, we have succeeded in placing them, however.

b) "19 Terpskulls of various origins", as Prof. Barge says. We had great difficulty in identifying these. At first we supposed them to be the 19 Groningen Terp skulls of 1890, as these were a most fitting subject, although they came partly from the deepest strata and partly from the higher ones. But the figures did not tally, and we knew for certain, that Folmer had described no skull with an index of 84.2.

Finally this brachycranium guided us aright. Prof. Barge has evidently added together the 18 skulls that Folmer described in 1891, with a doubtful hand. This group is a mixed assortment of Frisian and Groningen crania of unknown origin, some from the deepest, and some from the surface strata; some authochthonic and some allochthonic, and some that had no connection with the Terps. The three skulls from Lutjesaaksum are probably from the inhabitants of a monastary and therefore allochthonic. The brachycranium from Schaphalsterzijl had belonged to a warrior, and was consequently almost certainly allochthonic. The origin of the brachycranium from Hallumermieden is doubtful, and brachycranium L was a modern Specimen Skull.

But this group contained only 18 specimens, whilst Prof. Barge mentioned 19. The only solution is that, misled by the way in which Folmer has made out his table, Prof. Barge has counted the average figure (79.5) of the preceding series, as a separate skull. If we calculate the percentage of mesocephalicae including the above figure, this actually appears to be the case.

c) Folmer ([2]) 10 crania from Lutjehuizen.

d) Folmer ([3]) 12 Modern Leeuwarden crania.

As we have pointed out in discussing Folmer's groups, this one is rather open to criticism. Nor is it clear why Prof. Barge did not

combine this small group with other skulls from Leeuwarden to form one set of some importance.

e) Folmer (4) — 19 skulls from the deepest Terpstrata. Presumably these are the Old Frisians from Folmer's treatise of 1890.[1])

f) Folmer (5) 24 Modern skulls from Leeuwarden.

g) 65 Museum skulls, measured and partly described by Prof. Bolk in 1908 [2]). As we have shown, this is probably a mixed group with the extreme indices 68.17 and 86.4, so with a much higher maximum than any of Folmer's Terp-groups.

Contrary to the opinion of Prof. Bolk, Prof. Barge says: "It is not likely that they are only from the deeper strata, which would be a mere accident, as to my knowledge no attention was paid to the matter when they were collected." p. 65. Presumably, therefore, these skulls came from different depths, and would be of little value for accurate determination.

h) Prof. Barge's own group of 35 skulls with an average index of 77.84, which is almost as high as any of the group of Modern Leeuwarden skulls (78.2). The shortest cranium, with an index of 89.05, was more brachycranic than any of Folmer's Terpskulls.

On considering these skulls we are especially struck by their highly mixed character. Evidently Prof. Barge was of the same opinion, for he applied a method which has been so far little used (Bolk) in Terp-literature. He grouped all the specimens together, in order to construct a curve, and in that way to subdivide them into elements. But this was not free from risk, as the brachycephalic element was already present among the Older skulls and, generally speaking, the Terpmaterial is of highly heterogeneous origin. How difficult it is to clear up the question in that way is apparent in the pages which Prof. Barge has devoted to it [3]).

As an instance of a somewhat doubtful conclusion arrived at in this way, we may cite the following: "On the contrary, I should wish to regard the skulls of the above-said groups of Sasse, Folmer and our own, as found, not only in the more superficial strata, but even exclusively in the topmost strata of the terps". Now from Folmer's first discusion (1881) we know with certainty, on the evidence of the burial gifts, that the skeleton of Lutjesaaksum

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[1]) Ned. Tijdschr. v. Geneeskunde, 1890, I, p. 608—9.
[2]) Boerenhuis, pp. 150—152.
[3]) P.p. 60—65.

SKELETON LUTJELOLLUM 24

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(two-edged sword) dates from Frankish times, and therefore must be from the lower strata. Also that the brachycranium of Enum, with Denarii of the Emperor Antonius Pius, dated 151, 154, 160 A. D. must date from the first years after the second century [1]). There are but few skulls of which we know the date with so great certainty as of these two. But other crania in this group have most probably come out of the deeper strata.

In the same way, Prof. Barge's assertion that "about 800 A. D. the brachycephalic element of the Frisian people had already made considerable progress" requires further testing [2]).

Finally we will show, by means of a frequency curve, how strangely the partly allochthonic Mediaeval material used by Prof. Barge contrasted with the autochthonic Terp-skulls. As we have no other Mediaeval Frisian material available, we have contrasted with it the Mediaeval "village-race" of Lutjehuizen; though we are well aware that we are using material which cannot with absolute certainty be placed in one class with Mediaeval Frisians.

	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
45 Old Frisians	2	3	5	7	7	4	9	3	1	2	0	2					
23 Old Groningers	0	2	0	0	4	3	3	2	4	1	1	2	1				
10 Mediaeval Groningers		1	0	2	0	0	3	2	0	2							
Series of Prof Barge	1	1	0	2	2	1	3	4	3	4	7	1	2	1	2	2	1

It further remains difficult for us to inquire whether Prof. Barge can have arrived at reliable conclusions from the study of the above-mentioned skulls known to him from literature. We need only add a few closing remarks. The first group was allochthonic, the second is unsuitable as a standard of comparison; the third is small and consists of Groningen skulls. We have already stated our objections to groups 4 and 6 consisting of Moderns from Leeuwarden; the seventh is mixed, and has only been partially measured by Prof. Bolk (length, breath and height according to Broca's method, and length and breadth of face). So there remains only the fifth group as being of any real value, viz 19 skulls from the deep strata of the Frisian Terps. But as this Old series was continually compared and combined with less reliable groups composed of skulls from different periods, even the

[1]) The Roman coins were current till after the decline of the Empire.
[2]) P. 66.

careful accuracy with which this investigator has noted and compared the different measurements and indices, cannot give to his results the great importance they would have had if he had been able to use more reliable material. It is greatly to be regretted that the work of Prof. Barge has been prevented by the difficulties of the investigation, and the scarceness of accurately dated materal, from yielding such fruit as it deserved to do.

B. *Modern Material*

Having presented a survey of the most important researches about the Terp-builders and the later Terp-dwellers, we now proceed to state the chief results of the inquiries about the Modern Inhabitants of Friesland and Groningen.

Earlier authors

One of the first inquirers to take an interest in the Frisians was J. B. Davis, who already in his Thesaurus Craniorum (1867) determined an index cranicus of 78., based on the measurements of 6 skulls. This figure approached very near to the average afterwards obtained from the study of far more extensive material.

The Leyden Professor J. van der Hoeven, gave in his well-known work Catalogus Craniorum Diversarum Gentium (1860) a few figures, and a short description of 4 Terp-skulls from Bolsward. Lubach in his Natural History of the Netherlands divided the present-day population of Holland into two groups: the Frisians and the Low Germans. He described the Frisian skull as being "with some not very rare exceptions, a long oval with protruding occiput, and but slight arching of the crown, as is also found in the shape of so many Scandinavian skulls".

Therefore Lubach clearly indicated the resemblance with the Scandinavians, and he had also observed that the Frisians, though not unmixed, constitute a clearly distinguishable type. Virchow (1874) published the index cranicus of some skulls from the environs of Leeuwarden, and 2 from Groningen (Davis). But it is

A. Sasse

to Dr. August Sasse that we owe the most extensive and exact data about the Frisians.

In his report "Sur les Cranes des Frisons" [1]) Sasse disputed Vir-

[1]) Revue d'Anthr., 1874, p. 633—653. Vol. III.

chow's opinion that the Frisians, unlike many Northern tribes, had always been settled in the same place. Virchow declared that not a single Frisian skull had come into his hands that was not brachycephalic. As long as he had no more accurate information, Sasse kept to the opinion "that the Germans were originally dolichocephalic, whilst the skulls of their progeny are broader or shorter in consequence of crossing with brachycephalic tribes, whose existence in Denmark and in South and North Germany has been proved, and which I have myself found in our province of Zeeland". However, in this paper Dr. Sasse described 17 skulls, chiefly obtained from the Terp at Hartwerd, on which the monastery Oldeklooster had stood. Consequently the skulls were those of monks or of anabaptists from other districts, and therefore probably allochthonic.

In his "Memoires sur les Crânes de Geertruidenberg" 1875 he compared these presumably allochthonic skulls with the Frisian and other Netherland skulls. Therein he pointed out the great merit of Virchow in having been the first to draw attention to the low type occurring among the Netherland skulls. According to Sasse, this type occurs in considerable numbers in North Germany, and especially in the Northern parts of our country. In 1876 he proposed to compare his 19 Frisian Terp-skulls with the crania of the Eastern Provinces, in order, by craniological means, to try to determine whether the opinion that the Anglo-Saxons had lived here before crossing over to Britain might be accepted as correct.

The Kolhorn Skulls (1877) were especially remarkable as being extremely low. "This skull-form", says Sasse, "is indeed found among the inhabitants of West-Frisia, and may even be seen among the more Southern skulls of de Rijp and Geertruidenberg; but I am persuaded that it is not the type of the Frisians, as Virchow asserts it to be. The fact is that Virchow's pronouncement was only based on the study of his 6 Warga skulls, and therefore not sufficiently justified. Sasse thereupon appealed to his Frisian colleagues to furnish him with a sufficient number of "just common graveyard skulls". Already at that time Sasse took up the right standpoint, and declared that he would rather have skulls "from a part of Friesland where Frisian is still the language of daily speech",

than from Leeuwarden and the villages in the immediate vicinity of that town.

Among the skulls obtained from the churchyard of Hoek, the oldest part of Leeuwarden, and which had been closed in 1680, there was not a single brachycephalic one of 83.33 and upwards. Whilst his West-Frisians from Langendijk and Kolhorn had an average index cranicus of 76.9, the average ind. cran. of the Leeuwarden skulls was 78.8. The height: length-index was 74.2 — so, not brachycephalic and low. In an appendix Sasse printed a couple of letters from the famous philologist Prof. Kern, in which he states that Friesland can only have extended as far as the Z w i n between 500—600 A. D., and that the Seven Zeelands of Friesland only extended from the Vlie to the Lauwers.

In 1878 Sasse published the measurements of a skull from Ameland and another from the Island of Schokland. This latter Zuiderzee skull proved to be not low, in contradiction to the opinions of Spengel, Virchow, and others, and Sasse justly asked whether too much had not been expected of these skulls.

In 1884 Sasse made the following important communication about the skulls of Sneek: "So I found more traces of mixture in the Leeuwarden skulls than in those from the open country round Sneek. But in neither case is the series of skulls large enough to furnish fully reliable averages. Therefore we shall have to wait for a supply of more skulls from Friesland, and preferably from the open country, separated as far as possible from the great centres of population and traffic, before the Frisian skull-type can be determined with sufficient certainty."

Whereas Folmer gave a detailed description of each skull in the German fashion, Sasse omitted doing so for the following reason: "For anyone who works by preference in the sphere of craniology, these descriptions are excessively tedious, without presenting anything like a plastic image of the skull". Yet we are very grateful to Folmer for not omitting to describe the habitus of each specimen; nor do we at all agree with Sasse's opinion, who considered it conferring too great an honour upon every skull. These remains of the Northern pioneers of our shores have thus far received but too scant honour.

Sasse thought that the height: breadth-index would be especially valuable for the Dutch skulls. He writes: "The breadth is in-

deed a far more enduring measure for these skulls, and liable to less variation than the length"[1]). He tried to demonstrate this in 13 sets of skulls, but did not succeed very well. It is true that the average absolute breadth differed less, but the percentage of the variation about the average seemed, if possible, still higher than that of the length. The extreme figures for the length were 9.3 % and 16.3 %, average 14.6 %; and for the breath 8.4 % and 22.2 %, average 13.9 %.

Rudolf Virchow

Virchow's great study of the Frisians (1877) has had a most important influence. Like his investigations among schoolchildren, it was partly the result of his dispute with de Quatrefages, who, under the pressure of the war-spirit of those days, had made out the Prussians to be Finns. For this purpose Virchow applied himself ardently to the study of the Anthropography of his country, which he has afterwards developed as no other German investigator. Many of the Dutch inquirers have been formed under the influence of Virchow's book. Through the kindness of the Folmer family we have been enabled for some time to study the copy that was used by Dr. Folmer, and which contains such convincing traces of the use he made of it, that even without knowing Folmer's work it is easy to guess to what book he chiefly owed his inspiration. Virchow's influence upon A. Sasse has been great also, although it inspired the latter more with a spirit of contradiction. In some parts, Prof. Barge's book resounds with the echo of the mighty voice. Many of the ideas of the Dutch authors are already to be met with in Virchow, albeit in another form. But, on the other hand, it is a fact that the inquiries of the Dutch anthropographers have been a useful help to Virchow.

As a reaction against Virchow's enormous authority, his mistakes have been specially emphasized after his death. Yet in spite of its faults, such a book as "Physische Anthropologie der Deutschen" would have shown him to be an Anthropographer of great merit, not only for his own country, but also for the surrounding lands.

Virchow's work at once rose high above that of those Anthropographers who had confined themselves to more local inquiry, because he stated his problems from the start, and thereby gave the reader a prospective view of the main lines along which he

[1]) N. T. G. 1886 II p. 530.

intended to operate [1]). Though there was a general desire to establish a "mittleren Typus des Stammes" (average type of the race), for the European civilized nations, Virchow thought that the individual differences had increased so greatly as to make it appear impossible to many inquirers to determine a mean type for each nation separately.

Therefore Virchow propounded the query: "Wie entstehen die in demselben Volke hervortretenden, verschiedenen Typen?" [2]) He sought an explanation in two directions: 1. Environmental influence, 2. Mixture of races. In either case it was necessary to search for the original type, both if new types had sprung from it by derivation, or if it should be looked upon as a normal type resulting from mixture with other types. It was natural to suppose that the best way to pursue such a genetic enquiry was to penetrate far back into the early development of the nations. In that way it was thought possible to "reconstruct the original type of the Germans from the remains found in graves." "But experience has plainly shown", writes Virchow, "that this only leads to going round in a circle. For a skeleton from a pre-historic grave could only be recognized as German, if we first know the type by studying skeletons belonging to historic times". But a hasty glance at the remains found in the Reihengräber showed that many things were still but little known.

But now another difficulty arose: "Herr Ecker selbst hat in Hügelgräbern derselben Gegenden Südwest Deutschlands, in denen die erwähnten Reihengräber lagen, brachycephale Schädel gewonnen, welche aller Wahrscheinlichkeit nach, älter sind als die dolichocephalen der Reihengräber" [3]).

If these brachycephaliae are to be regarded as non-Germanic, what is to be said of the occurrence of brachycephaly among the German population? Do all these brachycephaliae derive from a pre-Germanic people, who were temporarily driven back by German immigrants, or has the dolichocephalic skull been changed to a brachycephalic one in the course of time?

Moreover, of both headforms there are various kinds to be

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[1]) He was of opinion the study of Polynesians and Chinese had gone far enough, and with the introduction of the genetic and comparative method, the time had come to concentrate his energies upon the people of his native country.

[2]) Phys. Anthr. p. 2.

[3]) Phys. Anthr. p. 5.

distinguished, of which too little is known to enable an original type to be derived from them. Virchow declared it to be a problem for the future to arrive at a clearer insight into the anthropological elements by means of local inquiry.

The genuine German type, he said, is distinguished by dolichocephaly, orthognathy, and large build of body. It was chiefly found in Scandinavia and England, but ever less frequently in Germany. Did not von Hölder write to Beddoe that he desired to visit England to see true Germans? An explanation of the change has been sought in many directions.

Next, Virchow published the results of his researches among schoolchildren, saying that the pigmentation increases from the North West of Germany in a South-Easterly direction.

The German tribes have repeatedly changed their dwelling-place in the course of history, and Virchow writes: "Für den Beginn weitergehender Forschungen werden wir daher mit vorsicht wählen müssen, wo wir den Hebel der Naturwissenschaftlichen Untersuchung am sichersten auf den beglaubigten Untergrund historischer Ueberlieferungen aufsetzen können. Solche Gegenden giebt es in Deutschland unendlich wenige; vielleicht nur ein einzige, und das ist Friesland" (p. 13).

Here we come to the weak spot in Virchow's interesting argument. We pass over the question whether this theory of Friesland conflicts with certain classical authors and, further, whether it is as true for the period of the Wanderings of Nations throughout the whole of the territory that Virchow understood thereby. Neither do we express ourselves regarding the Frisian Croniqueurs, who already sought a connection with India, when others thought but of descent from Japhet. Nor whether we have as high a regard for the Oera Linda Book [1]) as Virchow. Considering "Panta Rei" as a fundamental principle of Anthropography, we cannot but think Virchow's opinion that no immigration had taken place in Friesland, rather puerile for such a great mind [2]). He also used the name Friesland in a very wide sense, adding to the country

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[1]) Most probably a falsification. Dr. M. de Jong Hzn. Joh. Winkler en het Oera-Linda Boek. De Vrije Fries 28 P II 1926.

H. Otto, Historische Skizzen auf Grundlage von het Oera Lind Bok. 1875.

[2]) E. Pittard, appealing to J. de Morgan, L. Lefèbre, and Brunhes et Vallaud, writes: "l'Europe occidentale surtout (est) un cul-de-sac, dans lequel s'étaient succédées ou entassées des masses migratrices".

between the Vlie and the Eems the Zuiderzee region as well as Eastern and Northern Friesland. Had he disposed of Terp-material from the lowest strata, he would certainly have formed a different conclusion. But his collection of material was not a strong feature in his researches. It was very limited and the material was not always shown to be autochthonic.

Virchow drew special attention to the extraordinarily inferior height of the Frisian skull, which had been pointed out by Davis and Welcker already. Also to the height of the facies temporalis, which had also been noticed by Spengel. He not only expressed it in figures, but says that the liniae semicirculares rose as high as in savage races. Virchow pointed out that his 6 Frisian skulls showed an important sex difference, as the four female skulls from the vault at Warga had a considerably higher index cranicus. The two male skulls were however almost certainly allochthonic, so that the difference was most likely a difference of race. The high index being the most constant, Virchow considers "die Niedrigheit der Frisian Schädel als das am meisten typische Merkmal".

In comparing a skull from the Terp of Potshausen in East-Frisia Virchow drew attention to the resemblance with the „Neanderthaloide" Marken skulls of Spengel, and also with the Neanderthaler itself. He placed the different homogeneous points of the two test curves in a similar position in order to bring them into congruence. In this way the more powerful supra-orbital development of the Neanderthaler is rendered clearly apparent. Virchow also remarked the difference in the length of the frontal part of the curve, and the sagital seam of both skulls. He explained the greater length of the frontal part of the curve as caused by the more powerful development of the regio supra-orbitalis. He declared the occurrence of the Neanderthal skull to be nowhere more frequent than among the Frisian race.

For this reason Virchow thought it not impossible that there was any ethnical connection. In his summary he expresses himself still more decidedly: "Die Analogien mancher dieser Schädel sind so gross, dass die Frage berechtigt ist, ob derselbe nicht wirklich dieser Gruppe angehört. Am meisten ausgesprochen sind die Besonderkeiten in verschiedenen friesischen Provinzen, nicht nur im eigentlichem Friesland (Mittel-Friesland) sondern auch in West- und Ost-Friesland. Ja, sie lassen sich noch weiter,

namentlich nach Osten und Süden verfolgen, bis in Gebiete, welche schon in vorkarolingischer Zeit als sächsische genannt werden" (p. 356).

Though Virchow raised the question whether the Neanderthaler was to be regarded as belonging to the Frisian race, we must not forget that he based his arguments on the supposed pathological character of this skull (1872), which was only refuted by Schwalbe in 1901—1902. Hence he had to make attempts to classify the skull with one of the known races. That the idea did not appear strange to others at that time, is evident, as A. Sasse, Houzé, de Quatrefages et Hamy, J. Sasse and several other investigators had found supposed resemblances between the Neanderthal skull and recent individuals.

Virchow considered the Frisians, with their low and short skulls, to be of another type than the Row-grave skulls, but both the Folmers opposed this opinion.

Various authors

In 1880 several of Vichow's assertions were disputed by von Hölder, who denied the accuracy of his theory that the Frisians have remained free from mixture, and therefore should have preserved a characteristic headform of their own. So the typical Frisian chamaecephaly is not especially Frisian. It is found everywhere in South-Germany, especially in Wurtemberg.

In their Crania Ethnica (1882) A. de Quatrefages et E. S. Hamy reprinted some of Virchow's conclusions without much comment. Joh. Sasse's study of Frisian skulls in 1895 referred to 16 crania from Terschelling, whose autochthony was however doubtful, as they were perhaps from shipwrecked mariners. Moreover Sasse's remarks are merely superficial in this work.

J. Deniker published in 1899 (1926) the results of some 30 measurements of living mesocephalic individuals in Groningen (Folmer). These gave an average index cephalicus of 81. The index of 47 skulls from the same province gave an average figure of 77.6.

K. Röse, who, in cooperation with G. Retzius a.o. made, a most extensive anthropometrical investigation in the early years of the present century (1906)[1]) found no confirmation of Virchow's assertion that the Frisians are distinguished by flat heads and

[1]) For Germany and the adjacent countries.

receding foreheads. But his inquiries only extended over a small part of East-Friesland, viz. the neighbourhood of Embden and Leer. He writes: "Einen echten "Friesentypus" mit flachen Schädel und fliehender Stirn habe ich seinerzeit leider nicht auffindig machen können, obwohl in Königs Ulanen Regiment zu Hannover ziemlich viele Friesen dienten."

W. Ripley

An acquaintance with Ripley's Treatise on the Netherlands People is indispensable for a correct knowledge of the whole third period of the Anthropography of the Netherlands. For that reason we give a review of the work in our Introduction. But as the book, which is written in English, is easily obtainable, we need not treat it more fully.

L. Bolk

Among the most important discussions of the Frisians must certainly be reckoned those contained in the Survey published by Prof. Bolk in 1908. It was the first, and so far it is the only one, to attempt an anthropological description of the Dutch people as a whole. Compared with what had appeared before in the field of Anthropography, it is undoubtedly far superior, both by the clear reasoning, and the pleasant style.

„De bevolking van Nederland in hare anthropologische samenstelllng"

Prof. Bolk seems to have started with the didactic intention of teaching the Hollanders that they are mainly not Germanic. In this he goes contrary to a cultural-historic-linguistic-opinion [1]). At the close he comes to the important conclusion that the short head-length of the Frisians is due to an invasion of the Saxons, which must also be considered a cultural-historic-linguistic conception.

Like Ripley, Prof. Bolk assumes Europe to have been peopled by three races. The fourth race, the Dinarians, with their flattened occiput and aquiline nose, who approached the Dutch frontier in the provinces of Liège and the Rhine, was mentioned in the early part of this century chiefly by Deniker, whose six races were rather too intricate a matter to find acceptance in Holland, where Anthropology had made but little progress. Therefore Prof. Bolk made a good choice in principally following Ripley's division, which still finds a fair number of adherents. But, like ten Kate and J. Sasse, we are ourselves doubtful of the incorrectness of

[1]) On the score of language, the Dutch must certainly be accounted of Germanic origin.

Deniker's division. We must still consider the present divisions as well-meant, and a praiseworthy attempt to produce order in the chaos; but should certainly not be astonished at new divisions being brought forward.

One of Ripley's three races, the Mediterranean, was at once eliminated by Prof. Bolk, because, according to this investigator, its extension in Europe is limited to the countries bordering on the Mediterranean. His opinion was contrary to that of Ripley and many other writers, but may perhaps be accepted for tactical reasons.

If we confine ourselves chiefly to the bodily peculiarities we get the following view of the characteristics belonging to both races.

Nordic and Alpine Characteristics.

	hair	eyes	skin	stature	neuro-cran	splanch nocran	fore-head	nose	chin	neck	shoulders
Nordic	light blond	blue to grey	white	tall	dolicho	lepto-prosopic	not wide	straight convex	not prominent	long	medium
Alpine	dark blond to black	dark grey to brown	white dull	medium	brach.	chamae-prosopic	not wide	short thick concave	prominent	short	broad

Slight differences excepted, the present-day Anthropographers still agree with Prof. Bolk in a great measure. It is a pity that he has not expressed his idea of dolicho- and brachycephalic in figures. As the indices for both races vary a great deal with different writers, we give those of E. Fischer (1923): Homo nordicus, index cephalicus 76—79; Homo alpinus 85—87 (intra vitam). So we may consider that the variations for heads of Homo nordicus may run to a limit of $\frac{79 + 87}{2} = 82$, which agrees with Bolk's limit of $80 + 2 = 82$.

Prof. Bolk pointed out that remarkably pure specimens of the Nordic race are met with. But this is very seldom the case with the Alpine race, as may be seen in a cursory glance at the illustrations. The few photo's of Alpines in Ripley's book have frequently been critised on good grounds. The strong mixture has been attributed to the fact that the Alpines lost many of their characteristics on their hypothetical march from Asia amongst other races. Even

in countries where they constitute a large part of the population they are very rarely found free from mixture. This fact is of great importance in determining their share in populating our country; especially so, when the judgement is largely based on pigmentation.

On this basis the two races differ perhaps as much from each other as in the headform. But as the characteristic signs of pigmentation, easy as it may seem to observe them, are extremely difficult to distinguish, and perhaps still more to express in concise terms, the statements of untrained persons on this matter should only be accepted with hesitation.

Having limited our investigations chiefly to the skull, we should rather not discuss the question of pigmentation; but, as Prof. Bolk has connected it closely with the form of the skull in his survey, we cannot but pay some attention to it.

Ripley described the eyes of the Alpines as hazelgrey and the hair as light chestnut, whilst he made no mention of the skin, which is very important and comparatively easy to determine. Prof. Bolk notices the skin, but left this question untouched in his inquiry; probably in consequence of the disappointing results obtained by Virchow in North-Germany, though in Central-Europe they were more favourable.

It is especially difficult to fix a limit between light, and dark blond hair and between grey, and dark grey eyes, to say nothing of countless other difficulties that have arisen in connection with pigmentation. It is not to be supposed, therefore, that the schoolmasters who performed the investigation made no mistakes; especially as they were not assisted by explanatory colour-maps of hairtests as in England, nor tables of iris-pigmentation such as were used by Prof. K. H e r m a n B o u m a n in his Amsterdam experiment. (1920). The hope that these mistakes would counterbalance each other to a large extent, is decidedly optimistic. The controlling tests afterwards made by Prof. Bouman and J. J. Wap, the latter by personal enquiry, showed already that great surprises might be expected. Though these tables could not be compared immediately, Wap supposed that Prof. Bolk had rightly conjectured that much "dark-blond" had been included under the heading "brown". Moreover, for every seventeen schools which had sent in reports, four had not; and it was not stated how they were

distributed over the country. Nor is it at all sure that the errors committed in collecting the material had been made good by the manipulation. As W. J. de Wilde pointed out in 1911 already, Prof. Bolk only counted the fair-haired as Teutons, classing as Alpines those with brown and greenish brown eyes.

The result was that the fair ones with greenish brown eyes were always counted twice over, once as Teutons and once as Alpines. We do not mention the risk attendant on judging the two races by different standards of marking, especially in the case of children. Until the full report of this great inquiry appears, we cannot form a final judgment as to its value for the Anthropography of the Netherlands.

For our purpose, the most important points in Prof. Bolk's treatise are:

a. His statements regarding the remains of the Terpbuilders and the Terpdwellers.

b. Those on the present-day inhabitants of Friesland and Groningen.

c. The hypothesis concerning the brachyzation of the inhabitants.

The explanation of this latter phenomenon dominates the whole work, and we might almost call the question of the alteration in the form of the skull the "Leitproblem" of Prof. Bolk's work. Let us proceed to determine in how far this investigation has succeeded in bringing it nearer to a solution.

We begin with the present inhabitants of the two provinces.

The index cephalicus in East Groningen, where 565 persons had been measured, was 81.2. Of these, 71.8 % were classed as dolichocephalic. In consequence of the error that has slipped into the calculation, the list of percentages of brachycephals on p. 171 is incorrect. All we know, therefore, about the inhabitants of the province of Groningen is that they are within the limits of longheads fixed by Prof. Bolk, and also within the variation of the skull for Homo Nordicus (Fischer).

In the West of Friesland 418 persons were measured at Prof. Bolk's request. The average ind. ceph. was 80.4. So the inhabitants of this province are also within Prof. Bolk's limit for longheads (82), and within the variation for Homo Nordicus.

The mean index for the present population of Friesland is 80.4.

For 168 the ind. ceph. was under 80, and for 250 higher. So the average for the inhabitants of this province is also within Prof. Bolk's limit for longheads, and the breadth-variation for Homo Nordicus.

On comparing the common index of his Terp-skulls with that of the present population of Friesland (80.4) Prof. Bolk was struck by the large difference [1]). Even when he applied the formula, head-index = skull-index + 2, bringing the head-index of the Terpskulls up to 77, there still remained a difference of 3.4 units. The type of Terp-Frisians (vide Atlas pl. XXXIII.5.) had therefore, says Prof. Bolk, been replaced by the Alpine type (vide Atlas pl. XXIV.1.). A simple measurement on the photo proves that the face of the latter type is wider.

The author begins by stating that, in principle, the Anthropologist should rid himself of all historical and linguistic influences. But at the same time this implies the duty of the Anthropologist not to trespass on the field of the historian or linguist, unless it should be strictly necessary. And yet, after propounding the hypothesis that a foreign element must have driven out the original Terp-Frisians, he utters the following philological effusion: "In this ousting by a foreign element may possibly be found an explanation of the fact that the original Frisian language has not only been unable to develop throughout a large area, but has demonstrably been confined within continually decreasing limits in historic times. The language died out with the people, and the invaders from the East, pushing ever farther West, brought their own speech with them."

Prof. Bolk further states that to the West of the Lauwers the Frisian head had also become shorter. But in those parts Frisian is still spoken to this day, which goes to show that language and bodily form had altered independently of each other. Still it

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[1]) In 1881 Folmer had already come to the conclusion that the Frisian headform had grown shorter, and by 1892 he had collected a large quantity of material to support his opinion. Prof. B o l k writes with the most praiseworthy intentions: "I am happy to be able to confirm on more ample data this great discovery made by an early-investigator, and which is of the first importance for the knowledge of the population of our contry."

One must not lose sight of the fact, however, that Folmer's dead material was both more extensive and more reliable than that of other writers, as well as more accurately worked out. Hence the more ample data mentioned by Prof. Bolk can only refer to his measurements intra vitam.

cannot be said that the linguist and the Anthropologist are yet "a posteriori" in complete accord [1]).

C. J. de Man, the Anthropographer of Zeeland, attempted to show that the headform in his province is also shortened; on the other hand, Prof. Bolk thought the heads in Zeeland had grown more dolichocephalic. Like Victor Jacques, this investigator started from the brachycranic element, whilst de Man started from the dolichocranic. But it has been demonstrated by Dr. Holwerda [2]) that Prof. Bolk's opinion: "In Zeeland also a people, strange to the original inhabitants, have forced their way in", is not founded on any data [3]). Yet the oldest inhabitants of Zeeland known, were dolichocranic.

Prof. Bolk thought that the problem of the invader could only be solved after finding an answer to the question: "What is the relation between the variability of the present-day population and the variability of the proportion of Brunets?" So he made the solution of the question of the headform dependent on the pigmentation problem.

In connection with this fact a few points require discussing before we proceed.

In the first place, the investigator tacitly assumed a correlation between the headform and pigmentation.

He had certainly some grounds for doing so, because he had from the beginning eliminated the strongly pigmented dolichocephalic Mediterraneans. When, however, he introduced the Saxons as broadheaded blonds, the connection between pigmentation and headform was lost.

Secondly, objection may be taken to the way in which the author has attempted to clear up the pigmentation-problem. And in the third place, the problem of the headform requires to be further discussed.

Prof. Bolk stated that in Holland the proportion of pigment increases in a North-South direction, a conclusion to which we can have no general objection, as it agrees with our anthropographical sphere. Quite recently (1923) Dixon pointed out that the only part of the world where the blond type occurs, is in the neighbour-

[1]) J. Huizinga 1914 p. 64-65.

[2]) De Gids, 1912, p. 58.

[3]) Are the three brachycrania from the Terps of Lyons and Achlum, in which Prof. Bolk found points of agreement with the Zeeland skulls, autochthonic?

hood of the Baltic. He writes: "In Europe, in the region surrounding the Baltic.... a powerful, if little understood influence towards bleaching has made itself felt on every people who have come within its sphere"[1]). This is certainly a very plastic statement. From the Alpine region in the Central Mountains of France, a line might be drawn across the Netherlands up to Scandinavia, showing the gradual decrease of pigmentation in the different peoples, whilst southwards it could be extended through Spain with its darker Mediterraneans, to ever darker regions.

Now let us turn to England, which is strongly dolichocephalic, and may be regarded, next to Scandinavia, as the cradle of the Nordic race because it was early free of the glacial ice. From there we draw a second line to the brachycephalic border-mountains between Saxony and Bohemia, which were already marked out by Beddoe and Ripley as strongly brachycephalic. Then this second line will intersect the first one in Holland. Hence it is no wonder that Prof. Bolk conceived the idea of assuming latitudinal zones of decreasing pigmentation, and longitudinal zones of changing headform. There might undoubtedly be some connection between those varying zones and our anthropographical environment.

But the forming of the idea was simpler than its practical realization. The author tried to ascertain where the strongest dolichocephaly occurred in Holland. He found it, not in Friesland, but in the North-Sea villages of Katwijk and Noordwijk, guided by the slight pigmentation and probably also by the finding of Nordic skeletons in the Dunes.

The number of measurements performed in the coastal villages of North- and South-Holland was only 32 however, and these also included individuals from such cosmopolitan places as Scheveningen and Zandvoort [2]). As we have no details concerning these measurements, we cannot determine whether they were performed on autochthonous heads. The Dune-region between Velsen and "Westland" formed the second "strip", and the third was the Haarlem Mere-polder.

Dr. ter Veen (1925) pointed out in his excellent sociographic essay that the population of this reclaimed land had flowed together from all the alluvial regions of Holland, and they therefore

[1]) R. Dixon 1923, p. 479.
[2]) There are no measurements from Noordwijk.

could not serve as a proof that the skull-index increases towards the East [1]). The fourth "strip" consisted principally (87 in 97) of inhabitants of the village of Castricum. After the next strip there came one that proved to be as dolichocephalic as the Dune region.

From this we see clearly how artificial the system of strips was, besides leaving large portions of the country out of the reckoning.

Prof. Bolk found the Alpine types purest in the neighbourhood of Venlo, in the most easterly strip, which is in contradiction with the opinion of Houzé (1882) that the adjoining province of Limburg is the most Nordic part of Belgium, where the German tribes had probably passed through in the period of the Wanderings of the Nations. A. Sasse had already remarked on the great difference in headform of populations at short distances apart (Westzaan, ind. ceph. 78.8, de Ryp, 81.9; distance 12 K.M.; Langeraar, 75.4; Kockengen, 82.9; distance 24 K.M. and in the neighbourhood of Hulst, 74.2 and 91.4). A division into strips is not possible for any people in the "vast cosmopolis" (Pittard) of Western Europe, nor was it so in Ripley's time, when great results were obtained with but a few measurements. This division into strips appears highly risky and tentative.

Although the idea looked very promising, as we have already stated, yet we consider it dangerous to found such important conclusions on it. Prof. Bolk however connected the great differences of race in Holland closely with these perpendicular lines, "differences such as are but seldom met with in Europe." He also thought the system brought out unexplained contrasts. As an instance, he contrasted the dolichocephalic dark-haired Walcheren Islanders with the extremely fair brachycephals of West-Friesland. The inquiries of Wap in 1921, however, showed the number of blonds in Middelburg (73.5 %) to be much more considerable than that noted by Prof. Bolk (60 %), and the longheaded brunets always in the majority in the various combinations of pigmentation and headform. This led him to the conclusion, in agreement with Ripley, that the Zeelanders had a Mediterranean strain. If Wap is correct in his opinion, and we see no serious objection to it, whilst it certainly agrees with the Vox Populi, which calls the brown-eyed Zeelanders descendants of the Spanish soldiers, there

[1]) Dr. H. N. ter Veen. De Haarlemmermeer als Kolonizatiegebied, p. 16.

can be no true comparison between the people of Walcheren and West-Friesland.

Prof. Bolk states about the latter: "The extremely fair West-Friesland has a population that is on the average brachycephalic". If, however we subtract 2 from the average index cephalicus for Drechterland, from which district the measurements were obtained, we come to an ind. cran. of 78.4, which is not far removed from the figures for West-Friesland (Broek op Langendijk and Kolhorn) noted by A. Sasse (77.5). Sasse called them sub-dolichocephalic. Now there is nothing particularly remarkable in sub-dolichocephalics being fair.

Prof. Bolk writes that a perpendicular crossing of the strips would render it impossible to bring our present-day population into agreement with the previously mentioned characteristics of the two races, the fair dolichocephalic Teutonic, and the dark round-headed Alpines. As we have now demonstrated that the perpendicular strip-division cannot present a factor of importance, one of the principal objections to the assumption that the Nordic long-heads also have been brachycephalized by Southern short-heads, has been overcome.

Let us also consider the further objections [1]) point by point. Prof. Bolk writes: "If such an intensive mingling has taken place, the second anthropological characteristic that we have investigated, the degree of pigmentation, ought to afford a proof of this". But this is not necessarily the case. It has been pointed out by Sasse in 1912 [2]) and by Cox that the colour of the hair and the form of the skull do not obey quite the same laws of heredity. Prof. Bolk himself looked upon the Saxons as fair-haired Alpines, but did not express any opinion as to when they lost their long-headness, or attained their blond complexion. Moreover, most investigators still differ as to the degree of pigmentation among the Alpines.

"The difference in the numbers of brunets in the North and the South of our country is too great to assume that there has been interchange or fusion of our people on any large scale" says Prof. Bolk (p. 183).

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[1]) Boerenhuis, p. 183.

[2]) Onzekerheden en vraagpunten betreffende de Anthropologie van Nederland. T. A. G. 1912, dl. XXIX, p. 14.

But all over the country there is continual fusion between the people of adjoining communities, and large administrative districts, though a considerable time must elapse, of course, before the Southern provinces exert any perceptible influence upon the Northern ones.

It takes place far more rapidly along the great lines of communication. On the example of Virchow, Prof. Bolk already pointed to the equalizing influence of the great rivers, whilst canals, roads and railroads have also contributed to the assimilation. The Zuyder Zee, which penetrates into the very heart of the country, is a Mediterranean Sea on a small scale, which has at all times strongly promoted mixture. Wherever great works are undertaken, such as peat-diggings, drainage operations, reclaiming of waste land, etc. the people flock together from far and near, as the sociographic work of Dr. ter Veen has clearly proved [1]). All towns offer means of existence to persons from distant parts, and on the other hand the country districts are racially influenced by the towns. This fusion was probably already going on in the Middle Ages, and has since been steadily increasing, as the means of communication have improved. The fact that the differences in pigmentation are still pretty considerable, need be no reason, in our opinion, to deny the existence of this fusion. Whoever does so, takes, in a sense, the same attitude as Virchow did with respect to Friesland.

In cases of crossing with Southern round-heads, the direction of the index variation would run from North to South, just as the pigmentation line, so thought Prof. Bolk. But in this case he represented the highly complicated facts far too simply. A glance at the pigmentation-chart (eye-colour) of 1904 shows that the boundary lines of pigmentation-areas in reality present strong curves; e. g. the band of 40 % pigmentation runs from 's Hertogenbosch in a South-Easterly direction to Limburg, whilst that of 10 % winds from West-Friesland through North-Groningen to the Middle of Drenthe. Even the outlines on the far simpler chart of Prof. Bolk in 1908 [2]) present wide curves. There the results of the

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[1]) If a large number of sociographic descriptions of various parts of the country will be produced in the near future, for which Prof. S. R. Steinmetz has been making a strong demand for more than twenty years, the number of bonds between north and south will be found to be very large.

[2]) Boerenhuis, p. 179.

inquiries into pigmentation are not to be reduced to a mathematical system. So much is not to be expected from inquiries as to the head-form.

After these three arguments Prof. Bolk ends by stating: "The change in the original population-groups cannot, therefore, at least not exclusively, be traced back to a mingling of the two original elements."

It is contrary to the results of the skull-measurements that have been effected here, to suppose that the two hypothetical original population groups were so sharply distinguished as Prof. Bolk suggests. It has always been possible to show traces of crossings. Consequently no Anthropologist would demand that brachyzation should be exclusively traced to the mixture of Northern dolichocephalic and the Southern brachycephalic elements. The qualification "not exclusively" perhaps seems to indicate that Prof. Bolk saw the weakness of his reasoning. The following passage probably reveals his intention to have been to lead up to the grand climax of the great mysterious unknown: "Everything tends to indicate the influence of an element foreign to the original inhabitants."

This seems to bring the solution of "the Leitproblem". The system of latitudinal and longitudinal strips was in fact intended to prepare the way for a hypothetical invasion of brachycephalic, fair-haired strangers from the East.

Dr. J. Z e e m a n, one of first to interest himself in an inquiry concerning the bodily height of the Dutch, wrote as early as 1869 in connection with the decline of the Frisians: "Meanwhile a stronger and more numerous low-German tribe was pushing them (the Frisian nation) towards the sea from the landside. And the Low-German tribe, who were forcing them onward, were pushed from behind by a coarser and more numerous people, coming down from the hills to the plains, and making their way to the sea along the Rhine and the Meuse."

Dr. Zeeman, therefore, had already perceived the invasion of Alpine strangers from the East and the South. It is the pushing, partly round-headed Germans, seeking room for expansion, who for centuries past, especially in times of depression, have been seeking refuge in "prosperous" Holland, so favoured by the sea. This must have attracted the attention of many scholars who

have occupied themselves with the study of anthropographical problems in this country.

Prof. Bolk had observed that the index cephalicus in the West of the Netherlands is lower than that in the Eastern parts of the country. This is undoubtedly an important discovery, for the two Sasse's, Ripley, Beddoe and most other Anthropographers supposed, at the commencement of this Century still, that the index was lower in the East of the Netherlands than in the West. Prof. Bolk probably at once sought a connection between the increasing breadth, and the penetration of the Germans. But it is perhaps to be regretted that he first thought it necessary to do so by means of a long reasoning starting from the West-Coast.

In his discussion of the headform, published in 1920, in which he handled more than twice as much material as in 1908, Prof. Bolk expresses no opinion with respect to the difference between Nordici and Alpines in the composition of the Dutch population.

„Over den index cephalicus en de absolute maten v. h. hoofd der bevolking van Nederland"

He certainly contrasts the provinces where the Frisian element preponderates with those with a mainly short-headed Saxon population. Here the writer attempts to draw an anthropological comparison between two cultural-historical-linguistic groups.

Prof. Bolk himself shows how arbitrary such a comparison must be, when he claims the provinces of North- and South-Holland, Utrecht and Guelderland as Frisian.

As far as North-Holland goes, one might agree to some extent, and sound arguments may be adduced in favour of South-Holland as well. But how about Guelderland, with its lower skull-index? (see Map p. 11).

At the commencement of this book Prof. Bolk speaks of the index cephalicus of the head and the skull. So it seems that contrary to his earlier practice, he now abandons the difference between the head-index and the skull-index.

This was also done by Topinard, because he considered that the difference fell within the accuracy limit of measurements. We cannot but suppose that Prof. Bolk reposed sufficient confidence in the accuracy of his investigators, though he merely states in connection with the material collected: "My exertions have at last enabled me to obtain data of 9975 male inhabitants of Holland"

(p. 970). Yet we should be glad to know something more about these investigators.

As moreover this writer differs in this matter from most other Anthropologists, the absence of any valid reasons for so doing is somewhat surprising. The more so if we remember that in 1908 Prof. Bolk repeatedly draws our attention to this difference between the indices.

These 9975 data not being arranged according to the index cephalicus, as Prof. Bolk had done in his discussion of 1908, the share of the different elements in the composition of the Dutch population cannot be determined without difficulty, especially as the division in longitudinal strips has been given up. It is to be regretted that Prof. Bolk has not sought for anthropographically connected areas, though we confess it would have been a most difficult problem. It is true that he gives a survey of the mean indices for each province, but these are administrative units, where the population is massed together without any regard for the demands of Anthropography. Besides this, they are too large for the figures obtained to form any valuable basis for further conclusions [1]). The difference between the several provinces generally only amounts to a fraction of a unit, or less than a possible error in the observation. Consequently, if Prof. Bolk should indeed neglect 2 units, his results could have no value for determining the mean index cephalicus for the various provinces, as the greatest difference, that between South-Holland (79.6) and North-Brabant (81.5), is only 1.9.

The number of persons measured varies considerably for the different provinces, whilst several other factors, such as the bodily height in the North (Johannsen), have been neglected. Nordic Groningen does not produce a higher average than Zeeland (80.8) and Limburg (80.6). Even if we compare Groningen with North-Brabant, where the bodily height is notably less (Gr. 169.8 c.m.; N.Br. 167.1 c.m.) the difference between 81.2 and 81.5 is far too small to be reckoned with seriously. The index cephalicus of Friesland (80.4) is equal to that of Guelderland (80.4) and about equal to that of Limburg (80.6) and Zeeland (80.8), in which

[1]) Prof. Bolk wrote in 1914 himself: „wie unzureichend im allgemeinen die auf gröszere Bezirke wie ganze Provinzen sich beziehenden Durchschnittsziffern für Schluszfölgerungen anthropologischer Art sind" (Körperlange p. 20).

provinces almost twice as many measurements were taken as in Friesland. Compared with the considerable difference in the height figures, (Friesland 171.4 mm; Zeeland 167,9 mm. and Limburg 167,3 mm) the variation in the index figures is remarkably small. Nothwithstanding Prof. Bolk has also stated the average for the two largest towns, we do not think his manner of treatment does full justice to his material. Perhaps greater results would have been obtained, if he had seen his way to express the data from the various provinces by a method of curves.

Now let us consider whether Prof. Bolk's opinion as to the predominance of round heads is confirmed by this more extensive material. If we confine ourselves to the division of the indices published by him in 1920 (ind ceph. = 80), this is most certainly the case. For on this basis only are South-Holland and the two-largest towns mesocephalic.

But if we keep to the Martin's limit of 81 between dolicho-mesocephaly and brachycephaly, eliminating the province of Drenthe, where the mean index is exactly 81, the only brachycephalic provinces are Groningen, Overysel and Noord-Brabant, whilst the seven other provinces are "longheaded". The long-headedness becomes more apparent when we compare the numbers measured of both groups. The number measured in the short-headed provinces amounts to 1640 ,and in the long-headed provinces 7875, so that the number of longheads in Holland is about five times as large as that of the shortheads.

If, as Prof. Bolk did in 1908, we take 82 as the limit, whereby, in conformity with Prof. E. Fischer's limit, we keep within the variation width of the Nordic race, the averages in all the provinces prove to fall below this figure. Most of the provinces are even far below the limit, e.g. South-Holland (79.6) Friesland and Gelderland (80.4) North Holland and Utrecht (80.5), Limburg (80.6) and Zeeland (80.8) and also the towns of Amsterdam (79) and Rotterdam (79.2). So Prof. Bolk's results of 1920 again prove convincingly that the Netherlands form no exeption to their anthropographically Nordic environment.

Prof. Bolk's treatise of 1924 on the composition and the origin of the Dutch people agrees with his book of 1908 in the main, but, besides the two races that had peopled our country in prehistoric

„Samenstelling en herkomst der Ned. bevolking"

times, he now assumes two "varieties" that have mingled with them within the historic period: the Saxons and the Franks.

As we have already observed more than once, these two names do not represent an anthropological, but a cultural-political-historical-linguistic idea. Probably it will be very rightly objected that the name "Frisian" represents a similar idea. We have used this term, because we preferred it for the present rather than "Terpians", by which term we denote the inhabitants of the Terp-region, a sharply defined anthropographic group. But that is not the case with the largely hypothetical streams of peoples who may have poured over Holland in proto-historic times.

A strong objection to the inpouring of these "varieties" is the fact that an archaeologist like Schuchhardt declares that "the Saxon stream" got no farther than the river Weser and never reached the Low Countries. Schuchhardt wrote of the conservative Low-Saxons, "Wes Stammes die Sachsen waren, desselben waren auch die Megalithgräberleute, gleichviel ob sie sich selber schon Germanen nannten oder nicht" [1]). Our pre-historians Holwerda and Van Giffen are producing ever more material according to which the palae-ethnological facts may be arranged on wide lines, showing that there has been an almost uninterrupted flow of the Megalithic- and Glockenbecher cultures over the Proto-Saxon Germanic cultures to the Batavo-Frisian, Gallo-Germanic and later-Germanic civilizations (Holwerda). No doubt new elements came in during the Völkerwanderung-period, as perhaps is proved by the grotesque Scythian animal-ornament from the South East of Europe in the 5th century, which Holwerda attributes to the mighty Gothic empire. Holwerda, Schuchhardt Van Giffen believe that Saxons settled along the Frisian coast [2]). But this is far from proving that these tribes settled in Holland en masse. If great streams of barbarians had hurled themselves upon the population, most probably there would have been a sudden break in the civilization, as was the case with the wealthy Roman culture in South-Limburg, which was suddenly and definitely destroyed [3]).

[1]) Alteuropa 1919 p. 341.

[2]) v. Giffen (1927) says about the Reihengräberfield of Looveen (Drenthe): "It gives together with the burial-fields in the terps the reflection of an apparent pacific penetration of new elements into the population, in this case of genuine original heathen Saxons, into North Netherland".

[3]) In general we may say that the use, or even the making of similar ergologica, is no proof of important immigration, far less of the entire displacement of a population.

"The Saxon stream has been of greater influence on the composition of our people than the Frankish stream", says Prof. Bolk in agreement with Dr. Holwerda, who in 1924 and 1925 showed that the Romans confined themselves to the river-districts; and the coming of the Romanized Franks bore the same character. This investigator protested, on the evidence of archaeological finds, against the hypothesis that "the Frankish empire was the result of violent conquest by foreign barbarians, who overthrew the Roman power and enslaved the settled populations". Investigating the sources of this theory, i. a. Gregory of Tours, he came to the conclusion that the reports from those times were extremely scarce, with wide gaps, and that later historians, drawing on their imagination, made up a connected story out of the simplest statements, repudiating whatever did not conform to their own ideas as unhistorical and worthless.

Holwerda built up the new theory that the German tribes had settled in Gaul more gradually, and had there founded a Romano-Frankish Kingdom, from which they had made themselves masters of our regions for the great water-ways. The Southern part of Holland and the adjoining parts of Belgium, which had before proved undesirable to the Romans, were at a later period still inhabited by various uncivilized tribes that took no part in the formation of the Frankish Kingdom, and were afterwards discovered as semi-barbarians by the Frankish missionaries.

Holwerda considers it a useless task to look for the centre of the Frankish dominion in these parts, or in the adjoining regions. The whole of our country, so Holwerda asserts, was in a state of barbarism up to the very end of the seventh century, until it was conquered, and added to their dominions, by the Carolingean princes.

Although we do not entirely agree with the above hypothesis, and look upon the relatively high stage of culture of the dwellers on the Woerden, the Terps and in the Dune region, as sufficient evidence for not accepting Dr. Holwerda's last assertion without contradiction, yet we feel too surely convinced that just in the period of the Völkerwanderungen, in consequence of the positive change in the level of the soil, the marshy and ever threatened Holocene of Holland can have offered but few attractions to strangers as a place of settlement. The rest of the land consisted at that time

mainly of moors, bogs and forests and was no more suitable to attract and sustain great streams of people.

When we read Prof. Bolk's imposing description of the Saxon-stream: "Thrust in between Twente and Gelderland, the stream deploys fanlike in a Western direction. It meets here the Frisian population, pushes them by its extension northwards out of Drenthe, which was doubtless only thinly populated, and thrusts its way onward, parting the East-Frisians from their kinsmen around the Middle Sea", we are inclined to ask: "how did all that flood of people live on the heath?" The more so if we assume, as Prof. Bolk was inclined to do in 1908, that the invaders utterly exterminated the inhabitants, so that these could not provide for their new lords either.

The presumption that the Saxons for a great part came to Terpia by sea, appears to us more plausible: in any case it deserves to be considered beside the old hypothesis of conquest by land. And we know also that the Saxons invading Britain were meso- and dolicocephalic, not short-heads.

Prof. Bolk assigns great value to the geological structure for the Anthropography of Holland. In this he especially saw the influence of locality on the phaeno-type, a matter of importance for anthropological inquiry [1]). "Partly as a result of geological difference", so Prof. Bolk presumed, "there could not have been an equal mingling of the four elements, resulting in the formation of a national soul, a national consciousness, and a feeling of homogeneity, in bodily shape; in fact, the forming of a Dutch type." How would Prof. Bolk explain the working of this influence?

If a knowledge of the geological structure of the Low Countries in the present time is of any value for the Anthropographer, our science would be decidedly farther advanced if we knew something of the geomorphology of those pre- and proto-historic times. It was especially van Giffen, who paid particular attention to this matter in the Terp-country. It should surely be borne in mind that Holland, by its geological and hydrographical conditions after the 3rd century, was but a poor subject for conquest by

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[1]) Scheidt nursed some grievance against Prof. Blok's paying no attention to selection, although the difference in the nature of the soil undoubtedly has a selective influence. Rassenkunde 1925 p. 278.

hordes of invaders, and the North part was rather avoided as a high-way for the same reason.

How loosely founded these geomorphological explanations still are, is proved by the explanation and interpretation that Prof. Bolk gives of what he calls the more Alpine character of the Eastern part of Noord-Brabant. He asserts that "de Peel" forms "a natural barrier against invasion", a declaration analogous with that given scores of times by geographers. He further says: "the population dwelling West of these marshes were therefore more or less protected against intermingling with new elements coming from the East."

But the recent fluviatile peat-moors of de Peel are intersected by extensive heaths [1]), so that they form but a small part of the surface, leaving plenty of space for the passage of whole tribes.

Even the feared Boertanger marshes are traversed by peat-bridges and a few roads [2]), whilst, according to the written statement of Prof. van Baren, they did not bear so impassable a character in the first centuries A. D. as in later times. In the Middle Ages they were crossed at Boertange by the highway between Groningen and Germany, leaving a broad gap for entrance in the North.

Finally, Prof. Bolk acknowledges that this barrier was insufficient to stop the invasion. A further argument against this invasion and the dispersal of the original inhabitants, is the continuance of an extremely poverty-stricken and simple culture in Drenthe, which, in spite of its inconsiderable age, has almost the appearance of being pre-historic [3]).

Prof. Bolk thought these Saxons might be defined as "a blond variety of the Alpine race". The present-day inhabitants of the Eastern parts of Gelderland, Overyssel, Drenthe and Groningen, where a Saxon dialect is spoken, are most probably not Alpines, as is proved by their index cephalicus, which has an average, according to Prof. Bolk himself (1920) of 81.1; 81.4; 81 and 81.2. No skeletons have been found to prove that the Saxon invaders were Alpines. Possibly, careful examination of human remains from the

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[1]) Only one tenth is peatmoor, according to a communication of the Ned. Heidemaatschappij.

[2]) o. a. Eastwards of Emmerschans.

[3]) Holwerda, 1925, p. 272—274.

peat grounds („veenlijken") and Row-grave skulls, may open further new points of view, but as long as no such examination has been made, we think that there are serious objections against assuming an invasion of streams of Alpines from the East.

A.E.van Giffen

Some of the preceding remarks are supported by Dr. Van Giffen's Treatise of 1925 on the oldest inhabitants in our country, in which he examines, in connection with Prof. Bolk's latest study of 1924, to what results the comparative investigation of the present population and some earlier inhabitants of the Netherlands has led, both with regard to themselves, and the rest of Europe. He also tests the conclusions which Prof. Bolk has come to about the origin of the Dutch people. Besides de Wilde's paper of 1911, and a few lesser ones, van Giffen's study is the only serious critique that has yet appeared, on a Dutch Anthropologist it, and it is the more remarkable as coming from an archaeological quarter.

Therein Dr. Van Giffen very truly points out how little physico-anthropological material we have at our disposal for studying the oldest inhabitants (on the sandy soil) of the Netherlands. As regards the inhabitants of the clay, matters are somewhat better, though far from satisfactory.

Dr. Van Giffen then proceeds, with the assistance of the work of Dr. Walter Scheidt (1924) on the collected neolithic skulls [1]) to examine what conclusions may be drawn from it that are useful for the Palae-anthropography of the Netherlands.

The whole of our ancient skeleton-material from the higher grounds, which constitute the greater half of Holland, consists, firstly, of the two skeletons from Niersen, found by Dr. Holwerda in 1907, and worked by the well-known ethnologist and Borneo-traveller Prof. Nieuwenhuis. And further of the brachycranium and a few other bones from Ryckholt in South-Limburg, found by Hamal-Nandrin and described by Fraipont and Stockis. Dr. Van Giffen cursorily examined the results of Holwerda's palae-ethnological enquiries, and concluded that they led to other results than Prof. Bolk was inclined to assume.

The neolithic-, anthropographical relics of the South of the Netherlands are similar to the Belgian and French. „The Neolithic

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[1]) Die Rassen der jungeren Steinzeit in Europa.

finds in the central parts indicate in physico-anthropological respect a powerfully built dolichocranic type, so that of Homo Nordicus; in any case not a Celto-Slavic[1]) type", says Dr. van Giffen.

The neolithic finds in the Northern parts of the country tell us nothing at all from an anthropological point of view. On a cultural basis they point to a main stream from North-Germany, and ultimately from the Baltic region. Cross-streams point to the Cymric peninsula.

Professor Ronald Dixon (1923) of Harvard University calls attention to the too frequent use of averages in anthropological science. He very justly objects to the practice and says "that the data therefore are not treated on the basis of the actual combination in the individual of the several criteria upon which the classification is based." R. Dixon

But instead of proposing a means of putting an end to the paralyzing influence of averages, the professor went to the other extreme and invented a system of formulae. This also has its drawbacks, as it would reduce the dull study of Anthropography to a series of calculations. But if this danger is foreseen and avoided as far as possible, Dixon's idea may be a means of releasing the study from the countless prejudices that now surround it, and we hope Dixon's system will have due attention. But the results of his investigations of Dutch skulls are not very encouraging.

Professor Dixon divides the races according to three skull-indices, the breadth: length-index, the height: length-index and the nose-index. Each of these indices is applied to skulls of the three most generally accepted groups; but no notice is taken of each skull individually. Here there is an element of inaccuracy which reminds us of the paralyzing averages. And yet it undoubtedly makes a difference whether we are figuring a Finnish brachycranium of 80, or a Savoyard of 90; a leptorrhine Scot with an index of 38, or a Tyrolese with a nose-index of 46.8; a Bavarian hypsicranium of 75, or an Armenian towerskull of 95.

According to this system we should come to $3 \times 3 \times 3 = 27$ groups, which is too many for practical use. So Dixon classified the extreme figures as the pure races, and the intermediary ones

[1]) The author probably used this term in the sense of Alpine.

as the result of mixture. In this matter he refers to F r e t s' "Heredity of Headform in Man" (1921) but with alteration and explanation to suit his own case.

In this way he comes to $2 \times 2 \times 2 = 8$ types, and of the remaining 19 he considers the nature of the mixture to which they owe their origin. We need not say that we cannot agree with this arbitrary division, nor with many other passages in the book.

To each of the 8 types Dixon gives a special name; but states very emphatically: "these types are used with a very definite and very restricted meaning. They designate in each case a particular combination of the three selected criteria, and *nothing more*. Thus the Proto-Negroid-type designates a form of skull which is Dolichocephalic, Hypsicephalic, and Platyrrhine, and carries with it no necessary implication whatever that any other features which we may be accustomed to think of as occurring in Negro crania, are also present; and the statement that among a given people the Proto-Negroid type is strongly represented, does not imply that they have or had a black skin or woolly hair". So Prof. Dixon takes the same line as had already been adopted by R. B e n n e t t B e a n [1]).

The eight types are as follows:

Dolichocephalic		Brachycephalic
Caspian	Hypsicephalic-Leptorrhine	Alpine
Mediterranean	Chamaecephalic-Leptorrhine	Ural
Proto-Negroid	Hypsicephalic-Platyrrhine	Palae-Alpine
Proto-Australoid	Chamaecephalic-Platyrrhine	Mongoloid

Prof. Dixon discusses our country together with France and Belgium in one chapter [2]), from which we quote the greater part of the passage on Holland without comment:

„What changes occurred in the population of this whole region in the millennia between the Neolithic period and the era of the great tribal migrations of the sixth century and after, we can only surmise, since satisfactory material is almost wholly lacking. Judging from the history of the adjacent region, however, we must infer a large influence of Palae-Alpines and Alpines, and that the upland at least, and probably much of the lowland, except possibly the northern coast, remained for most of the period almost exclusively brachycephalic. By the sixth or seventh century

[1]) R. Bennett Bean, The Racial Anatomy of the Philippine Islanders, 1910, a.o.
[2]) "France and the Low Countries", p. 46—62.

A. D., however when the movement of the Baltic peoples was well under way, we find the Frankish crania from southern Belgium prevailing dolichocephalic and characterized by that blend of Caspian and Mediterranean types which is commonly called "Nordic". It is at this period that we get our first data from Holland. A considerable series of crania of this period have been found in Friesland and Groeningen, the males of which are quite comparable with the Frankish crania of Belgium, except that in adition to the Mediterranean and Caspian factors there is here present quite a noticeable element of the Proto-Australoid, whose presence in the Baltic region in Neolithic times we shall have occasion to note later. The female crania, on the other hand, show a considerable Palae-Alpine and Alpine factor. It is tempting to regard this as evidence that the presumed dominance of these types in the Belgian uplands, at least in Bronze and early Iron times, had extended north over all of Holland, as witness their extension to Denmark. The Friesland data, then, of the sixth and eighth centuries would indicate an intrusion from the eastward of conquering Teutonic tribes allied to the Franks, Anglo-Saxons and others. This conclusion is strengthened by the even more complete submergence of the earlier brachycephalic population of Denmark by the Teutonic „Nordics" in the Iron Age, which would but little antedate the period of the Friesland crania.

These considerations are perhaps further substantiated by the scanty mediaeval data which we possess. Crania dating from the period between the fourteenth and sixteenth centuries from the islands in the Zuyder Zee, Amsterdam, and the islands of Beveland and Walcheren in the Scheldt-Rhine delta, show a very large majority of Alpine and Ural types, as though the older brachycephalic population had survived in relative purity in the more isolated portion of the country, where the influence of the Teutonic invasions had not made itself felt.

The characteristics of the modern population [1]) of the Low Countries seem admirably to bear out the preceding hypothesis. In the Ardennes plateau of southern Belgium the people are today just under medium stature, predominantly brachycephalic and brunet. The same type, but with greatly exaggerated brachycephaly, occupies the coastal provinces of Zeeland and Zuid

[1]) Literature used: Bolk, 1908; Barge, 1914.

and Noord Holland. On the other hand, the plains of Flanders and all the rest of Holland present a taller people, increasing in stature northwards to Friesland; in headform mesocephalic, with a rising proportion of true dolichocephalic individuals as one goes northward; and a general blondness, which becomes more pronounced in the same direction.

That even in Friesland, however, a considerable brachycephalic element still exists is shown by a series of nineteenth century crania, in which these factors are actually in the majority, the Ural type being present in large amount, as it is on the neighbouring coasts of Scotland and Southern Norway. This type was already noticeable in the Ardennes plateau, it will be remembered, as early as Neolithic times, and its long persistence in this region is a striking fact."

We think it better to group Holland with France and Belgium, as Dixon does, than with Switzerland and the Tyrol, as Ripley did. Prof. Dixon followed Ripley, Bolk and Barge in considering the Dutch from the brachycephalic point of view, though it stands to his credit that he begins with the Nordic element, and with the exception of brachycephalic Noord-Holland, Zuid-Holland and Zeeland, looks upon the country as being peopled by a meso- or dolichocephalic type. At the close he again emphasizes the predominance of the Nordic element, but.... from a linguistic point of view. He writes, "whereas in Belgium the Nordici have gone under, in the open lowlands the result of the Teutonic surge has been different. There a considerable modification in physical type has occurred, and throughout the area a Teutonic language now prevails."

In discussing the selected skulls of the Jaederen district in Norway, Dixon returns again to the question of the "Ural type" in Friesland: "The crania from the Jaederen district are, most unfortunately, a selected series, and do not give a fair picture of the facts, since they were chosen to prove the presence here of a special brachycephalic type. They reveal the presence of the Alpine and Ural types, of which it is the latter which is really significant, for it is this factor which is so characteristic of the mediaeval crania from Friesland, Bremen, and the North Sea coasts of Scotland, and which is absent or of very minor importance in other parts of the Scandinavian peninsula. It seems probable, therefore, that the localisation of this Ural type on the southwest coast of

Norway indicates that it came into Scandinavia from the Southward, perhaps from Jutland". But it is impossible for Dixon to dissolve the problem of brachycephaly: "In Westphalia and Friesland on the west, in Denmark and Sweden on the north, the population of this period was prevailingly dolichocephalic, so that the source of this strong Alpine factor in both Teuton and Slav in northwestern Germany is extremely puzzling".

Eugène Pittard

The word "race" has given rise to great confusion of ideas. The Swiss Anthropographer Eugène Pittard (1924) had made a deserving attempt in his "Les Races et l'Histoire" to set forth the actual "realités anthropologiques" lying behind these ethnographical and linguistic facts which pretend to be racial, and to demonstrate the enormous influence that race has had in world-history. But the task was a very severe one, requiring not only profound historical studies, but no less profound a knowledge of Anthropography, which, in the case of many nations, practically has still to be written. Hence it must especially have been very difficult for a Swiss investigator to make himself acquainted with the Anthropography of Holland, as most Dutch researchers publish their results in Dutch, a language which is understood by but few foreigners.

Consequently Prof. Pittard was not able to treat the Netherlands [1]) so thoroughly as he would have wished, though he seems to have made an attempt to read Dutch [2]). His book contains clear indications of the influence of Ripley's "Races of Europe", though not mentioned here by the author. Like Ripley and Prof Bolk, he emphasised the brachycephaly in Holland, and even speaks of "la dualité ethnologique de la Hollande". His complimentary remark: "les études anthropologiques sont assez avancées en Hollande", would perhaps not be saying too much at the present time, but at the commencement of this century — and the literature consulted by Prof. Pittard dates from before that time — such praise was scarcely deserved.

Prof. Pittard supposed that Sasse had obtained his Zeeland brachycrania from tumuli, and this led to much confusion of thought. Moreover, the Zeeland "Hillen" so far contained but

[1]) P. 241—252 la Hollande.

[2]) Folmer, Nederlandsche schedels, Ned. Tijdschr. v. Geneesk. 1892; de Man.

few somatic remains and ergologica. Following Prof. Bolk's example, Prof. Pittard sought a connection between the Kelts who inhabited the Low Countries in the time of Caesar, when Holland was known "sous le nom d'île des Bataves", and the late Mediaeval or Modern inhabitants of the submerged cities (XVI century). To this day there is no strong indication of the presence of brachycephals in Zeeland in Caesar's time, though we have proofs from Domburg that the coast-strip was inhabited by dolichocephals at a somewhat later period.

De Man's presumption that the brachycephals were sent there by the Monasteries of Belgium to enclose the land, is certainly not refuted in Victor Jacques' Report of the Historial Congress of Middelburg in 1889 [1]), which report was consulted by Prof. Pittard. De Man was far better acquainted with Zeeland than Jacques, although we fully acknowledge the great merit of the latter's description of the Saaftingen skulls [2]). What Prof. Pittard's idea of the dualité de la Hollande really was, appears from his conclusions about the comparatively small island of Walcheren (Zeeland), which he asserts to be inhabited by Nordici in the West, and in the East by brachycephalic Kelts. Prof. Bolk in 1904 stated the average distribution as 40 % brunet for the whole island, without any difference between East and West. In 1908, moreover, Prof. Bolk stated that the average index cephalicus was 79.6 (and therefore the average index cranicus 77.6) which approaches much nearer to the Domburg Nordic than to the hyperbrachycephalic Alpines.

Prof. Pittard connected the brachycephals in Holland with the brachycrania of Offnet in South-Germany. The presumption of this investigator that the brachy's in the South-West of Holland had maintained themselves upon the Terps against the flooded rivers and the ravages of the sea, is not borne out by the facts. "Ces barbares intrépide, dont les descendants vivaient, au dire des historiens latins, sur des terres flottant, seraient devenus ces prodigables lutteurs qui, contre les forces associées de l'ocean

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[1]) La Zélande, Compte rendu du cinquième Congres de la Fédération des sociétés d'histoire et d'archéologie de Belgique. Bull. Soc. d'Anthr. de Bruxelles VIII, 89—90. Also in: A propos d'un récent mémoire de M. le Dr. de Man sur l'Ethnologie de la Zélande. Bull. '93—'94.

[2]) L. de Pauw et V. Jacques, Le cimétière de Saaftingen. Bull. III, '84—'85.

et des fleuves, créèrent magnifiquement la Holland maritime du sud-ouest."

This eulogy would be still more flattering to us, if it were founded on reliable research; but the wrestlers with the ocean described by Pliny the Elder (± 79 A D Lib. XVI I-2-5) were most likely the Chauci, neighbours of the Frisians. From the passage cited below it appears that Pliny cannot have meant the Zeeland terps, as these only served as temporary refuges, and indeed probably date from a much later period.

Prof. Pittard gives an account of a hitherto unknown portion of the Frisian people. "Bolk a signalé dans les provinces de Frise et de la Drenthe, dans la partie septentrionale de la Hollande du nord, un type blond très bien conservé, qu'il ne rattache pas à la race Nordique. Ces blonds ont des yeux bleus, mais ils ont une stature plus petite que celle qui caracterise *l'Homo Europaeus*, et leur crâne tend vers la brachycéphalie. En outre, leur face est large et courte. Que faut-il penser de ce type?" asks Prof. Pittard.

We presume he means the Saxons, to whom attention was drawn by Virchow, and J. Sasse, and to whom Prof. Bolk (1908) attributed the brachyzation of the Frisians. However, the brachycephaly of our Saxons is still merely hypothethical.

There is not a single pronouncement of Prof. Pittard with which we can agree more fully than the following: „Il y a encore de beaux jours pour nos collègues hollandais qui voudront connaître, dans tous leurs détails, les éléments ethniques de leur pays" [1].

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[1]) P. 252.

CHAPTER III

THE TERP BUILDERS

Terpia

The Terp district extends along the shores of the Zuyder Sea and the "Wadden" from Workum in Friesland to Termunten on the Dollart.

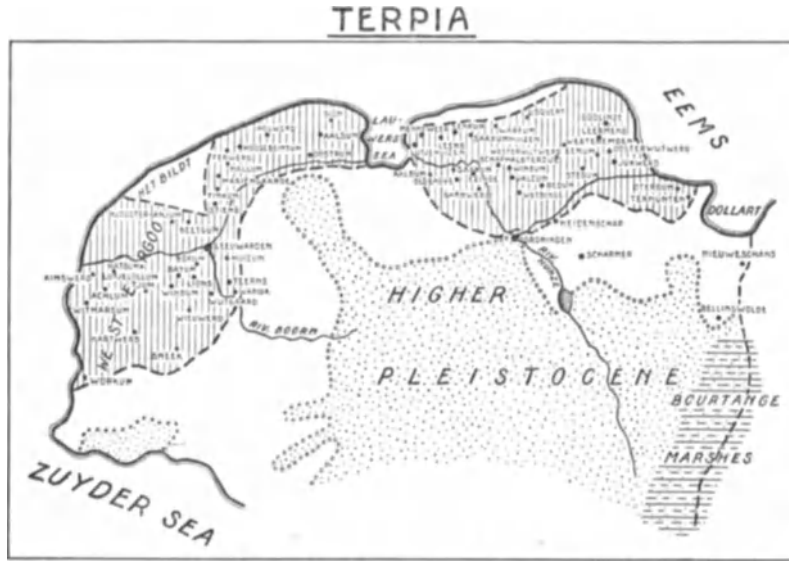
Whilst the Wadden of Friesland and Groningen form the Northern boundary, the Southern borderline in Friesland runs chiefly along the peatbog of Duurswold and the more recent sea-clay of the old basin of the Dollart. Though there are a few Terps lying to the South, the borderline may roughly be drawn from Workum, about Sneek to Warga, Biddard and Dokkum. The Lauwers Sea, which was in the Middle Ages much larger than at present, divided the Terp district into a Western and an Eastern half near Engwierum. To the East of the Lauwers Sea the Terpland extends much farther South and reaches the neighbourhood of the town of Groningen, which however lies outside it. In the North the Terpland did not reach farther than the line Ulrum-Uskwerd, but the lands on the North side of this line, which were afterwards protected with dykes, were probably populated by Terpians, so that they may also be reckoned as belonging to them.

In the South it is more difficult to determine the boundary. It runs about along Hoendiep and the Eems-canal to continue past Farnsum along the Eems river to Termunten. But there are still insufficient exact data to draw the line sharply.

If we take into consideration the historical division of Friesland and Groningen, the Terpland lying West of the Lauwers-Sea includes the whole of Westergoo as far as the Nieuwelanden [1]) of the former Middle-Sea and "het Bildt", which is partly inhabited by allochthones, and further the Northern part of Oostergoo. These Terps form more or less two groups, formerly separated by the

[1]) New Lands.

Middle Sea, one in Westergoo, one in the N. E. corner of the province. East of the Lauwers Sea the Terpland included Hunsingoo, part of the Westerkwartier, and the greater part of Fivelingoo, except the former Fivel-basin. Further a small part of Oldambt. Here we can also distinguish two groups; one in Hunsingoo, the other in Fivelgoo. As we cannot make use of the historical names,



and the term Frisians represent different groups [1]), we shall henceforth speak of the Terplands as *Terpia*, and call the land West of Lauwers Sea: *Friterpia* and that to the East of Lauwers Sea: *Groterpia*.

Geomorphologically there is a great resemblance between the two parts of Terpia, which consists for the greater part of recent sea-clay and forms the largest clay district of Holland. Consequently the means of subsistance are everywhere largely similar, although locally there may be slight differences in consequence of variations in the nature of the soil, in elevation, and the resulting difference in the level of the polderwater. All this concordance renders Terpia excellently suited for anthropographical research.

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[1]) At present the inhabitants of the province of Friesland.

Material

We will begin with a short survey of the principal material.

Friterpia

46 Ancient Terpskulls (A. Folmer) [1]).
65 Terpskulls from the Frisian Museum (Bolk).
27 skulls from Hallum (J. Sasse).
35 Modern Leeuwarden skulls (A. Folmer).
8 skulls from villages near Sneek (A. Sasse).
10 skulls from the town of Leeuwarden (A. Sasse).
87 Modern skulls from Leeuwarden (J. Sasse).
15 Modern Frisian crania (J. Sasse).
768 Frisians intra vitam (Bolk 1920).

Groterpia

23 Ancient Terpskulls (A. Folmer) [2]).
18 Mediaeval Terpskulls (A. Folmer)[3]).
30 Hunsigooërs intra vitam (A. Folmer) [4]).
Other skulls from the Province of Groningen:
46 skulls from Nieuweschans (J. Sasse).
10 skulls from Bellingwolde (J. Sasse).
48 skulls from Nieuweschans (J. Sasse).
290 Groningers intra vitam (L. Bolk).

Therefore, the number of individuals examined post mortem amounts to 293 for Friterpia, and 175 for Groterpia. The numbers examined intra vitam are 768 for the Western half of Terpia, and 320 for the Eastern. Though these numbers may seem respectable, yet the number of special observations made on the greater part of these objects is limited. In the preceding discussion of the various inquiries separately, we have already gone so thoroughly into the value of each, that we can now limit ourselves to a few brief remarks on this material.

Problems

The most important outcome of Folmer's investigations was,

[1]) Ned. Tijdschr. Geneeskunde, 1887, I, p. 434—'38; N. T. G. 1890, I, p. 608—9.
[2]) N. T. G., 1887, I, p. 434—438; N. T. G., 1890, I, p. 606—607.
[3]) N. T. G., 1885, II, p. 96; N. T. G. 1890, I, p. 607.
[4]) Eenige Crania, 1881, p. 80.

that the Frisian skull appeared to be considerably longer during the first millennium of our era than that of the inhabitants of Friesland at the end of the second millennium. As we have already pointed out, Folmer arrived at this conclusion by comparing Terp material with that of Modern townsmen.

Leeuwarden, the capital of Friesland, has had a varying population in the course of the ages. It is doubtful whether the inhabitants of Leeuwarden stand in any close genetic relation to the Terpbuilders, as is perhaps the case with the villagers near Sneek. Therefore, if in comparing Leeuwarders with Sneekers we arrive at differences, this need not be taken as a proof that the phaenotype of the Terpians has indeed changed.

Folmer has not compared Ancient Terpmaterial with that of Modern Friterpians, nor has it been done by any other Anthropographer. No Anthopographer has made a comparison between the Friterpian and Groterpian skulls. Only Virchow compared two Groningen crania with Modern Frisian skulls.

From the very first, when Folmer had still but little acquaintance with Anthropography and followed the lead of Virchow, he made no distinction between the crania from Groningen and from Friesland. His whole purpose was to find an agreement between the crania he had found and the narrow and one-sided opinion regarding the skulls from the Row-graves expressed in Virchow's "Anthropologie der Deutschen", as compared with the modern Frisian or Zuyder Sea skull. The lack of agreement between his own sets of skulls should rather have withdrawn his attention from scarching so zealously for an agreement with the ancient Germans, then so greatly admired under the influence of German culture and art (Wagner a. o.).

Although Folmer had seen but a few Friterpian and Groterpian skulls, yet in 1881 he writes: "A collection of skulls derived from the Terps or Wierds of the province of Friesland, and preserved in the Museum at Leeuwarden, forms a group that agrees with those from Hunsingoo in Groningen already described. Here also we see before us the last traces of a population of a neighbouring coast-strip, who lived, in ages long past, in a region separated by no impassable frontiers from the one we inhabit to-day."

This small group of Friterpian skulls was merely superficially studied by Folmer. Influenced by the geographical ideas of his

time (von Humboldt, Ritter and Kohl) which looked for natural divisions, and considered the influence of environment upon the human race of great importance, he came to the conclusion that there must have been a resemblance between the people inhabiting two such similar districts.

Yet the differences were so considerable that he gave no average figures.

Folmer certainly took very little trouble in the matter, as is proved by the following sentences, which bear but little evidence of serious investigation: "The opportunity for a more extensive inquiry enabled us for the first time to arrange on one side or the other of the dividing line certain characteristic points of a typical or individual nature, and further it offered proof that the Frisian terps, as also the unenclosed lands on this side of the Laubach (Lauwers) were inhabited by a race whose type, as far as the head index and height measurements go, resembling that of the Franks and Alamanni of the Middle Rhine" [1]).

Folmer neglected to show that the population on both sides of the Lauwers Sea was indeed homogeneous, but contents himself with an impossible tirade, of which only the final part expresses his real purpose.

This appears again in his publication of 1890, in which he keeps the Friterpians and the Groterpians apart: "The mutual resemblance of the oldest population of the two provinces, which is moreover supported by the outcome of previous inquiry, shows that in spite of the present difference in dialect, the inhabitants of those times were of a kindred race that resembled in a striking manner the dolichocephalae of the Rowgraves found in South-Germany, the well-defined remains of Germanic tribes dating from the IVth to the VIth centuries A. D." [2])

Again in 1890, therefore, Folmer based his opinion, not on accurate comparison, but on a more or less superficial agreement with the Rowgrave type. The later Anthropographers accepted Folmer's opinion without further investigation. This opinion was in general accord with that of the Linguists [3]).

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[1]) Folmer, 1881, p. 81.

[2]) N. T. G., 1890, I, p. 599.

[3]) Folmer had himself observed the similarity between the place names of Groterpia and the Saxon names in England, on reading the Vita Luidgeri in Sloet's Charter book I.

Up to the present day it has not been proved whether the Friterpians and Groterpians are racially one or not. In fact no attempt has been made to do so. The opinion of historians and linguists that the Groningers are Frisians who were Saxonized at a comparatively late date, has probably debarred Anthropographers from independent inquiry. Consequently, whatever may be the result of our inquiry, whether we are forced to the conclusion that there is a difference or not, in either case the outcome will be important.

Further it follows from the above statement that it has not been proved that the Groterpians and Friterpians have really changed since the time of the first Terp-builders. For Folmer's investigation was confined to a hasty comparison between a limited number of living Hunsingooërs and mixed Friterpian crania. And his further conclusions on this matter, that they had become brachycephalic by environmental influence, and not by intermingling, were no better founded. Prof. Bolk only compared the index cranicus of Terp skulls with that of the inhabitants of the Western part of Friesland and the Eastern part of Groningen; therefore from material that was not homogeneous either. However probable it appears that an alteration has taken place, yet it cannot be considered proved.

The chief problems that we have to clear up by our inquiry are:

A. Were the Old Friterpians and the Groterpians racially similar?

B. Were the Friterpians and Groterpians each a more homogeneous unity, or made up of two or more coherent parts?

C. Have the Friterpians and Groterpians changed phaenotypically or genotypically?

Let us first consider the resemblance, and the difference, if any, between the Ancient Friterpians and Groterpians. For this purpose we have little else than crania at our disposal.

So far, but little attention has been paid to the collection and study of other parts of the skeleton, whilst remains of human integument are still unknown. And yet the remarkable conservative power of the Terp-clay, in which i.a. much cow-hair has been preserved, renders it likely that with careful investigation something more may be brought to light, just as from the Bronze graves in Denmark.

Since the work of Anders Retzius anthropometric science has been under the sway of indices. J. v. d. Hoeven's attempts to introduce the employment of absolute measurements (Essay 1837) were left unnoticed until Johannsen, von Töröck a. o. broke the monopoly of the index. Johannsen (1907) considered it more correct and simple to give the absolute measures. No doubt these stand in relation to the entire organism, but in taking measures there is no need to make corrections at once. They form the fundamental facts upon which the inquiry is based.

Yet in consequence of increasing wealth on the one hand, and of poverty on the other, great variations in the absolute measures may be brought about, giving rise to transition from one dimension to another. Further it is a fact that no average measure ever represents a constant quantity in any race. Pathological and environment influences may modify the figures so greatly, that in a population of comparatively pure race, the absolute figures present a picture of a highly unequal population, if they are divided into groups that are socially sharply contrasted. These differences are certainly to be expected among the Nordic peoples with their strong psychic sense of social distinctions. And where, as in the case of the comparatively small series of Terpskulls, accidental selection plays so large a part, prudence is all the more requisite. Szombathy has therefore suggested, as a means to avoid the differences resulting from variation in capacity, to reduce the measurements to a standard agreeing with the capacity of the skull. For this purpose he divides the hundred-fold of the figure by the cube root of the capacity. One advantage of this calculation, which we had ourselves applied before making acquaintance with Szombathy's work, lies in the fact that the difference of sex may be neglected.

But, for the greater part of our material, there are no calculations of cubic capacity. Folmer has only given the modulus of most of his skulls. Consequently we are practically unable to apply Szombathy's method. In order however to approach as near to his method as possible, we have looked up the cubic capacity given in Welcker's tables. Martin declares these are in so far exact, that an average calculated from 10 skulls differs by no more than 10 cubic cm. from the correct figure. Therefore we may

consider them fairly accurate. Some of the skulls among the Friterpians were however so large that they are not included in Welcker's tables.

In order to study the simple measurements as accurately as possible, we have constructed frequency curves, which we have also done for the Merovingian skulls from the Rowgraves at Katwijk on Sea, measured by J. Sasse (1911). Judging from the burial gifts, Dr. M. H. Evelein thinks they belong to about 650 A. D.

We do not venture to decide whether they were really Merovingians; the more so, as other Germanic ceramics have come out of the same finding place. There were also numerous Saxon and Frisian settlements at the mouth of the Rhine, and the finding of Merovingian earthenware is, in our opinion, no convincing proof that the people that used it were themselves Merovingians. For want of space we shall discuss this series only casually.

NEUROCRANIUM

Absolute Measurements

Especially in comparing the absolute figures, we must proceed with the utmost care. The laws of heredity have clearly shown the inconstancy of certain forms. Therefore we may attach only limited value to the division into groups. Not only does this greatly depend on chance, but many crania may be included in one group on account of one characteristic, and in another group for a different reason. But only in cases where various characteristics point in one direction, and the absolute and relative measures agree in confirming our induction, do we consider the evidence of sufficient value to base conclusions on.

Capacity

We already deplored the fact that Folmer has not stated the capacity of his skulls. To make good this neglect as much as possible, we have looked up and, where necessary, calculated the capacity in Welcker's table according to the modulus.

44 Friterpers had an average skull capacity of 1493 cubic cm;

24 Groterpers of 1458 cubic cm. According to Broca's division [1]) the Groterpers are just above the limit of small and average, the Friterpers are average. According to Flower and [2]) Turner the Groterpers are just megacranic; according to Sergi's division both [3]) are metriocranic, while the Friterpers are nearly megalocranic (> 1500 ccm.). Divided according to the sex 28 Friterper males have a capacity of 1556 ccm., so are megacranic, according to Flower and Turner, megalocranic according to Sergi. 16 Friterper females have a capacity of 1345 ccm. and are oligocranic according to Sergi, mesocranic according to Flower and Turner. 15 Groterp males have 1547 ccm. capacity, or are megacranic according to Flower and Turner; 8 Groterp females 1288 ccm. or small according to Broca, microcranic according to Flower and Turner. The sex difference between the Groterpians (259 ccm.[3]) is again considerably greater than between the Friterpians. The sex index is 83 for the former, 86.4 for the latter.

This time the Friterpers exceed their neighbours in breadth-variation.

ABBREVIATIONS USED IN THE TABLES

F = Friterpians	S H = Schmidts height
G = Groterpians	r st = reduced to standard skull
l = Leeuwardeners	do = dolicho cranic
h = Hoekers	me = mesocranic
f = Frisians	br = brachycranic
O = old	Cl T = Classification of von Töröck
m = mediaeval; medium	Cl M = Classification of R. Martin
r = modern	Cl S = Classification of E. Schmidt
L = length (in mm.)	In cr = breadth: length index (ind cranicus)
B = breadth (in mm.)	In = index
H = height (in mm.)	av = average
ba = basion bregma height	var = variation

To save space in the tables, the hundreds and tens in the frequency curves have been abbreviated as far as possible.

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[1]) Broca
mikrocranic x–1150
small 1150–1450
medium 1450–1650
makrocranic 1950–x

[2]) Flower & Turner
mikrocranic x–1350
mesocranic 1350–1450
megacranic 1450–x

[3]) Sergi
mikrocranic x–1150
elattocranic 1150–1300
oligocranic 1300–1400
metricranic 1400–1500
megalocranic 1500–x

Variation in Capacity according to Sex.

min. c c m	max c c m	var.
♂ F 1276	♂ F 1839	563
♀ F 1139	♀ F 1485	346
♂ G 1326	♂ G 1680	354
♀ G 1163	♀ G 1369	206

Variation in Capacity of Nordic series

Series	Cap. c c m ♂	Cap. c c m ♀	Cap. ♂ ♀ c c m	Authors
Friterpians	1556	1345	1484	
Groterpians	1549	1288	1458	
Alamanni of Augst	1463	1330	1418	Schwerz
Other Swiss Alamanni	1481	1304	—	„
Swiss Burgundians.	—	—	1451	„
N. W. Germans of IX–XIV century	—	—	1422	Gildemeister
Modern Swedes	—	—	1409	Valentin

Length

Length

Cl. T.	medium long					long								
L.	170 174	175 179	180 184	185 189	190 194	195	196 199	200 204	205 209	210 214	av	med	long	do	me	br
45 F.	2	0	10	14	3	(6)	(3)	4	2	1	189	75.5%	24.5%	192	188	185
23 G.	6	1	4	6	1		2	2	1		184.7	78.3%	21.7%	192	181	173
29 M.	2	5	9	5	2		4	2			184	79.3%	20.7%	188	181	

The two first series differ considerably, notwithstanding the fact that the division in averages according to von Török's classification do not show very much difference.

In the series of the Groterpians the smaller half comes first, but in the Friterpian series it lies in the middle (185—199). So we see that in absolute length the Friterpians considerably exceed the Groterpians. The Merovingians take the third place.

A comparison with Bolk's Terp series (185.7 mm.) also shows a difference. This is also the case with the Pre-Carolingian mixed Alamanni of Augst (average 184 mm.; min 167, max. 204 mm) and the Swiss Burgundians (av. 183.2; Schwerz) whilst the Friterpians prove to be long.

The greatest length given by Martin,that of the modern Scots

(♂ av. 187 mm.; min. 167 mm.; max. 204 mm.; ♀ av. 179, min. 161, max. 193) remains far below the Friterpians, although the max. for the Scotch women (193 mm.) exceeds the Friterpian ♀ max. (186 mm.). The Danes of Hansen (av. 185.5 mm.; less 7.5 mm.) and the Norwegians of Halfdan Bryn (183.5 mm.) remain far below the Friterpians, but exceed the Groterpians.

Compared with the longest Friterpian (Lutjelollum, 212 mm., 147 mm., 141 mm.) the skull of Pharao Amenophis IV, which was probably lengthened artificially, and according to Ferguson, bore traces of hydropsy, was but small, it measured 189, 154 and 136 mm. (Scott) [1]) and even falls short of the Hallum cranium (204—155—143 mm.) which is 15 mm. longer.

If we divide the two series according to sex, we get for 30 male Friterpians an average length of 194; and for the male Groterpians 183 mm. The length of the Friterpian females (183 mm.) equals that of the Groterpian males, whilst that of the Groterpian females is much less (175 mm.). The difference between the sexes (Friterpians 11 mm.; Groterpians 16 mm.) is much larger for the Groterpians. The sex index of length in Friterpia is 94.3; in Groterpia 91.6.

Also in the relative figures of Standard Skull the Friterpian crania (166) prove much longer than the Groterpian (162). And as the frequency curves for the two series run widely apart, this certainly proves that a difference exists between the two ethnical groups. The breadth-variation (157—171) is considerably larger in the far less numerous Groterpian group (150—171), a fact which we shall observe repeatedly.

Breadth

In the breadth the difference between the two series appears to be much less considerable. The apex of the three curves coincides, although the curves of the Friterpians and Merovingians show a second apex more to the right. In Bolk's Terp-series also, the average breadth (139.6) is only slightly less than that of the Groterpians.

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[1]) Berkhan Uber Makrokephalie in der Familie des Pharao Amenophis IV (18 Dynastie) Arch. f. Anthr. 1919.

Breadth.

Cl. T.	narrow	medium broad					broad		av.	med. br.	broad
	120	125 129	130 134	135 139	140 144	145 149	150 154	155 159			
45 F.			8	12	9	12	4		141	91.1%	8.9%
23 G.		1	3	8	4	5	2		140	91.3%	8.7%
29 M.	(1)	2 (1)	3	9	6	8	0	1	139	96.5%	3.5%

According to von Töröck's division: narrow (101—125 mm.) medium (126—149 mm.) and broad skulls (150—173 mm.) the averages differ but little. The average breadth of the Friterpians is equal to that of the male Roumanians (Pittard); that of the Groterpians equals that of the male Eskimoes and Guanches (von Behr). The Friterpians are slightly narrower than the Alamanni of Augst (141.7) and the Swiss Burgundians slightly broader than the Groterpians. The Norwegians coincide with these (Halfdan Bryn 140.5 mm.); the Scotch (Turner) are broader (143 mm.).

Divided according to sex, the breadth figure for 30 Friterpian males is 143, and for 15 females 136; for 14 Groterpian males 143, and for 9 females 135. For the Friterpians the difference between the two sexes is 7 mm.; and for the Groterpians 8 mm., therefore larger. The sex difference is therefore less pronounced in the breadth figures than in the length figures (F 11 mm, 7 mm; G 16 mm, 8 mm.). The sex index for the length is Friterp 94.3 and Groterp 95.6. That for the breadth is 95.1 Friterp, and 94.4 Groterp. Therefore the Friterp crania led to the same result as Giuffrida-Ruggeri found for 200 Italian skulls, where the sex difference was more pronounced in the length than in the breadth. But for the Groterps it is just the contrary.

The average breadth skull of modern Norwegian females — Alette Schreiner — is 141.6 mm. (128.5—165.5 mm.) thus broader than that of the Friterpian females (136; var. 130—142) and the Groterpian females (135; var. 127—142). In the latter the breadth-variation is again larger.

If we calculate the average breadth of Standard Skull, the Friterpians (123.6) prove to be relatively slightly narrower than the Groterpians (124). The variation is 118—129 for the former; so again less than for the latter (118—130).

Length and breadth

So we conclude that the Friterpians are longer, but equally broad as the Groterpians. Thus they are more eurycranic (great length of skull with greater width). The Groterpians are more brachycranic (absolute inferior length of skull).

As Prof. Bolk (1920) considers the sum total of the length and breadth useful for obtaining some insight into the average size of the skull, we have composed this frequency curve also. The difference clearly appears in the average figures (F. 330; G. 324.7) but it is shown still more strongly in the curve.

Among the Groterpians there is a group with small length + breadth, which forms almost a quarter of the entire series, but it is not found among the Friterpians. Among these, however, we find a group with great length and breadth, of which hardly any occur among the Groterpians. The Merovingian series gives an average of 324 and a sense of the curve which is intermediate between those of the Friterpians and Groterpians.

Height

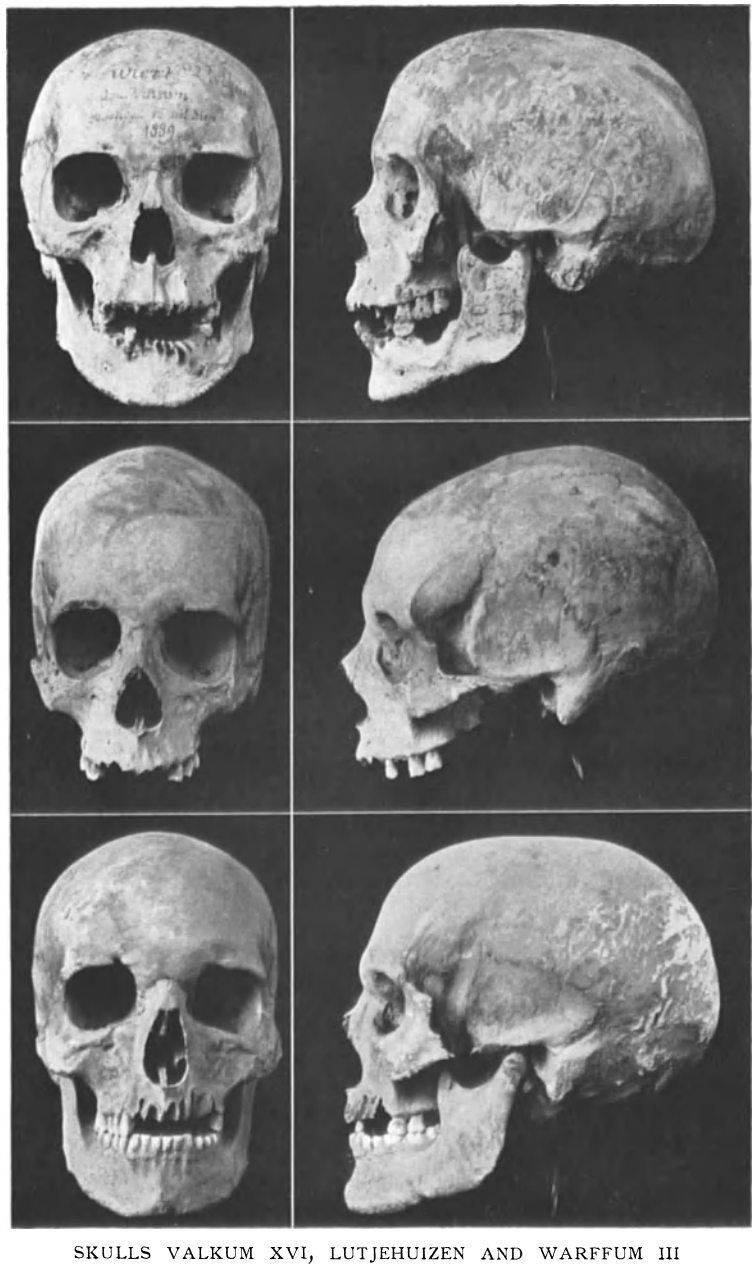
In Folmer's day there was still less agreement in the determination of the height than at present. The two Sasse's attached great value to Schmidt's height (Martin no. 18*a*) in which they were theoretically no doubt right, though its determination offers some difficulty in practice. In many cases Folmer did not give it. Like Virchow, he also gives the total height (Ganze Höhe), and the extreme height like von Ihering.

Total Height.

Cl. T.	medium high										high						
H.	122 123	124 125	126 127	128 129	130 131	132 133	134 135	136 137	138	139	140 141	142 143	144 145	146 147	av	med high	high
38 F.	1	3	3	3	1	2	6	6	(2)		7	1	3		134.7	73.7%	26.3%
23 G.	1	0	0	4	2	4	5	1	1		2	0	2	1	136	82.6%	17.4%
17 M.	1	0	2	0	0	3	7	0		0	2	1			135	75.9%	24.1%

The average figures already indicate a slight difference, though the Groterpians have a greater height, and the sense of the curves shows it strongly. The Friterpians include a lower group which is not found with the Groterpians. But the group on the borderline of medium and high is stronger among the Friterpers, and eliminates the influence of the low crania.

There is also a slight difference when we use the division of Virchow (102—120 mm. = low; 121—138 mm. = medium high,



SKULLS VALKUM XVI, LUTJEHUIZEN AND WARFFUM III

and 139—157 mm. = high) to a frequency curve of the basion bregma height, applying the rule: Total height = basion bregma height + 1. As this curve agrees closely with the preceding, it is not necessary to include it here.

Compared with the Alamanni of Augst (basion-bregma-height 133.8) the Friterpians (b. b. height 133.7 mm.) appear to be as low, and the Groterpians (b. b. height 135) a little higher. Both are higher than the Swiss Burgundians (132.5).

The difference between 28 Friterpian males (136.3) and 11 females (131.1) is 5.2; that between 14 Groterpian males (136.5) and 9 females (129.7) is 6.8 mm. So again the sex difference is greatest with the Groterpians.

The mean greatest height of von Ihering is greater for the Groterpians (139.9 mm.) than for the Friterpians (139 mm.). The average for the Groterp males (142 mm.) is considerably higher than for the Groterp females (136 mm.). The 18 Friterp males (139 mm.) and the 9 Friterp females (135 mm.) differed less; thus the sex-difference of the Groterpians is again greater.

Although the averages of the Friterpians (135.6 mm.) and Groterpians (135.7 mm.) do not vary much when measured by Schmidt's height, yet there is a notable difference in the frequency curves.

Schmidt's Height.

CIS	medium									high								
S H	123 124	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46	47 48	149 150	av.	medium	high
31 F.	1	2	1	1	2	4	4	6	5	2	0	3			135.6	48.4%	51.6%
23 G.				4	1	4	8		2	1	1	2			135.7	73.9%	26.1%
33 M.		1	2	2	1	5	5	2	6		1	6	1	1	138	48.5%	51.5%

Again we are struck by a group of low Friterpians. J. Sasse placed the dividing line between medium and high at 136. Though this figure is certainly not too high, it allows of classifying one half of the Friterp skulls as high, against one fourth of the Groterpians. Whereas three quarters of the Groterpians lie between 129 mm. and 136 mm. more than half of the Friterpians lie above 136 mm.

So the majority of the Groterpians are medium high; the Friterpians high and low.

The average figure of the Merovingians is higher than that of

the other two series because they include an important high group, which is scarcely found with the Friterpians. Reduced to Standard Skull the Friterpians give an average of 118.9; the Groterpians of 120.1, so a little higher.

The female skull is generally lower than the male. Yet the difference in the mean hight of Friterp. males and females (136 and 134 mm.) is again less than that of the Groterp. males and females (138 and 133 mm.). Here again we find the greater sex difference among the Groterpians.

If we reduce the total height figures to Standard Skull we get an average of 119.5 for the Groterpians, and 118 for the Friterpians, so again a higher figure. The breadth variation of the smaller Groterp series (106—125) is relatively greater than that of the Friterpians (108—128).

Sex index	L.	B.	Tot. H.	S. H.
F.	94.3	95.1	96.2	98.6
G.	91.6	94.4	95	96.4
Norwegians (Alette Schreiner)	95.3	97.8		

Occiput length

Folmer was prevented by difficulties in his investigations in the Frisian Museum (1890) from stating the occiput length of these Frisians. Consequently we are only able to give this measurement for a small series of Friterpians. Again we find that the breadth variation is much greater for the Groterpians.

Occiput length.

Oc. L.	50 54	55 59	60 64	65 69	70 74	75 79	80 84	av.	min.	max.	av. ♂	av. ♀	sex index
18 F.	2	3	3	10				62	52	69	62	58	93.3
24 G.	4	5	5	3	4	0	1	60	50	80	65	60	92.3

When we calculate the occiput length to Standard Skull we get an average of 53 for the Friterpians, which is smaller than that for the Groterpians (55). The end figures deviate much more again viz. (45—69) against (46—60) for the Friterps. More than half of the Friterps form the medium group (55—59).

Foramen magnum

Dr. Adolf Schulz (1918) has again drawn attention in his excellent study to the importance of the measurements of the basi-

liary part of the skull, which, as the connecting link between the facial and the cerval parts, promises to bring new correlations to light. Folmer, however, paid little attention to this part of the skull.

The average length of the Foramen magnum of 23 Friterpians amounts to 39 mm., and of 23 Groterpians to 36. The mean width of the foramen magnum for 22 Friterpians is 34, and for 23 Groterpians it is 32.

Consequently the foramen magnum of the Friterpians is somewhat longer and wider than that of the Groterpians, which agrees with the greater absolute head-measurements of the former series.

Conclusions

In conclusion, on comparing the absolute figures of the neurocranium of the two series in their curves, we find, that in a few cases they agree, but more often they differ. *The difference is especially marked with regard to the length. The Friterpians are much longer and somewhat lower than the Groterpians, also if we reduce the measures to Standard Skull. The Friterpians are eurycranic, the Groterpians brachycranic.* There are further some differences in the length of the occiput and the dimensions of the foramen magnum. The height of the os frontis does not seem the same, but Folmer does not give much information on this subject. The capacity of the Friterpers is greater. *The variation breadth; and especially the sex difference with the Groterpians is considerally greater than with the Friterpians.*

In connection with the considerable difference in length between Friterpians and Groterpians we remember the pronouncement of Röse (1906) after his investigation of the Germans: "Die absolute Kopflänge ist bei unserer deutschen Mischlingsbevölkerung das zuverlässigste Unterscheidungsmerkmal um fest zu stellen, ob ein einzelner Mensch mehr germanisches oder mehr turanisches Blut [1]) in seiner Adern hat."

Splanchnocranium

Of various skulls the facial part was damaged. Some of these measurements, among others those of the eyes, are still difficult to take. In Folmer's time much was yet undefined. Therefore, with

[1]) Alpine

regard to the following absolute measurements, we must use even greater reserve.

Facial height

The facial height could only be determined of the smaller half, which have the lower jaw.

Facial height

Fac. H.	100 104	105 109	110 114	115 119	120 124	125 129	130 134	135 139	140 144	av.
19 F.	1	2	1	6	2	4	2	0	1	119.8
15 G.	1	2	2	1	5	0	0	1	1	117

The difference between both averages is not insignificiant. It is partly caused by the considerable sex difference (16 mm.) between the Groterpians (121 mm. and 105 mm.) which again considerably exceeds the difference (9.3 mm.) between the male (119.8 mm.) and female Friterpians (111.5 mm.). The Friterpians belonged to the peoples with the greatest facial height. Only that of the Eskimo of Hrdlicka (123 mm.) is greater [1]).

If we calculate the numbers of Standard Skull for the facial height, we find for 19 Friterpians 104.4; for 14 Groterpians 10,28 so that this too would prove that the faces of the Friterpians are a little longer. If we exclude the cranium of Aalsum (121) the variation breadth for the Groterpians (93 and 115) is again greater than for the Friterpians (93 and 111).

Also from the course of the frequency curves, a difference is evident. The Groterp apex comes much farther to the left. The difference between both series is more evident here than with the absolute measurements.

Reduced facial height

Fac. H.rst	90 94	95 99	100 104	105 109	110 114	115 119	120 121	av.
19 F.	2	3	5	7	1	0	1	104.4
14 G.	1	5	3	2	2	1		102.8

The chief group of the Friterpers has a considerably longer face than that of the Groterpers, even though this difference is not very apparent in the averages. The Cranium of Aalsum 12 with its

[1]) Martin p. 790

high jaw points to the existence of a longer group with the Friterpers. It is to be regretted that Folmer did not measure the mandibular height.

This height is 69 mm. (53—84 mm.) with 130 Alamanni of Augst (Schweiz) with 58 Swiss Burgundians 69 mm. (56—80 mm.) Upper-facial height

Upper-facial height

H.	59 60	61 62	63 64	65 66	67 68	69 70	71 72	73 74	75 76	77 78	79 80	81 82	85 86	av.	min.	max.
37 F.	1	3	2	1	2	2	6	1	9	3	5	0	2	73	61	85
23 G.	2	1	1	0	4	3	1	6	1	2	1	1		70.7	59	82
15 M.	1	1	1	2	4	0	1	2	1	1	1			69	61.5	79

The upper faces of the Friterpers are much longer than those of the Merovingians of Katwijk, the Alamanni and the Burgundians. The Groterpians again approximate to the Merovingians. According to the sex, the difference (6.1 mm.) between the averages of the Friterp men (68,7 mm.) and women is equal to that of the Groterp men (73.1 mm.) and women (66 mm.). So with the smaller group of Groterpians the sex difference is again greater (sex index Friterp 91.7; Groterp. 90.3). More than half of the Friterpians have an upper face longer than 74. This is only the case with one fourth of the Groterpians. So the probability that the entire facial height of the Friterpians is longer than that of the Groterpians is augmented by this. Moreover, there are indications of the presence of a very long element (85 mm.) which is wanting with the Groterpers. The Friterpians have longer faces than the male Kalmucks-Tourgouts (72,7 mm., 63—80) of Reicher and nearly as long as the Eskimo (74,5 mm.) of Hrdlicka. The Groterpians have faces equal in length to those of the Malays of Bartels, and somewhat shorter than those of the Bavarians of Ranke. The Frisian maximum (85 mm.) exceeds the maximum, that Martin gives (84 mm.).

Reduced Upper-facial height

H rst	50 54	55 59	60 64	65 69	70 74	av.
36 Friterpians	2	5	12	14	3	63.4
23 Groterpians	1	3	12	6	1	62.4

Also when we reduce the upper facial height to Standard Skull, the Friterp upper face (63.4 min. 51, max. 73) remains longer than that of the Groterpian (62.4 min. 54, max. 70). From both curves also the existence of an element with longer upper face among the Friterpians is evident.

Zygomatic arch breadth.

The difference in zygomatic arch breadth between both series is considerable.

On comparing the Alamanni of Augst (131 mm., 114—147 mm.) with the Swiss Burgundians (128 mm., 110—140 mm.) and 8 Merovingians of Katwijk (132 mm.; 128—137 mm.) this breadth of the Friterpians proves to be somewhat greater, and that of the Groterpians smaller. Yet in the latter series the variation breadth is much greater. The apex of the Friterp curve lies more to the right.

Zygomatic Arch breadth.

B	111 112	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46	47 48	149 150	av.	min.	max.
35 F.			2	3	2	5	2	2	1	3	6	7	0	1	1			133	120	146
20 G.	1	2	2	2	0	1	3	4	0	1	3	0	0	0	0	0	1	127	110	149

The broad element, which is well-nigh wanting with the Groterpians, constitutes more than one fourth of the Friterp series. The zygomatic arch breadth intra vitam of the modern Norwegians (13.3, Bryn) is equal to that of the Friterpians. So in reality the Friterpers are 6 mm. broader (C z e k a n o w s k i), the Groterpians as broad as the Norwegians. The absolute maximum (145 mm.) that Martin gives is even surpassed by the cranium of Hallum (146 mm.). Three older Frisian crania approximate to it.

If we divide both series according to sex, the difference between Friterp males (132 mm.) and Groterp males (130 mm.) becomes smaller (2 mm.). That between Friterp females (126 mm. and Groterp females (121 mm.) remains equal to the difference in the averages of both series (5 mm.). The sex difference between

B rss.	105 109	110 114	115 119	120 124	125 129	av.	min.	max.	var.
34 F.	1	8	21	4	0	116.1	109	121	12
21 G.	3	9	6	2	1	114.1	106	126	20

the Groterpers (9 mm.) proves to be considerably greater than that between the Friterpers (6 mm.). The sex index for the Friterpers is 95.4, for the Groterpers 93.

Reduction to Standard Skull does not cause the difference in zygomatic arch breadth between Friterpers and Groterpers to disappear. The variation breadth of the Groterpers is again considerably greater. The apex of the Groterper curve lies lower.

Malar breadth

The malar breadth is a measure little used at present, giving the distance between both zygomaxillar points. For 36 Friterpers it is 96, and for 21 Groterpers on an average 95 mm. Though the apices of both frequency curves coincide, a broad element is present with the Friterpers, which is wanting with the Groterpers. More than one third of the Groterpers is under 92 mm.; while with the Friterpers only one sixth is under that figure.

Nasal length

The nasal length of the Friterpers (51 mm.) is somewhat smaller than that of the Groterpers (53 mm.). This is also apparent from the frequency curve. As a shorter nose corresponds to greater breadth, we have arranged the latter in a descending scale. The nasal length of the Friterpers is equal to that of the male Spaniards of Hoyoz Sainz and the Tyrolese of Frizzi; the nasal length of the Groterpers is a little smaller than that of the Britons of Knowles.

Nasal length

L.	27	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	av.
38 F.	1	1	0	1	0	0	2	2	4	4	5	3	5	3	2	2	3	0	0	0	51 mm
27 G.				1	1	0	3	1	1	2	3	1	2	2	0	1	1	2	0	1	53 mm

Nasal breadth

B.	30	29	28	27	26	25	24	23	22	21	20	19	av.
37 F.	1	3	2	4	6	2	5	1	1	1	0	1	25 mm
22 G.		1	0	5	0	3	9	4					25 mm

In accordance with the sense of the curves for the length, the apex of the Friterp curve for the breadth lies more to the left. So a part of the Friterpers have a shorter and broader nose than the

Groterpers. The nasal breadth of the Friterpers is equal to the male Punjabi (Charles) and the Tyrolese (Frizzi); that of the Groterpers equals that of the Wallas (Pittard) and is a little smaller than the nasal breadth of the Bavarians of Ranke:

Series	number	nasal length	min.	max.	number	min.	max.
F.	38	51	27 43	58	37	19	30
G.	27	53	45	61	25	22	29
Alamanni of Augst (Schwerz) .	123	51	38	62	123	18	32
Swiss Burgundians (Schwerz) .	58	52	42	60	57	19	30

If we exclude the non-Nordic minimum 27, the nasal length for the Groterpers varies more. As regards the breadth, the noses of the Friterpers vary more. Both in averages and in minima and maxima our series well-nigh agree with those of the Nordic groups of Schwerz.

Orbita

About the form and position of the orbita, Folmer gave few particulars. Martin (p. 857) says that on account of difference in technique, the statements in literature can only be compared while using great caution.

Orbital height

H.	28	30	1	2	3	4	5	6	7	8	9	41	av.	min.	max.
38 F.	0	1	0	4	2	3	2	9	5	10	2	0	36	31	41
22 G.	1	0	1	1	4	4	2	5	2	0	0	2	35	28	41
14 M.	0	3	2	2	3	1	1	2	0	0	0	0	32.2	30	36.5

The apex of the Friterp orbital curve lies a little more to the right. Two thirds of this whole series lie from 36—38.

The Groterpers are more scattered, they also have greater variation-breadth.

Orbital breadth

B.	36	6	7	8	9	40	1	2	3	4	5	6	7	av.	min.	max.
35 F.	0	0	0	4	5	3	4	3	4	6	2	3	1	42	38	46
21 G.	0	0	2	3	3	5	2	2	1	1	3	0	0	40	32	45
14 M.	2	2	2	1	4	1	1							38.3	35.4	41.2

In the breadth curves the apex of the Friterp series lies much farther to the right. This points to a group with broader and higher eyes. Yet the averages do not vary much. With the Groterpers the variation breadth is again considerably greater.

The length curves of 22 Friterpers (average 49 mm.) and 20 Groterpers (average 48 mm.) present a much greater difference than the averages would suggest. The apices of the Friterp series lie much farther to the right than those of the Groterpers (44 and 47 mm.). Palate

Neither do the apices of the breadth curves for 22 Friterpers (average 35 mm.) and 28 Groterpers (average 36 mm.) coincide (with 37 and 34 mm.) However, the irregular course shows that both series are much too small. As the measures of the palatum are less reliable, we shall not include them.

Folmer ascertained two facial angles: A. the angle, which the linea facialis, passing from sutura nasofrontalis to the alveolar edge of the upper jaw, formed with the auriculo-orbital plane; B. that which was formed by a linea facialis, passing from sutura naso-frontalis to basis spinae nasalis, with the auriculo orbital plane. Facial angles

Facial angles

Series	av	min	max	♂	av.	♀	av.	sex. dif.
19 F. ♀	83°	78°	92°	13 F.	83.7°	6 F	81.3°	2.4°
12 G. ♀	80°	75°	92°	8 G.	79.4°	4 G	81.8°	–2.4°
19 F. ♀	87°	83°	95°	14 F.	88°	5 F	85°	2°
12 G. ♀	83°	78°	96°	8 G.	83.1°	4 G	82°	1.1°

So the Friterpians are less prognatic than the Groterpians, as appears from both angles.

Partly on account of a defect in the measurement, perhaps, less difference between both groups can be pointed out with the splanchnocranium than with the neurocranium. Yet here too the absolute measurements differ so often, and so rarely agree, that also here there are more indications for diversity between both parts of Terpia, than for similarity. Conclusions

In facial height, in upper facial height, in zygomatic breadth and malar breadth, in length of palate and facial angles the Friterpians exceeded their Eastern neighbours. However, the Groterpians had longer noses and broader palates, while here too, as regards variation breadth, they generally exceeded the greater Friterp group. The sexual difference between the Groterpians is considerably greater.

Even if the numbers according to Standard Skull had not corroborated our opinion, the study of the absolute measurements would have made us suspect a considerable difference between both series. We are convinced, that this would also have been the case with Folmer, if he had paid attention to it.

Relative Measurements

In comparing the moduli for the series of Friterpians (38), Groterpians (23) and Merovingians (27) the similarity between the last two series is again obvious.

Relative length

The average relative length according to Schmidt is, in consonance with our former results, higher for the Friterpers. Moreover, there is a difference between both series, because with the Friterpers there is a very long group (124—126), which comprises one fourth of the total number, and is almost absent with the Groterpers. More than two thirds of the Groterpers are under 121, and of the Friterpers rather more than one third.

Relative length

Cl S	medium long					long				very long					
R L	115	16	17	18	19	120	21	22	23	24	25	26	av	min	max
38 F.	0	1	0	4	1	4	4	8	6	3	6	1	122	118.4	126.2
22 G.	0	1	2	4	4	2	1	5	3	0	0	0	120	116.1	123.5
27 M.	1	1	3	3	4	4	7	1	1	1	0	0	116	115.8	124

According to Schmidt's division the Friterpers and Groterpers are both long, the Merovingians on an average long. Of the Friterpers 42.1% are very long, and of the Groterpers 13.6 %.

Relative breadth

For the Friterpers the average breadth is but slightly greater. Yet the curves differ. Of the Groterpers more than one half reach

the figures 90 and 91, and of the Friterpers but one third. According to Schmidt's division, the latter touch the dividing line of narrow, and are on an average broad, while the Groterpers are on an average narrow.

Relative breadth

Cl S	extra n	narrow					med broad				broad			
R B	83	6	7	8	9	90	1	2	3	4	5	6	av	min	max
38 F		1	2	5	5	9	4	4	3	1	4		91	86.6	95.5
23 G		2	0	1	1	7	5	3	2	1	0	1	90.3	86.7	96.7
27 M	1	1	2	2	5	2	3	7	1	3	0	0	90.5	86.7	94.4

Relative height

According to the relative height of Schmidt the Friterpers are lower than the Groterpers. As we have already stated, this is principally the result of a low element, which is not compensated by a high element.

Though half of the Groterpers are above 80, this is the case with only one third of the Friterpers. The Groterpers here again approach the Merovingians. According to Schmidt the Groterpers are on an average high, the Friterpers low. 17.1% of the Friterpers are very low and extraordinarily low, while 9% of the Groterpers are low.

Relative height

Cl S	extra low	very low			low				med high				high			
R H	78	80	3	4	5	6	7	8	9	90	1	2	2	av.	min.	max.
35 F	1	1	1	3	0	4	6	8	6	3	0	0	1	87.4	82	93.1
22 G	0	0	1	1	1	3	3	3	5	4	2	0	0	88.4	83.9	91.8
30 M	0	0	0	0	0	3	2	5	6	2	6	3	0	89.7	86.1	92.5

Johannsen (1907) seriously cautioned against the use of "rohe Indices". He supposed correlation to exist between the index cranicus and the absolute length of the skull. He also showed the probability of a connection between this length and the length of the body. However, Folmer very often refrained from giving us the data to make corrections according to Johannsen. Moreover, our series are so small that a division into smaller groups is not worth while. We felt the same objection against a division according to sex or index groups.

Breadth : length-index.

Class. of Garson	hyper dol.			dolicho-cranic				mesocr.					brachy						
In cr	67	8	9	70	1	2	3	4	5	6	7	8	9	80	1	av	hyp. dol	dol	me	br	min	max
45 F	0	0	2	3	5	7	6	6	8	3	1	2	0	2	0	74	4.4%	60 %	31.1%	4.5%	69.3	80.4
23 G	0	0	0	2	0	0	4	3	3	2	4	1	1	2	1	76	0%	39.1%	47.7%	13.2%	70	81.1
27 M	1	0	0	0	3	2	0	4	2	4	4	4	0	2	1	75.8	3.7%	33.3%	51.9%	11.1%	67.9	81.5

Of the three series the Friterpers have by far the greatest number of dolichocrania, the Merovingians the smallest, while the Groterpians include the greatest number of brachycrania. The majority of the Friterpians is dolichocranic; the Groterpians are mostly mesocranic and brachycranic. Here the mesocrania form the most important group. The crania with low index (69—72), often occurring with the Friterpers (38 %), are well-nigh wanting with the Groterpians. If for a moment we adopt the hypothesis that the dolichocranic element increases, and the mesocranic decreases with the increase in the age of the series, the Merovingians would be the youngest, the Friterpers the oldest. Reckoning with the increase of the brachycranic element, the Groterpians would be the youngest. As the Friterpers, with the inclusive series of Folmer (1890), show the lowest index cranicus of any series as yet found in Holland, probably few objections would be raised against it. But the difficulty with both other series showed already that the hypothesis of a narrow relation between time and index cranicus is of little use. Must we reckon only with average index cranicus, and not with increase of the mesocrania or that of the brachycrania?

The Groterper series, which has a higher average than the mediaeval Lutjehuizers (75.1) has been almost entirely disinterred under Dr. Folmer's personal supervision or influence. It partly consists of crania, as to the antiquity of which there can be no doubt. Among these there are some which can be rather sharply defined historically, as the brachycranium of Enum (coins of 151—160 A. D.). Therefore the opinion that, on account of the greater percentage of meso- and brachycrania, this series should be regarded as younger than the Friterp series, has little foundation.

On account of the high percentage of meso- and brachycrania,

the Merovingians would possibly have to be regarded as very young. Yet it is fairly certain, that they date from 650 A. D., perhaps some are even older. So in both series we have a fairly positive proof, that the index cranicus is of little value for defining the age. It is not wholly impossible, that the dolichocrane Frisian series is younger than both the mesocranic series.

In comparing the averages, and also according to the division, the Friterpers (74) prove to be *dolichocranic*, the Groterpians (76) *mesocranic*. The difference in index cranicus between both series (76 — 74 = 2) is considerably greater than between the old Groterpians (76) and the greatest recent Leeuwarden Series (77.1). It is even greater than between the Groterpians (76) and the important group of modern Nieuweschansers (77.65). It is little smaller than between the old Friterpers (74) and the only modern Friterp series, that of the Hallumers (76.9) So we must consider both the difference in the averages, and the entirely different division according to breadth: length-index, an important distinction. In Folmer's time, the classification of the Friterpians as dolichocranic, that of the Groterpians as mesocranic, would have been sufficient reason to completely distinguish the two series. At present such a high value is no longer set on this index. However, the division in groups of both series is so divergent that this alone is sufficient reason for inferring a racial difference.

Divided according to sex, the 30 male Friterpers have a breadth-length index of 73.7, the 15 female Friterpers of 74.5. So both are dolichocranic. The ind. cran. of 15 male Groterpers is 75.4, that of 8 females 77.1. So both are mesocranic.

The sex-difference between the Friterpers is 0.8; and between the Groterpers 1.7. Also the average variation of the latter (2.4) is greater than that of the Friterpers (22.1).

Breadth-length-index

Anglo Saxons.	73	J. B. Davis[1])
20 Franks of Hainault	73.8	Houzé
45 Friterpians	74	
16 Alamanni of Solothurn	74	Schwerz
76 Alamanni of Baden	75	Ecker

[1]) E. Pittard, Recherches d'anatomie comparative sur divers séries de cranes anciens de la vallée du Rhône, 1899, p. 92.

60	Alamanni of Bavaria.	75.2 Ranke
101	Swiss Alamanni	75.7 Schwerz
19	Alamanni of Basel	75.8 Schwerz
27	Merovingians of Katwijk	75.8 J. Sasse
23	Groterpians	76.
	North Western Germans (IX—XIV century)	76.0 Gildemeister
352	Modern Swedes	76. Valentin
81	Merovingians of Chelles	76.4 Broca
20	Franks of Brabant.	76.9 Houzé
777	Modern Amsterdammers	78.3 Bolk
80	Helvetians	78.6 Schwerz

Height: length-index

In the average height: length-index, which, according to Martin, gives a still more characteristic distinction for various races than the breadth: length index, a distinct difference between Friterpers and Groterpers may be ascertained.

Total height : length-index

H L in	62	4	5	6	7	8	9	70	1	2	3	4	5	7	8	av	min	max	♂	♀	sex in
38 F	1	1	1	2	3	4	3	6	5	1	2	5	1	2	1	70.7	66.1	78.3	70.4	71.5	101.5
23 G	0	0	0	1	0	1	1	3	0	5	4	1	3	3	1	73	62.6	77.9	71.8	75	104.5

Also in the course of the total height: length-index curve, the low element with the Friterpers, which is well-nigh wanting with the Groterpers, becomes very evident. This also appears from the division according to the sexes. The sex difference (1.1) between the averages of 28 male Friterpers (70.4) and those of 10 female Friterpers (71.5) is considerably smaller than the difference (3.2) between 15 male Groterpers (71.8 and 8 females (75). In both groups the female height: length-index exceeds the male.

To make a comparison with Martin's statements possible, we have computed the basion-bregma height: length-index. The Friterpers (69.7) are parindicial with the male islanders of South California (Boas) and the male Woguls (Silinic). They are a little higher than the male crania of the Norman Reihengräber (Hamy). Also according to the average as to the percentage, the Frisians are *chamaecranic*. As the greater part of the human race is ortho-

cranic like the Groterpians (72.5) or hypsicranic, this is a very remarkable characteristic.

Basion bregma height: length-index

Cl.M.	chamaecranic								orthocr.					hyp-sicr.												
Ba. in	62	3	4	5	6	7	8	9	70	1	2	3	4	5	6	7	av.	♂		♂ ♀		♀		cham.	orth.	hyps.
39 F.	2	1	0	0	3	6	4	7	6		2	5	1	0	0	2	69.8	26	69.4	12	71.2	38	69.9	58.9 %	35.9 %	5.2 %
23 G.	0	0	0	1	0	1	0	3	1	4	5	1	3	0	1	3	72.5	15	71.5	8	74.5	23	72.3	26.1 %	56.5 %	17.4 %

The Groterpers are parindicial with the Sioux (72.4, Boas) and the male Kaffirs (Shrubsall). Whilst the female Friterpers are parindicial with the male Merovingians of Hamy (71.1) and the Frenchmen of Frizzi (71.9); the female Groterpers (74.5) are parindicial with the Bohemians (Matiegka) and the ancient Pompeians (76.8, Schmidt).

We have also calculated this index for Schmidt's height. Even from the arithmetical mean, a considerable difference between the Friterpers (71) and Groterpers (73.7) is evident, but still more so from the course of both frequency curves.

Schmidt's height : length-index

SH: L in.	62	5	6	7	8	9	70	1	2	3	4	5	6	7	8	av.	do.	me.	br.
31 F	1	2	1	0	4	2	2	6	3	1	7	0	0	2	0	71	71	71.1	73
21 G						2	2	1	4	2	4	2	0	1	3	73.7	71.2	74.7	74
26 M								4	4	3	1	4	3	2	1	74.7	74.1	74.7	76.9

Here again the presence of a low element among the Friterpers, which is wanting in the two other groups, is evident. Here too the Groterpers approximate to the Merovingians.

Divided into three groups after the index cranicus, the small brachycranic groups are the highest, with one exception. This is caused by the high Groterpian mesocrania, which are much higher than the dolicho's of this series, and as high as the Merovingian mesocrania.

For the greatest height: length-index a considerable difference is also apparent. The average of 27 Friterpers is 73.5 (min 66.5 max. 77.9) of 22 Groterpers 75.4 (min. 72 max. 80.1). So here too, the variation between the Groterpers is greater, while again

the sex difference between them is greater also. Perhaps the course of the curve shows the difference between both series strongest here on account of the presence of the low element among the Friterpians, which forms a third of the entire series, and which is altogether wanting with the Groterpians.

Height : breadth-index

As the length of the Friterpers and Groterpers differs much more than the breadth, it is to be expected that the difference between both series is less evident from the height: breadth-index.

Yet we shall also compare the latter.

The Groterpers prove to be higher in the norma occipitalis. At the same time the low group with the Friterpers comes to the fore. On the other hand, the high Groterp group is less conspicuous.

For comparison with Martin's statements, we have also calculated the basion-bregma height: breadth-index.

Basion bregma height : breadth-index

Cl. M.	tapeinocranic							metrio-cranic							akrocranic												
Ba in.	80	2	4	5	6	9	90	1	2	3	4	5	6	7	8	100	2	4	106	av.	♂		♀		tapeino cranic	metrio cranic	akro cranic
38F		1	0	2	1	1	2	3	1	5	3	7	4	2	3	1	0	1	1	95.5	26	94.8	10	96.2	26.3%	57.9%	15.8%
23G	1	0	1	0	0	1	0	1	1	3	3	2	2	2	1	3	2	0	0	95.6	16	95.2	7	96.1	17.3%	56.5%	26.2%

Both series are here on an average metriocranic. The Friterpers are parindicial with the male Roumanians (Pittard), the Groterpers parindicial with the male Spaniards (Hoijoz Sainz). From the division, the difference between the two series is apparent. While the percentage of metriocrania (F 63.2% ; G 61 %) does not show a marked difference, we note a considerable tapeinocranic group with the Friterpers, and with the Groterpers an akrocranic group.

For the convenience of Dutch investigators we have calculated Schmidt's height: breadth-index.

Schmidt's height : breadth-index

S. H. in	82	4	6	7	8	90	1	2	3	4	5	6	7	8	9	100	1	2	3	5	106	av.
37 F.	1	1	0	1	2	2	3	1	1	0	2	4	8	2	4	2	1	0	0	1	1	95.1
23 G.	0	0	1	0	0	0	1	1	1	4	3	0	4	2	0	3	0	1	2	0	0	96.8

Though the averages do not differ greatly, here again a considerable difference is apparent on account of the existence of a low group with the Friterpers.

Schmidt's classification. Friterpian and Reihengräber-type

We shall now ascertain, how often the typical Nordic skull (long, narrow and midway between medium high and high) occurs in both series, chiefly according to the relative measurements of the neurocranium. According to J. Sasse, the group figures for Nordici after Eykman's system are 5—3—4. On investigation we found this to be correct in the main, though we are of opinion that we may not exclude a somewhat greater height for the Reihengräber type (group 5).

The Katwijk Merovingian 26 (relative length 124, relative breadth 83.3, relative height 91.7) answered best to this type, according to Sasse. However, this skull falls under the second breadth category. Yet the Beetgum skull no. 35, with its 122.4, 86.6 and 91 as relative measurements, shows the group figures 5—3—4, so that it exceeds the Merovingians in this. Also in the other measurements given by Sasse, except in Schmidt's height 136 (145), there is little difference to be discovered between both crania (H:L ind. 73.9—74.3, modulus 157—159.3). Adequate data concerning the facial parts are lacking for both crania, though, in connection with the upper facial height (75), we may with some certainty assume that the large cranium (1615 ccm.) was leptoprosope. So the ideal Reihengräber type is surely represented in our Frisian series. In the Groningen series Lutjehuizen II (rel. measures 120.2, 88.8, 90.9) approximates pretty closely to the two preceding skulls, though it is somewhat shorter and broader. So the type is also present in Groterpia.

Relative classes of Schmidt

Length classes		Breadth classes		Height classes	
1. extra short	< 107	1. extra narrow	< 83	1. extra low	< 80
2. very short	107–111	2. very narrow	83–87	2. very low	80–84
3. short	111–115	3. narrow	87–91	3. low	84–88
4. med. long	115–119	4. med. broad	91–95	4. med. high	88–92
5. long	119–123	5. broad	95–99	5. high	92–96
6. very long	123–127	6. very broad	99–103	6. very high	96–100
7. extra long	> 127	7. extra broad	> 103	7. extra high	> 100

However, besides this Reihengräber type a longer and lower Nordic type occurs, which is probably more strongly represented in our anthropographical environment. Especially among the Friterpians the very long type is strongly represented. Among the Groterpians 3, or 16.3%, are very long whilst 13, or 32.5 % are very long among the Friterpians, so twice as many.

Sasse already observed that his Nordic skulls had a tendency to assume a relatively still higher figure for the length, and a lower figure for the breadth.

Yet, next to this, a lower figure occurs, especially for the height, whereby these crania may with certainty be distinguished from the Reihengräber. They closely approach the third, or come under the third (low) or second (very low) category of Eykman or Schmidt. As West Germanic, they are sometimes contrasted with the high East Germanic type (Trost 1925). They exhibit the Nordic type so pronouncedly, that we must accept them as a second subtype next to that of the Reihengräbers. Lutjelollum 28 and 29, among others, exhibit it (6—3—3). We call these long, narrow, low Nordici the *Friterpian* type. They are dolichocranic without any exceptions.

Now, however, the question arises, whether mesocrania which exhibit the Reihengräber type, may be considered to belong to the Nordic type, as Valcum XVIII (ind. cr. 75.8), Wijtgaard 14 (ind. cran. 75.2) and Witmarsum 22 (ind. cran. 75.2). Gildemeister included them in his Bremen series. All N.W. European series, whose Nordic character cannot be doubted, also those from the Swedish Stone, Bronze and Iron Ages, consisted to a considerable extent of mesocrania. Their headform often does not differ considerably from that of the dolichocrania. As at present the fact that they are non-Nordic has not yet been settled definitely, and, in connection with the diminishing respect for index figures, there is little chance that this will happen, we must reckon the mesocrania among the Nordici. This is more convenient, as all our specimens are doubtful ones.

In order to ascertain, how frequently the Nordici occur in both series, we have, in our table, placed the group figures according to Schmidt's classification after the relative length, breadth and height. We place the division according to face and head index first.

Of the cranium Kimswerd 4 D L, Folmer did not mention

Schmidt's height, so that we could not calculate the relative measurements according to these principles. On analogy of Bayum 16 L D, however, we may with rather more certainty reckon it among the Nordici. Also the large cranium Lutjelollum 6 L D exhibits the Nordic characteristics too pronouncedly for us not to reckon it confidently among them, even though Schmidt's height has not been recorded. Folmer regarded Leeuwarden 3 as one of his most Nordic skulls. The cranium of Hallum, however, is probably too broad (class 4) to reckon it among the Nordici in connection with the requirements of this classification, even though, in the words of J. S a s s e, „it is too truly Germanically colossal" for us to dare exclude it [1]).

Classification of Friterpian Nordici

Class. on facial index	class on index cran.	Friterpia	Terpbuilders Rel. Measures l b h	Class of Schmidt [2])	Nordici	Friterptype	Reihengrabertype.
L	M	1. Huizum					
L	D	2. Kimswerd	121.1—88.8—90.1	5—3—4	N		R
L	D	3. Leeuwarden . . .	119 —87.1—93.1	5—3—5	N		R
L	D	4. Kimswerd			N	F	
L	M	5. Boxum.	122.9—92.6—84.4	5—4—3			
L	D	6. Lutjelollum. . . .			N	F	
L	D	7. Lutjelollum [3]). . .	123.9—89.6—86.4	6—3—3	N	F	
L	D	8. Lutjelollum. . . .	125.6—87.1—87.1	6—3—3	N	F	
L	D	9. Lutjelollum. . . .	121 —90.1—88.8	5—3—4	N		R
L	D	10. Finkum	125.8—91.6—89.5	6—4—4			
L	M	11. Teerns	116.2—93.2—90.7	4—4—4			
L	M	12. Aalsum	125.9—95.2—78.9	6—5—1			
L	D	13. Huisum	122.1—90.8—87	5—3—3	N	F	
L	M	14. Wytgaard	120.7—90.9—88.3	5—3—4	N		R
L	D	15. Huizum	122.1—90 —87.5	5—3—3	N	F	
L	D	16. Bayum.	122.1—89.9—88	5—3—$\frac{3}{4}$	N	F	
L	D	17. Lutkelaard	122.4—89.1—88.4	5—3—4	N		R
L	D	18. Wytgaard	123 —90.2—86.9	$\frac{5}{6}$—3—3	N	F	
C	D	19. Lutjelollum. . . .	123 —88.6—87.9	$\frac{5}{6}$—3—3	N	F	
L [4])	D [3])	20. Beetgumermolen .	122.7—91.1—86.1	5—4—3			
C	M	21. Witmarsum . . .	118.5—93.5—87.8	4—4—3			
C	M	22. Witmarsum . . .	120.3—90.5—89.2	5—3—4	N		R
C	M	23. Hallum					
C	M	24. Lutjelollum . . .	118.4—92.4—89.1	4—4—4			
C	M	25. Aalsum	118.6—92.6—88.8	4—4—4			
C	M	26. Feitsma State Huizum [3])	123.1—92.8—84.1	6—4—3			

[1]) We have not included the child's skull Achlum 38 in the calculation.
[2]) $\frac{3}{4}$ = on the limit of class 3 and 4.
[3]) Not mentioned by Folmer.
[4]) Reckoned by Folmer to the chamaeprosopes (facio-zygom. ind 92).

Class. on fascial index	Class. on ind. cran.	Friterpia	Terpbuilders Rel. Measures l b h	Class. of Schmidt	Nordici	Friterptype	Reihen-gräbertype
C	D	27. Lutjelollum. . . .	124.6—93.3—82	6—4—2			
L	D	28. Lutjelollum. . . .	125.4—88.4—86	6—3—3	N	F	
C	D	29. Lutjelollum. . . .	125.3—88.9—85.7	6—3—3	N	F	
C	D	30. Lutjelollum. . . .	123.6—88.2—88.2	6—3—4	N	F	
C	B	31. Beetgum	118.6—95.4—86	4—5—3			
C	D	32. Stiens	121.6—90.9—87.5	5—3—3	N	F	
—	M	33. Aalsum	120.1—90.2—89.6	5—3—4	N		R
C	D	34. Stiens	126.2—90.2—83.5	6—3—2	N	F	
C	D	35. Beetgum	122.4—86.6—91	5—2—4	N		R
C	M	36. Dronrijp	120.8—91.2—88	5—4—$\frac{3}{4}$			
C	D	37. Dronrijp	123.3—89.4—87.3	6—3—3	N	F	
C	M	38. Achlum inf. . . .	121.8—94.3—83.8	5—4—2			
—	D	39. Winsum	123.5—89.5—86.9	6—3—3	N	F	
C	D	40. Aalsum	124.4—90.9—84.7	6—3—3	N	F	
—	B	41. Teerns	118.4—95 —86.5	4—$\frac{4}{5}$—3			
C	D	42. Stiens	125.2—91 —83.7	6—$\frac{3}{4}$—2	N	F	
C	M	43. Stiens	122.6—93.6—83.7	5—4—2			
				Together	23 N	16 F	8 R

Classification of the Groterpian Nordici

Class. on facial index	Class. on ind. cran.	Groterpia	Terpbuilders Rel. Measures l b h	Class. of Schmidt	Nordici	Friterptype	Reihen-gräbertype
L	D	I. Lutjehuizen .	123 —86.7—90.3	5—2—4	N		R
L	D	II. Lutjehuizen .	120.2—88.8—90.9	5—3—4	N		R
L	D	III. Warffum . . .	123.3—86.7—89.9	6—2—4	N	F	
L	M	IV. Westerwijtwerd	118.1—91.3—90.6	4—4—4			
C	D	V. Lutjehuizen [1])	121.6—90.5—87.9	5—3—4	N		R
C	D	VI. Maarslag . . .	123.5—90.9—85.6	6—3—3	N	F	
C	D	VII. Valkum . . .	122.2—90.4—86.7	5—3—3	N	F	
C	M	VIII. Stedum . . .	124 —95.2—80.8	6—5—2			
C	M	IX. Lutjehuizen .	117 —91 —91	4—$\frac{3}{4}$—4			
C	M	X. Wetsinge . .	117 —91.1—91.8	4—4—4			
L	B	XI. Enum	115.8—93.4—90.7	4—4—4			
C	B	XII. Lutjehuizen .	119.2—96.7—83.9	5—5—2			
C	D	XIII. Garnwerd . .	122.4—90.6—86.9	5—3—3	N	F	
L	D	XIV. Ulrum	122.2—89.5—88.3	5—3—4	N		R
L	D	XV. Garnwerd . .	122.2—91.5—86.2	5—4—3			
L	M	XVI. Valcum . . .	119.4—92.8—87.6	5—4—3			
L	M	XVII. Valcum . . .	122.8—92.3—84.8	5—4—3			
C	M	XVIII. Valcum . . .	119.7—90.7—89.4	5—3—4	N		R
C	M	XIX. Garnwerd . .	119.2—91.7—89	5—4—4			
C	M	XX. Garnwerd . .	120.8—90.9—88.3	5—3—4	N		R
C	M	XXI. Garnwerd . .	119.5—90.9—89.6	5—3—4	N		R
C	M	XXII. Valcum . . .	118.1—93.6—88.2	4—4—4			
C	B	XXIII. Wetsinge . .	116.1—92.9—90.9	4—4—4			
				Together	11	4	7

[1]) Reckoned by Folmer to the leptoprosopes (frontozyg. ind. 85.2).

So the number of Nordic crania comprises 26, or 65 % of the 40 of the series, among which we also reckon Kimswerd 4 and Lutjelollum 6, which are most likely both Nordic too. So the number of Nordici is considerably greater among the Friterpians than among the Groterpians.

The number of Friterpians is 18, or 45 % of the Western series; that of the Reihengräber 8, or 20 %. Among the Groterpian Nordici 4 are of the Friterpian type, or 16.3 %, but 7 of the Reihengräber type, or 31.6 %. Sasse reckoned 11 or 28.9 % of the 38 Katwijk Merovingians among the "Germanic peoples". If, however, we abide by the norm 5—3—4, there were only 7, or 21.1 %, which almost agrees with the percentage of Reihengräbers among the Friterpians. So, as regards the proportion of Nordici, the Katwijkers again more closely approximate to the Groterpians.

The number of Nordic skulls among the Friterpians is considerably greater. They are mostly of the low Friterpian type, whereas the Nordic crania among the Groterpians show more of the Reihengräbertype.

	Nordic 65%	Mixed 35%
Friterpians	leptoprosope 65%	chamaeprosope 35%
Friterpians	dolichocranic 65%	meso- and brachycranic 35%

Groterpians	mixed 52.2%	Nordic 47.8%
Groterpians	chamaeprosope 52.2%	leptoprosope 47.8%
Groterpians	meso- and brachycranic 60.9%	dolichocranic 39.1%

	Nordici			
	23 Friterpians		11 Groterpians	
leptoprosope	17	73.4%	6	54.5%
chamaeprosope	6	26.6%	5	45.5%

We shall further cursorily attend to the facial skull arranged according to Folmer's division into lepto- and chamaeprosopes, which we have amplified and made to tally with Martin's lower limit of 90 for the leptoprosopes as much as possible. It appears that of the 40 Friterpians 26, or 65 % have a long face, 11, or 47.8 % and of the 23 Groterpians. Therefore the Friterpians consist of 65 % Nordici and long faces,

the Groterpians of 47.8 % Nordici and long faces. So there is a striking similarity between both percentages. Of the "Friterpian" type in Friterpia 64.7 % are leptoprosope. At all events this does not bear out Hauschildt's opinion that the long, low "Low-Germanic Teuton" would have a short face, and the high skulled type a long face. According to the three categories of the index cranicus, 26 Friterpians, or 65 % are dolichocranic, 35 % meso- and brachycranic; of the Groterpians 39.1% are dolichocranic and 60.9 % meso- and brachycranic. So a notable agreement in the division according to Schmidt's system appears both in the facial index and the skull index.

If we place the majority first in the table, we only see some deviation with the Groterpians, whose number of meso- and brachycranics somewhat exceeds that of chamaeprosopes and non-Nordic elements. From this it appears that the Nordic character of the Groterpians is more clearly expressed in the facial form than in that of the neurocranium.

So that we must chiefly look for the difference between both groups in the form of the neurocranium.

If we only pay regard to the Nordici, leaving the rest of the crania out of consideration, of the 23 Friterpian Nordici, whose facial form we know, 17 are leptoprosope or 73.4 %; of the 11 Groterp Nordici 6 are leptoprosope or 54.5 %. So in both groups this element is in the majority, though the chamaeprosopes are proportionally stronger among the Groterpian Nordici than among the Friterpians. Among the Groterpian Nordici too, chamaeprosopes and leptoprosopes appear to be almost equally strong, which undoubtedly influences the arithmetical mean of the entire group. The determination of a difference in face with other groups is thereby made more difficult.

The difference between Friterpians and Groterpians must especially be sought in the form of the neurocranium.

Splanchnocranium

Os frontis height : greatest height index

The difference in this index (average of 18 Friterpers 70.6; and of 21 Groterpers 66.8) is also clearly apparent. Of the Friterpers 62 % have the index 55—64, as against 39 % of the Groterpers.

The averages of the fronto-zygomatical index by means of which the ratio of the zygomatic-arch-breadth to the smallest frontal breadth may be expressed, differ little (27 F av 73.9; min 67.1 max 79.3; 19 G 74.7; min. 65.6, max 80.9). Still the curves differ somewhat. Under the low index come 67—70, or 29.6 % of the Friterpers, against 10.5 % of the Groterpers. With the Groterpers the variation breadth is again greater. The sex. difference too (av ♂ F 73.4; ♀ F 75; av ♂ G 73.8, ♀ G 76.6) is again greater between the Groterpers (2.8) than between the Friterpers (1.6) .As regards fronto-zygomatical index the Friterpers are parindicial with the ancient male Egyptians (73.5 Oetteking), the Groterpers with the male Merovingians (74.0 Frizzi). Fronto : zygomatical-ind. [1])

A great many of Folmer's crania were calvaria. Therefore it was only possible to determine the morphological facial index of a limited number of skulls. As, moreover, euryprosopism (short-face) may be caused both by slight height and by a great zygomatic arch breadth, too great significance may not be attached to this index for indicating the differences in form of the facial skeleton as a whole. Facio : zygomatical-index

Facio : zygomatical-index

Cl M	eurypr.						meso			leptopr					ultra								
Fa	80	1	2	3	4	5	6	8	9	90	1	2	3	4	5	101	2	av	var	eury	meso	lepto	ultra.
19 F	2	2	1	0	1	0	1	1	2	2	1	1	0	1	2	0	1	89.4	80 –102.1	31.6%	21 %	26.3%	21.2%
14 G		1	1	0	1	2	1	0	1	1	2	1	1	0	1	1		89.1	82.4–101.4	21.4%	28.5%	28.6%	20.5%

In the averages there is little difference between both series. With the Friterpers the euryprosope element is strongest, then the leptoprosope; while the mesoprosope and ultra lepto-prosope parts are nearly equal.

With the Groterpers the meso- and leptoprosope groups predominate. While the Friterpers are parindicial with the Papuan (88.9 Sawalischin) the Groterpers are so with the Eskimo (89.5 Oetteking).

Also in the average upper facial-zygomatical index there is little difference between both series. Upper facio : zygomatical-index

[1]) Belongs to neurocranum and splanchnocranium.

Upper facio : zygomatical-index

Cl.M.	eur.			mesene					lep-tene				hyp. lept.				in %								
Up. in	45	7	8	50	1	2	3	4	5	6	7	8	60	61	av.	var.	eur.	mes.	lept.	hy-per	♂		♀		dif.
36 F	1	2	3	0	3	3	0	4	5	7	2	2	2	2	54.5	45 -61.5	16.7	27.7	44	11.6	24	54.6	12	54.3	0.3
20G		1	1	2			1	4	2	5	2		2		54.8	47.5-60.6	10	35	35	20	12	55.3	8	54.0	0.3

With the Friterpers the leptene element is the most important; with the Groterpers the mesenics and leptenics are equally strong. The euryene part is stronger with the Friterpers than the hyperleptenic, but with the Groterpers it is just the reverse. The variation-breadth and the sex difference are again greater with the Groterpers.

Nasal index In nasal index considerable difference between both series is again evident. Here we give the division of Broca used by Folmer and Sasse: leptorrhine < 48, mesorrhine 48—53, platyrrhine > 53.

Nasal index

Class. by Br.	leptorrhine						mesor-rhine			platyr-rhine						
Nasal index	36 37	38 39	40 41	42 43	44 45	46 47	48 49	50 51	52 53	54 55	56 57	96 97	av.	lept.	mesor	platyrr
38 F	1	1	2	4	2	5	6	6	3	5	1	1	49.2	39.4%	39.4%	22.2%
21 G		1	3	0	3	5	0	4	5	0	0	0	47.6	57 %	43 %	0 %

According to this division, the Friterpers are on an average mesorrhine, the Groterpers leptorrhine. With the Friterpers the leptorrhines and mesorhines are evenly balanced according to the percentage, while the leptorrhines form the majority with the Groterpers. In the division according to Mollisson the Friterpers are divided into four groups, and consequently the difference is not so evident.

The Friterpers are parindicial with the ♀ Bavarians (49.2; Ranke) and the Chinese (49.3 Knowles); the Groterpers with the Tyrolese (47.5 Frizzi) and the Californian Indians (47.8 Hrdlicka).

Terpians compared with other Nordic series

series	nasal index (variation)	
Merovingian.	50.4	Frizzi
Friterpians	49.2 (36.5—55.5 (96.2))	
Helvetians	48.6 (41 —57)	Schwerz
North West German .	47.7	Gildemeister
Groterpians	47.6 (39.3—54)	
Swiss Alamanni . . .	47.3 (37—59)	Schwerz
84 Alamanni of Augst.	47.0 (38—60)	
Franks of Brabant . .	47.1	Houzé
Franks of Hainault .	45.6	Houzé
Franks of Namur . .	44.1	Houzé
Scots.	416.	Turner

The averages of both series differ little. According to this table both series are hypsikonch.

Neither does the difference between the two curves appear to be great. Eye index

Eye index

Cl M	Cha-maek	mesokonch			hypsyonch.												
in	71/72	3/4	5	6	7/8	79/80	1/2	3/4	5/6	7/8	89/90	1/2	3/4	5/6	7/8	99/100	av	var	cham.	meso.	hypsi.
38 F	2	0		0	2	3	5	6	6	2	3	4	1	3	0	1	86.2	71 -100	5.3%	42.1%	52.6%
22 G	0	1		0	2	3	2	1	5	1	1	2	2	0	2	0	85.9	73.6-97.6	4.5%	36.3%	59.1%
14 M	0	0		1	0	0	3	2	4	1	0	3	0	0	0	0	85.6	76.8-92.4		42.8%	27.1%

Folmer mentioned nothing about the form of the orbits, neither did he tell us how he took the measurements. So, notwithstanding this seeming similarity, there still remains much that is unknown.

According to the palatal index both series differ rather considerably. Yet both are leptostaphyline. The averages tally with the results of Schwerz, who found that the long-heads have a narrower palate than the broader ones. Palatal index

Palatal index

Clas. Martin	leptostaphyline					meso-sta-phyl.	brachysta-phyline						
in.	55/59	60/64	65/69	70/74	75/79	80/84	85/89	90/94	95/99	av.	lepto	meso	brachy
21 F.	2	2	7	6	1	2	0	0	1	70.5	85%	9.5%	5.5%
19 G.	2	0	5	4	3	3	1	1	0	73.6	73%	15.9%	10.5%

The Friterpers have nearly the same palatal index as the Tamils (71.9, Sarasin).

The Groterpers ♂ have a longer palate than the female Aino's (72.8, Koganei).

Conclusions

If, in summarizing, we consider the similarity and difference in relative measurements of both series, *we observe a difference in relative length, small in relative breadth, more in relative height.*

According to the average breadth: length-index the Friterpers are dolichocranic, the Groterpers mesocranic. Among the Friterpers the majority is dolichocranic, among the Groterpers meso- and brachycranic. Here the mesocrania form the most important group.

If possible, the difference is even more apparent in the height: length index. *Being chamaecranic, the Friterpers are exceptions to the greater part of mankind. The Groterpers are on the average orthocranic. Also when compared with other height: length indices than the basion-bregma height, a great difference is evident. The Schmidt's height: breadth index also shows a difference.*

The facial indices show a far greater resemblance, chiefly because many of these measurements were difficult or impossible to take. *Yet the facial index, the upper facial index, the os frontis: greatest height index, the jugofrontal index, the orbital, nasal and palatal index point to differences. According to the division of Broca, the Friterpers (where the majority was meso- and platyrrhine) were on the everage mesorrhine and the Groterpers leptorrhine. In nearly all the measures and indices the sex difference and the variation breadth between the Groterpers is much greater.*

Though occasionally a similarity comes to the fore, which may be expected with related groups, as a rule the difference seems to dominate. Just as in the case of the absolute measurements, and after reducing these to Standard Skull, we come to the conclusion: *the agreement between the two series makes probable, that we have studied genetically related groups, but the difference between them is so marked that we must consider the Friterpers and Groterpers as anthropo logically differentiated.*

West- and East Friterpia

After we have traced the resemblances and differences between

the two halves of Terpia, a second problem presents itself: Did the Friterpians and the Groterpians each form a more homogeneous whole, or can they easily be divided into two or more coherent parts?

Here in the first place we think of the historic-geographical division of each into two districts: Friterpia into Westergoo and the North East corner, Groterpia into Hunsingoo and Fivelingoo.

Though the dividing line between West and East Friterpia is not so clearly defined as that of the Lauwers sea, which formed a large bay in former times, we have already seen that the archaeologists had also observed a difference between the two parts. Westergoo constitutes the older part, the seat of the oldest Terp-culture, East Friterpia in general has Terps of a later date.

Westergoo was bounded in the East by the Middelzee, a narrow bay, which will probably not have obstructed communication seriously. We don't know how far Westergoo extended at the commencement of our era. It is not impossible that the Terp-centre lay farther West. Farther to the East, however, lay the marshy tract of peat-bog, which was long uninhabitable [1]), whereas lastly, the Friesland Pleistocene was to a considerable extent covered with peat-moor. However, it was probably not yet so much covered with peat at the beginning of the Christian era, as has often been assumed on the analogy of later conditions. When some centuries later the sea-level was raised — presumably in consequence of secular changes in the crust, and perhaps attended by a more humid climatic period — the entire region, which now comprises Oostergoo, Zevenwouden and the Stellingwerven, must have been rather inhospitable. As in the West, moreover, the Vlie widened, and the Zuyder Zee extended more and more, Westergoo long lay rather isolated. This isolation probably necessitated, among other things, an earlier extension of the Terps than in the East, where in times of highest water-level the people could easily flee to the Pleistocene.

On the other hand, East Friterpia lies closer to Hunsingoo, so that the possibility of a blending with the Groterpians was greater. In the South it borders on a spur of the Pleistocene, a region which was probably already inhabited long before the Terp region, as appears from finds from late Neolithic times (Åberg, Holwerda)

In Groterpia Fivelingoo was most isolated. In the N. W. the Fivel-bay separated it from Hunsingoo. In the South lay the marshy tract of Duurswold, in which the Schildmeer occupied a larger area. This again bordered on the Pleistocene, which was covered with peat-moor, and was not very fit for habitation. Yet Neolithic finds prove that it was already inhabited in early times, which was probably also the case with the Pleistocene islands of Schildwolde, Kolham and Midwolde, on which perhaps remnants of an older population managed to maintain themselves.

Thus the population of Kolham differs considerably from that of Schildwolde [2]). On Bolk's Brunet-map this difference in popu-

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[1]) Also in case the fen was inhabited first, as Dodo Wildvang supposes (1926).

[2]) Verbal communication of K. ter Laan M. P., Author of Nieuw Groningsch Woordenboek, 1927.

lation is marked by more pigmentation. Also the high brachycranium of Heidenschap (br.: l. ind. 84.1, h.: l. ind. 82.3, h.: br. 97.8) points to the fact that these regions of peat-moor offered a refuge to more round-headed elements. In spite of their isolated position, this population will also have influenced the people of Fivelingoo. Intercourse by water had already developed here in early times and the people from the Terp-region had skates, which formed an important means of communication in winter. Already in early times the road from Friesland via Bourtange to N. W. Germany, along which new elements entered, ran through this region.

On the other hand Hunsingoo's Terp-region lies in one line with the Hondsrug, with which it is connected by the lower course of the Hunze. The Pleistocene of Drenthe was already inhabited long before the Terp-region. It may be expected that, with the formation of the Holocene in the lagoon, the Drenthe crofters went out on the tracts of land outside the Diluvium to shoot and fish, and later to graze their cattle or for apiculture [1]). The finding of late Neolithic axes of North-European, West-European and Middle-Elbe types on the borders and also within the region of the terps (Åberg) is hardly needed to enhance the probability of this supposition.

So it is very likely that there was a certain difference between the population of the two districts of Groterpia, as well as between those of Friterpia. On the other hand we are here dealing with closely affined groups, where through the medium of morphology, it is difficult to determine any difference. Therefore, we must expect that the results will not always support one another, nay, will perhaps even seem to contradict each other. Thus, in forming our final conclusions, we shall only be able to set any value on such differences as are clearly visible. In order to investigate these differences, we should be compelled to divide up our skull material, which is not at all abundant. Moreover, Folmer's Groterpian material comes to a large extent from his district of Hunsingoo. That the only skulls from the East: Westerwijtwerd (77.2), Stedum (ind. cr. 76.7), and Enum (ind. cr. 80) have an index of 77.91, which lies above the Groterpian average (76), might have occasioned speculations in a former period, but for us this group is too small

[1]) Excavations at Looveen (Drenthe). Jaarverslag Terpvereeniging, 1926, p. 35.

to build on. So our Groterpian conclusions are chiefly applicable to the North-West. It is a fortunate circumstance that the material from the Middle Ages also comes from Hunsingoo.

For Friterpia we have more material at our disposal. If we count the material from Leeuwarden and environs with that from the East, it is about equally distributed over both halves. This region lies East of the Middelzee and so was probably separated from Westergoo. Presumably, it was connected by water-ways with the Northern Terp-region. So here we have a transition region between Westergoo and N. E. Friterpia, which we have mainly reckoned with the North on account of our limited material. Of the 23 Westergoo crania [1]) 9, or 39.1 % come from Lutjelollum, S. E. of Franeker, situated in the centre of Westergoo. Further, 3 from Beetgum lying on the borders of this region, 2 from Witmarsum, 2 from Dronrijp, 2 from Kimswerd, and one skull each from Boxum, Bayum, Achlum (infans.) and Winsum. The Lutjelollum group is to be regarded as a very valuable element.

Of the 20 crania of the N. E. Friterpia series, 5 come from Stiens, 4 from Aalsum, 3 from Huizum, 2 from Wijtgaard, 2 from Teerns and one each from Finkum, Lutkelaard, Hallum and Leeuwarden, so no less than 12, or 60 % from the transition region. [2])

Neurocranium

Absolute Measurements

Cubic. Capacity

Calculated from the modulus this is 1559 cubic cm. for 20 Westergooers, and 1456 for 16 East Friterpians, so the latter are considerably smaller. Yet both are medium according to Broca, and megacranic according to Flower and Turner. According to Sergi the Westergoers are megalocranic, the East Friterpians metriocranic. Though not a single cranium belongs to Broca's macrocrania (> 1950 c. c.m.), the Frisian "macrocephals" [3]) (Lutjelollum 6 and 8: 1826 c cm and 1816 c cm, Bayum 1765 c cm) are especially represented among the West. Friterpians. However the cranium of Hallum 23 (1839 c. cm.) probably exceeds all others in capacity.

[1]) Beetgum 44 and Stiens 45 are only calva.

[2]) The crania for which Folmer did not give the finding-place, are not included in our calculations.

[3]) Virchow 1877.

Length

Length

Cl. v. T.	Short	Middle long				long						
L.	170 174	175 179	180 189	185 189	190 194	195	196 199	200 204	205 209	210 214	av.	med. long	long
22 Westergoers			3	6	3	2	3	2	2	1	194	54.5	45.5
20 East-Friterpians	1		6	9		1	1	2			187	85	15

In both curves a difference is at once obvious, because 16, or 80 % of the East Friterpians are shorter than 190 mm., whereas of the Westergooers almost 60 % are longer than 190 mm. The average lengths, too, vary greatly (194 mm. and 187 mm.). Whereas of the Westergooers rather more than 45% are long, this is the case with only 15 % of the East Friterpians. Yet the apices of both coincide. The average length of the West Friterpians is 5 mm. longer than that of the macrocranium of Amenophis IV[1]). They almost approximate to the average length of the Neanderthalers ± 199 mm. (Hauschildt), whereas Lutjelollum 6 (212 mm.) and Lutjelollum 8 (209 mm.) even exceed the enormous length of the longest Neanderthaler (variation breadth 190—208 mm.). If we calculate the length numbers for both groups, reduced to Standard Skull, we get a length of 167 for the West Friterpians; of 164 for the East Friterpians. Therefore there actually exists a difference of length between the two groups.

Breadth

Breadth

Class. of v. Töröck	Middle broad				broad				
breadth in mm	130 134	135 139	140 144	145 149	150 154	155 159	av.	Middle broad	broad
21 Westergooers	1	6	4	9	1		142	95.2%	4.8%
19 East-Friterpians	5	5	4	3	1	1	140	89.5%	10.5%

With the Westergooers the middle-broad element is somewhat stronger in proportion to the broad element than with the East Friterpians. Yet, because the apex of the curve lies more to the right, the average 142 mm is higher than that for Westergoo (140

[1]) O. Berkhan, Ueber Makrokephalie in der Familie des Pharao Amenophis IV, Arch. f. Anthr. 1919, N. F. Bd. XVII.

mm). Just as in the length, the extremes in the breadth vary more for the small group of East Friterpians. If we reduce both breadth averages to Standard Skull we get the numbers 122 and 123, from which would appear that the East Friterpians are somewhat broader.

Total height

Height	Cl. v. T.	Middle high								high								
	Total height	124 125	126 127	128 129	130 131	132 133	134 135	136 137	138 138	139 139	140 141	142 143	144 145	146 147	av.	middle high	high
	19 Westergooërs			2	1	1	4	2	2		4		3		137	73.6%	26.8%
	16 East Friterpians	2	3	1		1	1	4			3	1			133	75 %	25 %

According to von Töröck's classification not much difference in total height between the two series is apparent. Yet we note a particularly low group among the East Friterpians. On the other hand there is a high group among the Westergooërs. Reduced to Standard Skull we get the height numbers 118 and 116, which seems to indicate a somewhat slighter height for the East Friterpians.

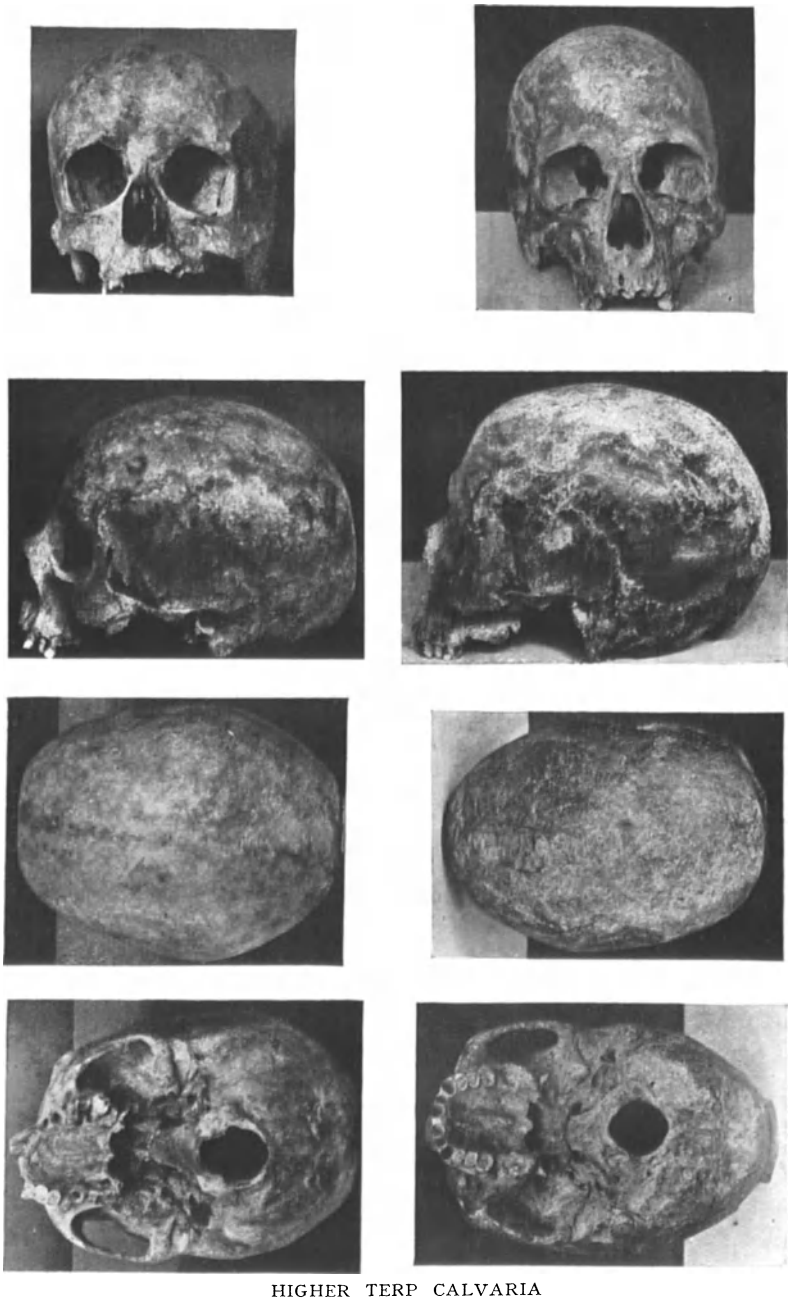
Schmidt's height

S H	123 124	125 126	127 128	129 130	131 132	133 134	135 136	137 138	139 140	141 142	143 144	145 146	av.
19 Westergooërs				1	1	3	2	6	1	2	0	3	133
17 East Friterpians	2	2	2	1	1	3	1	1	4				132

The difference in averages according to Schmidt's height for both groups is less than for the total height. Yet, from the course of both series, a tendency to low values clearly appears for the East Friterpians. The West Friterpians include a high group (26.3 %), which is wanting in the other series, but here we find a low group (35.3 %), which is not found among the Westerns.

The average basion bregma height of the West Friterpians is 136, that of the East Friterpians 132.

So the absolute height is always greater for the Westergooërs, which, as appears from the greater length and breadth, is also a result of the greater capacity of the Western skulls (1527 c.cm.



HIGHER TERP CALVARIA

and 1456 c.cm.). If we reduce the length of each skull separately to Standard Skull, we find a length average of 167 for 19 Westergooërs, and of 165 for 18 East Friterpians. From this it follows, that the reduced length of the Westergooërs is larger also. Then we find 124 for the breadth for both; 118.4 for the height for the West Friterpians, and 117.6 for the East Friterpians. If we reduce the average absolute measurements to Standard Skull ($\sqrt[3]{1559} = 116$; $\sqrt[3]{1456} = 114$) the length of the West Friterpians is 167, and of the East Friterpians 164; the breadth of the West Friterpians 122, and of the East Friterpians 123; the total height of the West Friterpians 118, and of the East Friterpians 117; Schmidt's height for both series is 116. Though this is an imperfect way of calculating, still it shows that there is a considerable difference in length, but less in breadth, between both groups, even though we allow for the size. Also that the height calculated in this way, is almost equal for both.

In Friesland, in the times of the Terpbuilders, the heads became shorter towards the East. The measurements of the neurocranium varied more in East Friterpia than in the West.

Splanchnocranium

Facial height

The average absolute facial height of 8 West Friterpians is 121; of 8 East Friterpians 120. If we reduce both averages to Standard Skull, we get the number 116 for both. The variation breadth for the West Friterpians ranges from 106 mm—130 mm, and for the East Friterpians from 100 mm.—141 mm.; so it is much larger for the Eastern series.

Upper facial height

The upper facial height of 18 West Friterpians and 16 East Friterpians is 73 mm for both series. If we allow for the difference in capacity, we get the numbers 63.5 and 64, so that the East Friterpians would proportionately have somewhat longer upper faces. The variation breadth ranges from 60 mm.—85 mm. for the West Friterpians, and from 60 mm.—185 mm. for the East Friterpians. So again it is much larger for the latter.

Zygomatical breadth

Zygomatical breadth in mm.	120–124	125–129	130–134	135–139	140–144	145–149	Av.
16 West Friterpians		2	3	6	5		135
16 East Friterpians	4	5	1	5		1	130

The zygomatical breadth of both series varies considerably. The West Friterpian series lies more to the right. Of the West Friterpians 68.8 % have broader zygoma than 135 mm., and of the East Friterpians 37.5 %. The average of the first series is 135 mm; that of the second 130 mm. If we eliminate the difference in capacity, we get the number 117 for the first series, 114 for the second, so that in this case too the West Friterpians have a broader face. The variation breadth is again considerably larger for the East Friterpians. This also remains so, if we reduce these averages to Standard Skull, whereby we get the numbers 116 and 114. If we reduce each skull separately to Standard Skull, the great difference in zygomatical breadth diminishes, and we get the standard number 116 for the 15 Westergoers and 115 for the 15 East Friterpians.

Malar breadth

This measurement, against which Martin advises, gives 98 mm. for 18 West Friterpians, 94 for 15 East Friterpians, so narrower for the latter in accordance with the smaller zygomatical breadth. If we reduce the average absolute values to Standard Skull, we get the numbers 85 and 82 for the malar breadth.

Conclusions

In the times of the Terp-builders the faces became absolutely narrower in Friesland towards the East. The measurements of the facial part varied more in East Friterpia.

NEUROCRANIUM

Relative Measurements

Relative length

The relative length of 19 West Friterpians is 122.1, and of 16 East Friterpians 122.3 so somewhat greater for the second group.

Cl S	medium long					long			very long						
relative length	116	117	118	119	120	121	122	123	124	125	126		med long	long	very long
19 W. Friterpians			3	1	2	2	3	4	1	3		122,1	31.6%	47.4%	21%
16 E. Friterpians	1		1	1	2	1	4	1	1	3	1	122.3	31.3%	43.7%	25%

Consequently, on an average, both are long. According to Sasse's division there is much agreement between the two series. Yet the apex of the West Friterpian series lies higher. The variation breadth is again larger in the Eastern series. If we bear in mind that the absolute length of the Western crania is considerably lon-

ger than that of the Eastern, both if we reduce each skull to Standard Skull, and if we make a reduction in connection with the smaller average capacity of the latter, the fact strikes us that the relative length varies so little. If we compare length and relative length, it appears that, in the first series, the very long crania Kimswerd 4 and Lutjelollum 6 do not occur, whereas in the second series, the cranium Hallum 23, which is relatively not so long, is wanting. If, on the analogy of other equally large skulls, we take this into consideration, we get an average of 122.6 for both groups. So there remains a contradiction between the reductions to Standard Skull and the relative length according to Schmidt's system.

The average relative breadth of 19 West Friterpians is 90.4, and of 16 East Friterpians 91.4, so somewhat higher for the latter. Therefore on an average both are narrow. Though the divisions *Relative breadth*

Class. of Schmidt	narrow					med. broad							
relative breadth	86	87	88	89	90	91	92	93	94	95	av.	narrow	med. brd.
19 W. Friterpians	1	1	5	3	2	1	2	2	1	1	90.4	69.9	31.1
16 E. Friterpians		1	0	0	8	2	1	2		2	91.4	68.7	31.3

for narrow and medium broad are almost equal, the apex for the West Friterpians lies considerably lower than that of the East Friterpians. Half of the Eastern group has the average breadth 90. The variation breadth is almost equal in both groups.

Relative height

Cl S	extra	very low			low				med. high					h		in %				
relative height	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	av.	ext. l.	very low	low	med. high	high
19 W. Friterpians					1	1	1	1	2	4	5	2	1	1			87.4		10.5	21.1	47.4	
16 E. Friterpians	1	0	0	0	0	3	1	0	3	3	1	2	1	0	0	1	86.8	6.3	18.9	43.7	24.8	6.3

The average relative height is 87.4 for 19 West Friterpians; 86.8 for 16 East Friterpians, so somewhat lower, which agrees with the results obtained on reducing to Standard Skull (118.4; 117.6). So on an average both groups are low. However, Sasse's division

shows far more variation. Whereas almost half of the West Friterpians fall under the class of medium high, in the other series this is the case only with scarcely one fourth. Here the largest group is low.

Therefore, as regards relative height, both series differ widely. The crania of Stiens (4 in number, average relative height 84.6) and Aalsum (4 in number, average relative height 85.5) are especially low, though half of the latter group lie above the average. The dolichocranium (ind. cr. 72.7) of Leeuwarden (relative height 93) is relatively highest. It belongs to the Eastern group, just as the low cranium Aalsum 12 (relative height 78.9), on account of which the variation breadth is again considerably larger here than in the West.

Schmidt's Classification Friterpian and Reihengräber type

We shall now compare the divisions as they appear in Eykman's system according to Schmidt's classification for both series. The great number of doubtful cases at once presents difficulties. We first tried to treat as doubtful all crania which differ less than one unit from the dividing line. But thereby still less clarity was brought into the division. Finally we only included the numbers which are just on the border line, so H $\frac{3}{4}$ = height 88. Moreover, we indicated the class according to the index cephalicus, just as we did in comparing the Friterpians and Groterpians, whether the skull was long or short in face, according to Folmer's division. As Folmer's list did not indicate this division of chamaeprosope (C), and leptroprosope (L) for all skulls, we have amplified them as far as possible, putting the lower limit of leptroprosopy at 90, and where this was not possible on account of the absence of the lower jaw, ascertaining whether they were chamae- (c) or leptene (l).

According to Sasse, the typical Rowgrave skull belongs to the 5th, 3rd and 4th groups of Schmidt. Besides this one, however, a longer and lower type occurs in N. W. Europe, which is often even narrower. We have adopted the formula 6—3—3 for it. But we thought we could not very well exclude 6—3—2, also, in the event of the skull being only "long", though we often had our doubts as to the purity of this type. On the other hand, with Sasse, as on p. 128, we have entirely excluded the average breadth class 4. (See table on page 147).

West- and East-Triterpian Nordici

fac. ind. ind. cran.	West Triterpia	group figures of Eyckman 1. br. h.	Nordici	Frit. type	Reihen gräber type	fac. ind. ind. cran.	East Triterpia	group figures of Eyckman h. br h..	Nordici	Frit. type	Reihen gräber typs
L. D.	2. Kimswerd	5—3—4	N	—	R	L. M.	1. Huizum		N	—	—
L. D.	4. Kimswerd		N	—	—	L. D.	3. Leeuwarden. . . .	5—3—5	N	—	R
L. M.	5. Boxum	5—4—3	—	—	—	L. D.	10. Finkum	6—4—4	—	—	—
L. D.	6. Lutjelollum . . .		N	—	—	L. M.	11. Teerns	4—4—4	—	—	—
L. D.	8. Lutjelollum . . .	6—3—3	N	F	—	L. M.	12. Aalsum	6—5—1	—	—	—
L. D.	9. Lutjelollum . . .	5—3—4	N	—	R	L. D.	13. Huizum	5—3—3	N	F	—
L. D.	16. Bayum.	5—3—$\frac{3}{4}$	N	F	—	L. M.	14. Wijtgaard	5—3—4	N	—	R
C. D.	19. Lutjelollum . . .	$\frac{5}{6}$—3—3	N	F	—	L. D.	15. Huizum	5—3—3	N	F	—
L. D.	20. Beetgumermolen .	5—4—3	—	—	—	L. D.	17. Lutkelaard	5—3—4	N	—	R
C. M.	21. Witmarsum . . .	4—4—3	—	—	—	L. D.	18. Wijtgaard	5—3—3	N	F	—
C. M.	22. Witmarsum . . .	5—3—4	N	—	R	C. M.	23. Hallum		—	—	—
C. M.	24. Lutjelollum . . .	4—4—4	—	—	—	C. M.	25. Aalsum	4—4—4	—	—	—
C. D.	27. Lutjelollum . . .	6—4—2	—	—	—	L. D.	32. Stiens	5—3—3	N	F	—
L. D.	28. Lutjelollum . . .	6—3—3	N	F	—	— M.	33. Aalsum	5—3—4	N	—	R
C. D.	29. Lutjelollum . . .	6—3—3	N	F	—	L. D.	34. Stiens	6—3—2	N	F	—
— B.	31. Beetgum	4—5—3	—	—	—	— B.	41. Teerns	4—$\frac{4}{5}$—3	—	—	—
L? D.	35. Beetgum	5—2—4	N	—	R	C. D.	42. Stiens	6—$\frac{3}{4}$—2	N	F	—
l. M.	36. Dronrijp	5—4—$\frac{3}{4}$	—	—	—	C. M.	43. Stiens	5—4—2	—	—	—
c. D.	37. Dronrijp	5—3—3	N	F	—						
l. M.	38. Achlum inf. . . .	5—4—2	—	—	—						
— D.	39. Winsum	6—3—3	N	F	—						

Therefore of the 21 West Friterpians 15, or 71.4 %, belong to the Nordici and of the 19 East Friterpians 11, or 57.8 %. So the Nordic portion is somewhat greater in the West. Of the 21 West Friterpians 4, or 19 % belong to the Reihengräber; and of the 18 East Friterpians 4, or 22.2 %. As we could not with certainty determine the type of Huizum 1, we did not include it. Of the long, low *Friterpian* type[1]) there are 8, or 42.1 % of the 19, in the West. Three of the low crania from the East have dropped out as being non-Nordic. On account of this only 6, or 33.3 % of the 18 East Friterpians are Nordic and long. So the low Nordic skull type occurred oftener in the West than in the East. Half of the 4 Reihengräber skulls in the West, however, are chamaeprosopic and consequently not typical, so that here only 13.1 % belong to the Reihengräber type.

Of Aalsum 33, which has the drawback of being mesocranic, the facial part is wanting. The two other Reihengräber of the Eastern series are leptoprosope. Of the 8 Nordici of the Friterpian type in the West, 3 are leptoprosope, 4 chamaeprosope, and of one the face is wanting. Of the 6 Nordici in the East, 5 are leptoprosope. So the leptoprosopes are in the majority among the Nordici. Of the 20 crania from the West, 12 have a long, and 8 a short face, so that 60 % are long-faced; of the 17 from the East, 12 have a long face, 5 a short face, so that 70.6 % are long in face. However, the long faces seem to be somewhat more strongly represented, both with the Nordic crania and the whole West Friterpian series. Yet the number of skulls is not sufficient for us to build on.

Conclusions *The Nordic crania are more strongly represented in the West than in the East. The majority belong to the Friterpian type. In the East the Reihengräber type comes more to the fore.*

Breadth: length-index.

Classification: of Garson	hyper dol.	dolichocranic					mesocranic					brachy					
index cranicus	69	70	71	72	73	74	75	76	77	78	79	80	av.	hyp.	dol.	meso.	br.
21 West Triterp.	2	2	2	2	3	4	3	1	0	1	0	1	73.7	9.5 %	61.9 %	23.5 %	5.1 %
19 East Triterp.			1	3	4	2	5	1	0	2	0	1	74.7		52.6 %	42.1 %	5.2 %

[1]) See p. 130.

Breadth: length-index

The average breadth: length index of 21 West Friterpian crania is 73.7, and that of 19 East Friterpian 74.7. So in the East the average is one unit higher. As regards dolichocrany the West Friterpians even exceed the 20 Hainault Franks of Houzé (73.8) [1]). No less than 71.4 % of the Westergooërs were hyper- and dolichocranic. So they even exceeded the Swedes of Retzius from the Iron Age (68.3 % dol.). Therefore, they belonged to the most dolichocranic peoples of N. W. Europe. But both series show still more difference. Whereas the West Friterpian series consists of 61.9 % dolichocrania, the number for the other series is just a little over 50 %. So the mesocrania comprise about half of the Eastern series and are thus twice as strong as in the West. Whereas the apex of the Western series lies within the limit of dolichocephaly, that of the Eastern series lies outside it. Here the important group of strong dolichocrania, which comprises 19 % of the Western series, is wanting.

On controlling the figures, to test whether the higher index in the East is caused by a difference in length or in breadth, it appears that it is chiefly caused by the greater difference in length.

Height: length index

Total heigth : length-index

Totalheight:length index	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	av.
19 West Friterpians				1	1	1	1	3		2	4	1	2	3			70.3
15 East Friterpians	1	0	0	0	0	1	1	1	2	3	1	0	0	2	1		2 71

As the heights of both series differ little, and the absolute length of the Western series is greater, it may be expected that the length: height index will give a lower average for the latter Indeed this is the case; the average for the Eastern series (71) is somewhat higher than that for the West (70.3). In the East a high group occurs, which is lacking in the West. The variation breadth is again greater here.

Basion bregma height: length-index

Basion bregma height : length-index

Class. Martin	chamaecranic								orthocranic								hypsicr.		in %		
bas. br. breight: l. index	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	av.	cha-mac	orth.	hypsi.
19 West Friterpians		1	0	0	1	2	2	2	3	3	2	2	0	0	0		70.1	44.4	55.6	
17 East Friterpians	1	0	0	0	2	2	1	5	1	0	0	2	1	0	0	3	69.7	70.6	23.5	5.9

[1]) P. 125.

Though the averages for the basion bregma height : length-index of both series differ little, even though the one falls just above, and the other somewhat below the limit, a considerable difference is visible, as almost three fourths of the East Friterpians are chamaecranic, against 44.4 % in the Western series. The orthocranic element comprises almost half of the West, against less than one fourth in the other series. The hypsicranic element is only represented in the Eastern series. These results well-nigh agree with the division according to the relative height. But less so with the division of the skull types, where a great number of doubtful cases have influenced the classification, so that there the mistaken impression is created that the low type does not occur so frequently in East Friterpia. The variation breadth is again far greater in the smaller series.

Height: breadth Index

Total height : breadth-index

Total heigt: br. index	82	3	4	5	6	7	8	9	90	1	2	3	4	5	6	7	8	9	100	1	2	3	4	5	6	av.
18 W. Friterpians				1	0	0	0	0		1	1	1	0	1	3	1	3	2	2	1	0	0	0	0	1	96.2
15 E. Frirerpians	1	0	0	0	0	1	0	0		0	1	2	1	2	2	0	3	1	0	0	0	0	0	0	1	94.4

Both frequency curves for the total height: breadth index are interrupted, which proves that they are very incomplete. Yet the curves coincide to a large extent for the heights 90—100. The average height: breadth index of the West Friterpians is higher than that of the East Friterpians (137 mm.; 134 mm.), on account of the greater absolute height. As the former, however, are also somewhat broader, the difference between the average indices can only be slight.

Basion bregma height : breadth index

Cl. Martin	tapeinocranic									metriocr.								akrocranic																
Ba br h: br. index	82	3	4	5	6	7	8	9	90	1	2	3	4	5	6	7	8	9	100	1	2	3	4	5	6	av.	tapei-nocr.		me-triocr.		akro.
19 W. Friterpians				1					2	1		1	1	4	3	1	3		1				1			95.5	21	%	52.6	%	26.4	%
15 E. Friterpians	1			1	1				2		3	2	3		1										1	93.1	33.3	%	60	%	6.6	%

As on an average both series are metriocranic (95.5 and 93.1), the majority of both series may be said to belong to this subdivision. Whereas with the East Friterpians the tapeinocranic comprise one third of the total number, the acrocranic element is more numerous with the West Friterpians. Also in the norma occipitalis the East Friterpians give the impression of being lower than the others.

Splanchnocranium

Fronto: zygomatic-index [1])

This index, which gives the ratio between the narrowest breadth of the forehead to the zygomatic breadth, shows an average of 72.8 for 12 West Friterpian crania; of 74.56 for 10 East Friterpian crania. From this it follows, that the frontal breadth of the West Friterpians is perhaps somewhat narrower than that of the East Friterpians, even if we take into consideration that the Zygomatic breadth of the West Friterpians (135 mm.) is considerably larger than that of the East Friterpians (132.7 mm.).

Facio: zygomatic-index

For these index averages some difference is apparent. The division varies a good deal, too as in the Eastern series the leptoprosope element prevails, whereas in the West the mesoprosopes are in the majority. However, the small number of crania with lower jaw obliges us to use great reserve.

Facio: zygomatic-index

Cl. Martin	eury-prosope				meso-prosope					lepto-prosope					ultra-leptoprosope						in %				
Facio zygom. in	80	1	2	3	4	5	6	7	8	9	90	1	2	3	4	5	6	7	8	9	100	1	2	av.	eur.	meso	lepto	Ultra
8 W. Friterpians		1	1								1	1				1								88.1	25	37.5	2.5	12.5
8 E. Friterpians			1		1						1	2			1	1							1	90.7	25	12.5	37.5	25

Upper facio: zygomatic-index

Upper Facio: zygomatic-index

Cl. Martin	euryene					mesene					leptene						hyperl.		in %				
Upper Facio: zygom. in	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61		av.	eur.	mes.	lept.	hyper
16 W. Friterpians			1	3			1	1		2	3	1	2	1		1			54.2	25	25	43.7	6.3
15 E. Friterpians			1				1	2		2	2	3		1		1	2		55.9	6.6	33.3	40	20

[1]) Belongs to neurocranium and splanchnocranium.

On an average the West Friterpians (54.2) are mesene, the East Friterpians (55.9) leptene. Whereas with the West Friterpians the euryene element comprises one fourth, it is small with the East Friterpians. There, however, the hyperleptene is stronger. Yet the mesene and leptene elements differ little in both series. However, both series contain frequent gaps, so that the number of crania is highly insufficient. Probably the greater number of leptenes and hyperleptenes in East Friterpia (60 % against 50 %) is caused by the greater zygomatic breadth in the West, as the length of the upper jaw in both halves differs but little.

Nasal index

Nasal index

Class. of Martin	leptorrhine						mesorrhine				platyrrhine			in %			
Nasal index	36 37	38 39	40 41	42 43	44 45	46 47	48 49	50 51	52 53	54 55	56 57	96 97	av.	lept.	mes.	plat.
19 West Friterpian	1		1	2	1	1	4	4	2	1	1	1	50.8	33.3	55.5	11.1
16 East Friterpian			1	1	0	5	2	2	2	2	1		49.1	43.7	37.5	18.7

Whereas with the East Friterpians the leptorrhine element is stronger, the mesorrhine element predominates with the West Friterpians. On an average however, both groups are mesorrhine (50.5 and 49.1). If we eliminate the non-Nordic nose of Lutjelollum 27 and Achlum 38 (infans), a considerable difference appears, because then 17 West Friterpians (47.8 %), are on an average leptorrhine. However, it is clear from the large number of leptorrhines with 46—47 that this element is of great importance in East Friterpia too.

Eye index

Eye index

	chamaekonch			mesokonch						hypsikonch								in %			
Eye index	71 72	73 74	75	76	77 78	79 80	81 82	83 84	85 86	87 88	89 90	91 92	93 94	95 96	97 98	99 100	av.	chamae	mesok.	hypsik.
19 W. Friterpians	1				1	1	2	3	5	1	3		1	1			85.9	5.2	36.8	63.2
16 E. Friterpians					1	3	3	1	1			4				1	87.2		50	50

The apex lies lower with the Western series, in so far as in so incomplete a series one may speak of apices. The average too is lower for the West, which is remarkable, in connection with the more frequent occurrence of the chamaeprosope type there.

Conclusions

As regards breadth: length index there is a difference between West and East Friterpians, both in group division and in averages. *With the West Friterpians the hyper- and dolichocranic element predominates, with the East Friterpians the mesocranic and brachycranic element is almost as strong as the dolichocranic, whereas the hyperdolichocranic element is lacking. On account of this the average is one unit higher for the East Friterpians.*

The height: length index gives hardly any difference in averages. *According to the basion bregma height: length index the chamaecranic element is prevailingly stronger in East Friterpia, whereas in West Friterpia the chamaecranic element is a little less strong than the orthocranic element. The difference in average height-breadth index is greater. In both halves the metriocranic element is in the majority.*

The facio-zygomatic index of the West Friterpians is lower than that of the other series.

The average upper facio-zygomatic index of the West Friterpians too is less, though the leptene element in both is about equal. With the West Friterpians a euryene group, and with the East Friterpians a hyperleptene group is of some importance.

Whereas with the West Friterpians the mesorrhine element is most important according to the percentage, the leptorrhine predominates in East Friterpia.

As regards the eye index in West Friterpia the hypsikonch element preponderates, in East Friterpia mesokonches and hypsikonches are equally strong.

Comparison between the three groups	West Friterpians	East Friterpians	West Groterpians
Length	194 mm.	187 mm.	184 mm.
Red. Length	167	164	162
Breadth	142 mm.	140 mm.	140 mm.
Red. Breadth	122	123	124
Height	137 mm.	133 mm.	136 mm.
Red. Height	118	116	119.5
Facial height	121 mm.	120 mm.	117 mm.
Upper facial height	73 mm.	73 mm.	69 mm.
Zygomatic breadth	135 mm.	130 mm.	127 mm.

Comparison between the three groups	West Friterpians	East Friterpians	West Groterpians
Red. Zygom. breadth	116	115	114.1
Rel. Length	122.1	122.3	120
Rel. Breadth	90.4	91.4	90.3
Rel. Height	87.4	86.8	88.4
Index cranicus	73.7	74.7	76
Basion bregma height: lengthindex .	70.1	69.7	72.5
Basion bregma height: breadth index.	95.5	93.1	95.6
Facio-zygomatical breadth	88.1	90.7	89.1
Upper facio zygomatical breadth . .	54.2	55.9	54.8
Nasal index.	50.8	49.1	47.6
Nordici	71.4%	57.8%	39.1 %

If we compare some of the principal measurements for the two districts with one another and with Groterpia, often a gradual transition from West Friterpia via East Friterpia to West Groterpia is apparent.

In the absolute length this is at once very clear: 194 mm.—187 mm.—184 mm. This is borne out by the length numbers, which have been reduced to Standard Skull. Whereas the breadths in Groterpia and East Friterpia are equal, the reduced breadth numbers continually increase. However, the height is less regular. Here, there is quite a great difference between East Friterpia and Groterpia. Both facial lengths decrease towards the East. Even when reduced, the facial length in Groterpia remains smallest.

In relative length we can first trace a slight increase, then a great decrease towards the East. The relative breadth is almost equal in Groterpia and West Friterpia. The relative height first diminishes, but then again increases strongly in Groterpia. However, the breadth: length index continually increases towards the East .Yet this is not the case with the basion bregma height: length index. Here a strong contrast exists between the Eastern Terpregion and Groterpia, which is especially caused by the difference in length. We find less regularity in the basion bregma height: breadth index. On account of the small skull height in East Friterpia it is lowest there. Both the facial height: zygomatic breadth indices are higher in East Friterpia than in the West

on account of the great difference in zygomatic breadth. But, though the zygomatic arches in Groterpia are narrower, the index is again higher here on account of lesser facial height. The percentage of Nordici decreases towards the East, as is also the case with the nasal index.

Therefore, towards the East there is a gradual shortening of the head length, attended with an increase in the breadth: length index. The faces also gradually become narrower and shorter towards the East, the nasal index decreases. This coincides with the diminution of the Nordic type.

As this also partly agrees with the probably later erection of the Terps in the East, one might assume that the Eastern crania are of younger date and consequently shorter. But we have already ourselves brought forward so many objections to this idea, that we shall further ignore it.

Concluding Remarks

Finally, let us test the conclusions we have arrived at, by considering a few correlations based on Folmer's data. [1])

A. Correlation between breadth and length

In the correlation tables there are two groups of females, viz. thirteen Friterpian and seven Groterpian. The first group have the greatest length. Another group consists of twenty-three Friterpians (length class IV—XI). Though the seventeen longer ones are more uniform, the position of the female skulls on the left hand shows that all the twenty-three belong together.

The Groterpians are more distributed, especially in the shortest division of the Friterp group. Yet there are indications that Groterpians will also fall into three groups, as the Friterpians do, as soon as sufficient skulls have been collected. The position of the female skulls on the left shows that the Groterpians in the length classes I—IV belong more or less to one group, though the connection is looser than between the Friterpians.

B. Correlation between total height and length

This time the Friterpians do not seem to form so uniform a

[1]) Having given the frequency curves for almost all dimensions, we omit these tables to save space.

group, but tested by the absolute height, three groups may be more or less clearly distinguished.

I. An absolute low, medium long or long group, typified by the ultra-chamaecranic (62.1), tapeinocranic, leptoprosope dolichocranium of Aalsum 12.

II. A medium high, to high group on the dividing line of medium long and long, typified by the orthocranic, metriocranic, chamaeprosopic dolichocranium of Lutjelollum 19.

III. An absolute high group. In consequence of the great length they appear low in the norma lateralis. But in norma occipitalis they prove to be high, to extreme height (basion-bregma-height: breadth-index of the Beetgum cranium 105; maximum Martin; Kurgans of Bogdanow 106). The group is typified by the chamaecranic, acrocranic, leptoprosope dolichocranium Lutjelollum (XIII Folmer 1887) which yet reminds one of the Aalsum type (I) by its low receding forehead. In consequence of the great length, all three groups present the low Friterpian type, of which they are varieties.

The Groterpians are distributed through the higher II and III Friterp groups, but the isolated group of Groterp females, which constitute the less progressive element, point clearly to a shorter, medium high character of the Groterpians.

The Friterp females are ranged on the left of the Aalsum and Lutjelollum group.

Both correlation tables prove the greater mixture of the Groterpians, of which the female division, however, shows more uniformity. This mixed character, which already came to light in comparing the absolute dimensions, appears in almost all the correlations, but for want of space we cannot include them all.

C. Correlation between occipital length: total length

On comparing the occipital length and total length of the skull, the Groterpians are distributed all through the correlation tables on either side of the diagonal.

Only the Groterp females are placed together. Perhaps this may be an indication that the Groterp habitus is especially characterized by a medium long head and a medium long occiput.

The male and female Friterpians occupy the same position, so that there is but little difference in the length of the occiput of

this series. Although they are apparently divided into two groups, the difference in sex shows that we are probably dealing with one group only. The table shows skulls from each of the height groups on the right side as well as the left. So, in spite of their greater length of skull, the Frisians are characterized by a medium long occiput. On the whole it is shorter than that of the Groterpians. Therefore the front part of the skull must be much longer among the Friterpians than among the Groterpians. A point of difference that may prove of some value.

D. Correlation between zygomatic breadth and height of upper-face

These tables show more or less clearly three groups of Friterpers.

1. With a lower and broader upper face. This group contains skulls coinciding with the Aalsum group B I, though they do not agree with them in other respects.

2. With a medium and narrower upper face. This group partly coincides with the Lutjelollum group (B II).

3. With a high and wide upper face.

Part of this group coïncides with the Beetgum group B III; but the two groups do not agree.

We see therefore that, though there is some correlation between the height of upper face and the absolute height, the connection is not very close.

The Groterpers evince rather clear signs of forming two groups.

a. With a low and narrow upper-face.

b. With a medium high and medium wide upper-face, may be classed as intermediate between group 2 and 3 of the Friterpers.

E. Correlation between malar breadth and upper-facial height

Here again the Friterpians form three groups: I low and wide upper-face.

II. medium and narrow ditto.

III. high and wide ditto.

The Groterpians are more distributed and contain only one small group intermediate between I, II and III.

Both tables on upperfacial height show mixture with the Groterpians, and perhaps also differentiation with the Friterpians.

F. Correlation between height and breadth of the eye-sockets (orbita).

Here again we find three groups of Friterpians.

a. low orbita.

b. high and wide orbita.

c. high and narrow orbita.

This time the Groterpians form a distinct close group of skulls with narrow, medium high orbita (16) outside of which only 6 are distributed.

G. Correlation between palatum breadth and palatum length

Of the 21 Friterpians 12 (57%) fall into a long group (52 —57 mm.) whilst 14 Groterpians (74 %) form a shorter group (42—51 mm.) and these are somewhat wider than the Friterp group. The Friterpians stand out still more clearly, on comparing the correlations of the absolute, and the relative figures.

H. Correlation between length and index cranicus

Here there is a distinct division of the Friterpians into three groups.

α. an ultra-dolichocranic long group of 7 skulls (15.9 %).

β. a dolichocranic group ranging around the Huizum cranium on the dividing line of long and medium. This group contains 28 crania, or 63 % of the series. The female skulls are the shortest.

γ. A mostly mesocranic, medium-long group of 9 crania (22.7 %). This distributed group contains two skulls on the verge of brachycephaly. It is made up chiefly of female skulls, which points to a relation between the height of the index and the sex, that still has to be found.

These groups do not tally with the height groups, although group α includes several high crania af the Beetgum group B III, and group β a few of the Lutjelollum group B II. Of the 43 Friterpian skulls only 8, or 18 %, agree with the Groterpians.

The Groterpians may be divided into two groups: The principal one of 44 skulls or 58 % is chiefly mesocranic, but it contains also 3 brachycrania and 3 dolichocrania, so that the smaller half differs already.

The second dolichocranic group (29 %) lies in the middle of the

Huizum group of Friterpians and is distinguished by its greater length.

I. Correlation between breadth and index cranicus

41 Friterp skulls form a set of chiefly medium breadth, with an index cranicus of 70—76. These may perhaps also be divided into three groups:

a. 12 narrow (129—138 mm.) with a low ind. cran. (70—73).

b. 15 broader (135—146 mm.) with a higher ind. cran. (72—76).

c. 8 medium to broad (147—156 mm.) with the same index cranicus (72—76).

The position of the female skulls on the left shows that there is a connection between the set.

The number of distributed Friterpians is only 6 (14.6 %). Of the more dispersed 25 Groterpians the mesocranic part contains a distinct group of 12 (43 %) agreeing in breadth with the groups b and c of the Friterpians (137—148 mm.).

5 crania (17.9%) with a low index cranicus (70—71) form a third group, as broad as the first two Friterpean groups together.

Therefore the Groterp groups coincide only in the middle of the field with the Friterps, and they are all characterized by greater variation in breadth.

J. Total height: length index

Here again the Friterps form a set of three groups, of which the middle one is the largest. But they run so closely together that it is difficult to make an accurate division.

The maximum height varies remarkably little in the three groups. The highest limit is in the highest class in all three groups 140—145 mm.; the lowest limit falls lower in each group.

a. 11 orthocranic skulls (130—145 mm.); index 72—77.

b. 16 high and less high (mostly mesocranic) skulls (125—145 mm.); index 65—71.

c. 7 mostly lower, generally chamaecranic skulls (120—145), index 64—67.

The principal group of the Groterp skulls partly agrees with the highest Friterp group. Here we find 66.6 % of the Groterps, so that the greater number have a greater height:length index than the principal Friterp group.

The remaining Groterpians mostly coincide with the second Friterp group. There are indications of a Groterp group with a small height and a low index. It is also possible that there are only two Groterp groups. In both, the height-variation is greater than that of the Friterp groups.

K. Relative length and breadth

In the correlation table of relative length and relative breadth the 11 Friterp females are placed to the right of the 9 Groterp females. The Friterp males are placed to the right, all close together, whilst the Groterp males are spread about.

L. Relative length and height

In the table of relative length and relative height also, the 8 Groterp females prove to be considerably higher and shorter than the Friterp group of 11 females.

There is a close group of 11 Friterp males near to the females on the right. The Groterp males are more distributed.

M. Length, and various other measurements

From tabel G we saw that the brachycrania all fell among the shorter skulls (170—189 mm). In connection with Johannsen's opinion that dolichocephaly increases with the length, we have set down the class-averages.

Although, as was to be expected, a regular decrease together with the length may be determined, this decrease is not so strong as to lead to the conclusion of an acceleration in conformity with the length.

In fact it seems to be just the other way. The "rohe" index cranicus decreases less with increasing length than one would expect. Therefore we must attribute this to an increase of breadth together with the length; but the breadth increases at a slower rate. It is considerably greater than the Friterpian breadth in the C. and D-class [1]) of Groterpians. In the other classes there is not so much difference.

The cubic capacity must increase strongly with an increase of length and breadth. The averages prove that such is indeed the case, and also that the Groterp averages for most classes are of

[1]) 180—84 mm; 185—89 mm.

greater volume than the Friterpians. This must result from the greater height of the Groterpians, because the breadth does not differ so much, and in the classes A, E and G [1]) the Friterpians are even broader. With the exception of Class A the Groterpians prove to be higher, and even considerably so in the classes C and G.

In most of the length classes the index cranicus of the Friterpians is lower than that of the Groterpians, especially in the numerically larger classes C. D and G. In the smaller classes the case is sometimes reversed. In A, E and G this is in consequence of greater breadth for the Friterpians in that class.

In conclusion, we add a statement showing the connection between the length and most of the other dimensions. For this purpose the classes C. D, E, F and G, are the most important.

In these classes the Friterpians stand highest as regards:

nasal index; ocular index; zygomatical breadth; upper facial height; facial angle A; facial angle B; height of Os frontis.

The Groterpians exceed the Friterpians as regards:

entire height; greatest height; Schmidt's height; facial height; palatum index; occipital length; lowest frontale; relative breadth; relative height.

[1]) 170—174 mm; 190—194 mm; 200—204 mm.

Correlation between the length and various other dimensions

Classes of length	A 170—174	B 175—179	C 180—184	D 185—189	E 190—194	F 195—199	G 200—204	H 205—209	I 210—214	Number of skulls
Total height	1-134		7-128	12-134	3-137	9-133	3-138	2-142	141	38 F
Total height	6-132	129	4-134	6-134	1-140	2-136	2-144	145		23 G
Greatest Height of von Ihering . . .	2-132		6-136	8-138	7-141	2-141	146			26 F
Greatest Height of von Ihering . . .	5-135	134	3-139	4-139	142	142	2-146	2-147		19 G
Schmidts height . .	2-136		9-131	13-135	3-138	4-136	5-138	2-136	2-144	40 F
Schmidts height . .	5-132		4-135	5-135	140	2-138	2-144	146		22 G
Height of Os frontis .	1- 84		3- 87	5- 84	2- 92	6- 88	2- 92	103		21 F
Height of Os frontis .	5- 87	86	4- 82	5- 90	88	2- 85	2- 90.5	96		21 G
Lowest frontale . .	2- 93		7- 96	5- 95	3- 98	8-101	3-105	2-107		30 F
Lowest frontale . .	5- 93		4- 97	5- 95	99	2-106	2-101	104		20 G
Occipital length. . .	52		4- 63	3- 62	55	6- 66	2- 67	67		18 F
Occipital length. . .	5- 53	67	4- 65	4- 64	56	2- 70	2- 72	74		20 G
Facial height			2-113	6-112	2-118	6-121	2-133	2-130		20 F
Facial height	2-103	104	2-113	5-120	2-119	5-123	3-134	2-135		22 G
Upper facial height .	2- 71		7- 68	11- 76,7	3- 73.7	9- 73.7	3- 79.7	80	85	37 F
Upper facial height .	5- 64	60	4- 72	5- 73	72	2- 75	2- 79	80		21 G
Zygomatical breadth	2-125		7-125	9-130	3-137	8-139	4-140	2-139		35 F
Zygomatical breadth	3-118	120	4-130	6-129	132	135	144	138		20 G
Facial Angle A . . .	2- 82°		4- 82°	3- 81°	81°	5- 84°	3- 86°	86°		19 F
Facial Angle A . . .	2- 75°	92°	2- 81°	5- 79°	75°	84°				12 G
Facial Angle B . . .	84°		4- 86°	4- 86°	85°	5- 88°	3- 89°	90°		20 F
Facial Angle B . . .	2- 78	96°	2- 85°	5- 83°	81°	85°				12 G
Facial index			2- 88.9	5- 87.7	2- 87.7	6- 87.5	2- 93.5	2- 93.2		19 F
Facial index	2- 83.4	86.6	2- 87.9	4- 89.1	90.9	91.8	2- 91.2	101.4		14 G
Fronto-zygomatical index.	2- 74.4		6- 76.2	4- 72.1	3- 73.4	8-73.3	3- 74.2	2- 77.1		28 F
Fronto : zygomatical index.	4- 77.2		4- 74.7	5- 73.2	75	2- 76.2	2- 70.3	75.3		19 G
Orbital index . . .	2- 93.6		6- 89.4	11- 83.8	3- 85.7	9- 83.5	5- 88.3	86.3	86.3	38 F
Orbital index . . .	5- 89.2	77.5	3- 88.8	6- 83.9	1- 84.6	2- 89.9	2- 81.7	80		21 G
Nasal index	3- 40.9		7- 49.1	10- 48.2	3- 49.2	9- 54.1	4- 46	2- 50	1-45.6	36 F
Nasal index	4- 50.1	52.1	4- 48.6	6- 47.1	41.8	2- 47.8	2- 41.7	41.3		21 G
Palatal index . . .			3- 83.2	4- 66.9	2- 63.5	6- 71.6	4- 65.6	71.1	73	21 F
Palatal index . . .	4- 74.8	88.5	4- 72	5- 70.8	66.6	78	2- 76.3	70.8		19 G
Index cranicus . . .	1- 77.9		10- 73.9	15- 75.2	4- 72.4	7- 73.2	4- 74.6	2- 69.6	69.8	44 F
Index cranicus . . .	6- 78.2	76.9	4- 76.2	5- 75.3		2- 74.3	2- 73.6	74.8		21 G

CHAPTER IV

THE TERP DWELLERS

ABBREVIATIONS USED IN THE TABLES

F = Friterpians	S H = Schmidts height
G = Groterpians	r st = reduced to Standard Skull
l = Leeuwardeners	do = dolichocranic
h = Hoekers	me = mesocranic
f = Frisians	br = brachycranic
O = old	Cl T = Classification of von Töröck
m = mediaeval; medium	Cl M = Classification of R. Martin
r = modern	Cl S = Classification of E. Schmidt
L = length (in mm.)	In cr = breadth: length index (ind cranicus)
B = breadth (in mm.)	In = index
H = height (in mm.)	av = average
ba = basion bregma height	var = variation

For convenience we use the terms: *Olds, Middles,* and *Moderns* for the Old, Mediaeval and Modern Terpians.

I. MEDIAEVAL TERPIANS

Material

Notwithstanding the fact that our material appears fairly extensive on this subject, there are several lacunae. We shall however attempt to make up for the shortage in quantity by more intensive working. The Old Friterpians were proved by our investigations to be the most free from mixture. Partly also because we had a larger group at our disposal, we were able to bring more particulars to light about them.

Therefore they should properly form the starting-point of our further inquiry.

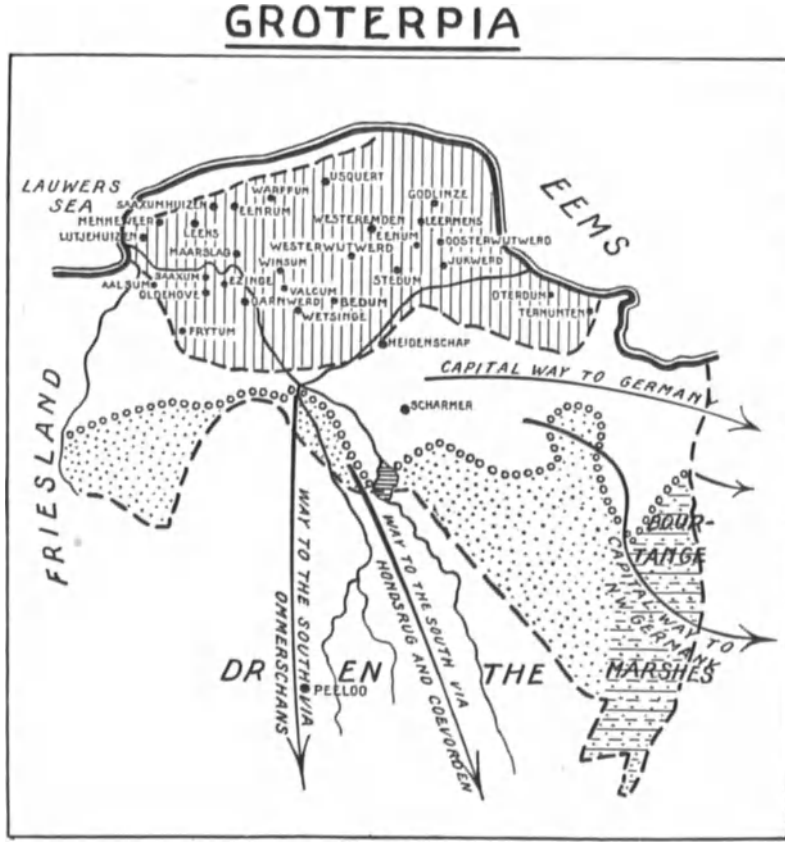
But we have no autochthonic Mediaeval Friterp material at our disposal, whilst for the Groterpians we are in want of Modern material. Consequently we are obliged to begin by investigating the Mediaeval Groterpians, especially with a view to the problem

of the "brachyzation", which was regarded as partly solved by the Dutch Anthropographers, who were of opinion that this process had already made much progress in the Middle Ages.

Then we shall proceed to work the Friterp material, and finally, by comparing Modern Groterp material intra vitam with that from the same area and from Friterpia, we may perhaps be able to come to conclusions on the Modern Groterpians.

Mediaeval Groterpians

For this purpose we have only the following 18 autochthonic crania, viz. the 10 Lutjehuizen skulls (Folmer 1885) belonging to the so-called "mediaeval village race", which, according to Folmer, shows remarkable homogeneity. Futher we have 8 crania from the surface layers of three other places in Hunsingoo (Folmer 1890). These we will compare with the series of 23 Old Groterpians.



Absolute Measurements

NEUROCRANIUM

Capacity

The cubic capacity of 17 Mediaeval Groterp skulls amounts to (1411) which is less than that of the Old Groterpians (1458 c.cm.)[1]). As the Medieval Hunsingooërs are longer, broader and higher than the Old Groterpians, this small capacity is a surprise. Comparing the average of the 10 Lutjehuizeners (1396 c.cm.) found by measuring with that of the 7 other Hunsingooërs (1445 c.cm.) we see some difference. The last capacity is reckoned from modulus and shows an average very close to that of the Old Groterpians. So we believe that Folmer perhaps made the usual mistake of measuring the capacity of the Lutjehuizeners too small.

Capacity of various European series

series	capacity in ccm		
	♂	♀	♂/♀
Old Groterpians	1547	1293	1458
Mediaeval Groterpians	1485	1339	1417
Old Bavarian (Ranke)	1503	1335	
Alamanni of Augst	1463	1330	1418
Swiss Alamanni	1481	1304	—
Swiss Burgundian	.....	.....	1451
N.W. Germans (9th—10th cent.)	.....	.....	1422
Dutchmen (Broca)	1530	1320	—
Recent Groningers (Dijkstra)	1538	1359	1448
Recent Swedes	—	—	1340
Recent Saxons (Welcker)	1460	1300	—

Length

Length

Cl. T.	medium long						long				
L.	170 174	75 79	80 84	85 89	90 94	95	96 99	200 204	av.	m. long	long
23 G.	5	2	4	6	2		1	1	184.7	82.6%	17.4%
18 M. G.	1	4	4	2	5	(1)	2 (1)		185	94.5%	5.5%

The average length of the Middles is equal to that of the White Russians (185 mm. Roshdestwenski) and nearly as long as that of the female Danish of Hansen.

The Middle Groterps have the same average length as the Old Groterpians. Yet there are differences. The Middles inlcude a smaler

[1]) 95 Adults from the environs of Groningen, measured shorthy after death in the Anat. Laboratory in Groningen, aver. cap. 1448 c.cm. (Dijkstra, 1927).

number of long ones. But on the other hand we find that the apex of the Middles is higher than that of the Olds. There is a considerable difference in the sex figures. The 9 males show an average length of 189; and the females of 181, so the sex index is 95.8.

In the curves of the length reduced to Standard Skull the Middle apex is higher (166—164). As Folmer has measured the cubic capacity of the Lutjehuizen skulls a little too small, these figures are not reliable. The fact that the smaller half of the Middles are placed in the class 165—169 certainly points to homogeneity of the Middle series.

Breadth

Breadth

Cl. T.	medium broad					broad			
B.	125 129	30 34	35 39	40 44	45 49	50 55	av.	m. br.	broad
23 O. G.	1	3	8	4	5	2	140	91.3%	8.7%
18 M. G.	0	1	9	4	2	2	141	89.4%	10.6%

The apices of both curves coincide. The averages vary very little, and the percentages of medium and broad show remarkable agreement. Here again half of all the Middles have a breadth of 135—139 mm. The average breadth of both Groterp series exceeds that of all series which Martin mentioned (♂ Kirgis 161 mm.).

The length + breadth of the Middle Groterps is greater than that of the Olds.

Length + breadth

Length + breadth

L. B.	295 299	300 304	5 9	10 14	15 19	20 24	25 29	30 34	35 39	40 41	45 49	50 54	55 59	360 364	av.
23 O. G.	1	1	2	1	5	2	4	1	1	1	2	1	0	1	323
18 M. G.				3	3	2	3	2	3	1	1				326

Few as our data are, yet, by reducing the absolute dimensions to Standard Skull, we come to the conclusion that probably there is a great resemblance between the Old and Middle Groterp crania.

The Old skulls show greater variety, however, than the Middle series, which again appear to be more homogenious. We can clearly distinguish a group with a probably smaller, and one with a larger head than the Middles.

Height

In determining the height Folmer did not take the total height, but the distance from the front rim of the foramen magnum to the crown. This is on an average 1.2 mm. lower than the total height, which can therefore be calculated from it. The average total height is 135, which is lower than that of the Old Groterps. The apex of the medium series moves a little higher, but the break proves that the series is not complete. In the height the sex differenceis also considerable. The mean height of the male crania is 137, and of the females 133. The sex index is 97.2. Height

Tot. H.	118 119	20 21	22 23	24 25	26 27	28 29	30 31	32 33	34 35	36 37	38 39	40 41	42 43	44 45	146 147	av.
23O. G.	0	1	1	0	0	4	1	3	6	1	1	2	0	2	1	136
17 M.G.	1	0	0	0	1	1	2	0	0	5	3	3	1	0	0	135

The Middles (138 mm.) prove to be lower in the greatest-height than Old Groterpians (139.9 mm.) The apices of the two curves coincide, which also proves how closely they agree. Here the 6 males average a height of 141, and the 7 females 135 mm., so the former greatly exceed the latter in greatest height.

Folmer did not give Schmidt's height for the Lutjehuizen skulls. For 7 skulls measured in 1887 it was 135 mm.; so only slightly less than for the Old Groterps (136).

Various measurements that he gave in 1885 for the neurocranium, he does not give in 1887, and vise versa; consequently they cannot be combined. The curves for the foramen magnum of both series have much in common.

Splanchnocranium

The available data are likewise far from extensive. In many cases those of 1885 cannot be combined with those of 1887. The breadth of the zygoma of three Middle crania is slightly greater than that of the Old Groterp average (127). Folmer has given the total facial-height of one cranium only (123 mm.— thus long).

This measure for 14 Middle Groterps (72 mm.) averages a little higher than the Old Groterps (71 mm.) and is equal to that of the male Tyrolese of Wacker (72.0 mm.) and nearly as long as *Upper facial height*

the people with the longest upper face which Martin mentions. (Eskimo of Hrdlicka 74.5 mm.). The apex of the medium curve lies a little higher also. The upper face height of the 7 males (73) is longer than that of the 6 females (71 mm.) so that the sex difference comes out again.

Nose The average nose-length of 17 Middles (53mm.) is equal to that of the 27 Old Groterps. The breadth variation of the Middle group (48—61mm) is much smaller however than of the Old Groterps (45—61mm). The nose breadth of 12 Middle skulls (23mm) is somewhat less (Old Groterps 25 mm). This agrees with the greater length of the face. This time the Middle series is more distributed (Middles 27—19 mm; Old Grot. 29—23mm).

Orbita Neither in length nor in breadth do the two frequency curves coincide. The average height of the orbits of 14 Middle Groterps is 34 mm. and differs but little from that of 22 Old Groterps (35)mm. The variation of the Old Groterps (28—41)mm. is far less divergent than of 14 Middle Groterps (33—38) mm. In the ocular breadth also, the 13 Middles form a remarkably homogeneous group (variation 37-42mm., as against 37—47mm. for the Old Groterps). Neither do the averages differ appreciably (Middles 39.9; Olds 41 mm.).

Palatum The palatum length (average 50mm; Olds 48mm) of the two series differs but little, but the breadth (av. 31; Old 36) does so rather more. The narrower palate agrees with the more leptoprosope character of the crania.

Therefore, the splanchnocranium shows some difference and exhibits the Groterp character in extremis.

Relative Measurements

NEUROCRANIUM

As Folmer has not calculated Schmidt's height for the Lutjehuizeners we are unable to state the relative figures for them. Szombathy's figures could not afford a guide, as Folmer's measures of the capacity were not wholly reliable.

In the modulus (153) the 7 Middle Groterps agree with the Old Groterps (153). Their relative length (119.8) is slightly less than

that of 22 Groterps (120); the relative breadth slighty greater than that of 20 Old Groterps (90.3) and the relative height slightly less (Old Grot. 88.4).

Breadth: length index

Cl of Garson	dolich									mesoceph.	brach				
In. cr.	70	1	2	3	4	5	6	7	8	9	80	1	av.	do	m.	br.	var.
23 O. G.	2	0	0	4	3	3	2	4	1	1	2	1	76	39 %	48 %	13 %	70—81.1
18 M. G.	1	0	2	2	0	5	2	1	3	1	1		75.9	27.7%	66.6%	5.7%	70.7–80.5

The averages of both series are fairly equal, but the curves diverge, because the dolichocranic and brachycranic elements are more developed than in the Middle series, where the mesocranic element comes more to the fore.

Height : length index

Breadth: length index

Folmer gave the greatest height, but the total height may also be calculated. Further we shall calculate the basion-bregma-height: length index, and also the breadth, for the sake of comparison with Martin's figures.

The total-height index of the Middle Groterps is 72.7. Therefore they are parindicial with the Old Groterps (72.6). There is a remarkable agreement between the two curves, which for the most part run parallel. According to sex, the height : length index is 72.3 for the 9 males, and 73.2 for the 8 females. Therefore the females appear highest in proportion to the length, which results from the greater difference in length than in height between the two sexes.

Basion bregma height: length index

Cl. M.	chamaecran.					orthocran.								hypsicr			
ba ln	65	6	7	8	9	70	1	2	3	4	5	6	7	8	av.	cham	orth.	hypsi
23 O. G.	1	0	1	0	3	1	4	5	1	3	0	1	3		72.5	26.1%	56.5%	17.4%
17 m. G.	1	0	1	2	1	0	3	4	0	2	0	3			71.9	29.4%	52.9%	17.6%

The basion-bregma-height length index of 17 Middle Groterpers is 71.9, so that, on an average, these as well as the Old Groterps are orthocranic. It is equal to the French of Frizzi (71.9 mm.) and heigher than the Dutchmen of Bolk (70.9). In consequence of the

greater length the average for the Middles is somewhat lower than that of the Old Groterpers.

In greatest height : length index for 13 Middle Groterps there is no great difference with 22 Old Groterpers.

Greatest height: length index

Gr. H. L.	71	72	73	74	75	76	77	78	79	80	av.	min.	max.
22 O. G.		4	4	0	2	3	5	2	1	1	75.4	72	80
13 M. G.	1	3	1	3	2	1	1	1			74.5	71.1	78.1

Schmidt's height : length index gives an average of 73.3 for 7 Middle Groterps, and of 73.7 for the 21 Old Groterps. Therefore here also, the two series are presumably parindicial.

Height: length index

Total height: breadth index

Tot. H.	81	2	3	4	5	6	7	8	9	90	1	2	3	4	5	6	7	8	9	100	1	2	3	av.
23 O. G.	1	0	0	0	1	0	0	0	0	1	0	1	2	4	2	1	2	2	1	0	1	0	2	95.6
17 M. G.				1	1	0	0	0	0	1	2	1	0	1	0	1	0	3	1	2	2	0	1	96.8

The average total height: breadth index of 17 Middle Groterps is slightly higher than that of the Old Groterps. Bolk's curves however strongly agree, also in the of variation-breadth.

Basion bregma height: breadth index

Cl. M.	tapeinocranic										metrio-cranic										acro-cranic			in %					
ba. br. in	80	1	2	3	4	5	6	7	8	9	90	1	2	3	4	5	6	7	8	9	100	1	2	av.	m.	max	tap.	mtr.	akr
23 O.G.	1	0	0	0	1	0	0	0	0	1	0	1	1	3	3	2	2	2	1	0	3	0	2	95.6	80.8	102.9	13.0	60.9	26.1
17 M. Gr.					2	0	0	0	0	0	2	2	0	1	0	0	0	1	2	2	3	1		95.3	84.2	102.9	38.3	17.7	44

According to the basion-bregma-height: breadth index the Middle Groterps are parindicial with the Old Groterps and slightly higher than that of the recent Swedes of Valentin (♂ 96.2; ♀ 96.6). Yet the grouping is very different. Whereas the Old Groterps were for the most part metriocranic, the Middles are chiefly acrocranic, and afterwards tapeinocranic. The repeated breaks in the curves point to a strong influence of accidental selection in this case. Grouped according to sex the female Middle Groterps average 95.3, and the male Groterps 94.9, showing that the females are relatively higher, as was the case with the Old Groterps (♀ 96.1; ♂ 95.2).

SPLANCHNOCRANIUM

In 1883 Folmer gave no figures of the upper-facio zygomatical index for the Lutjehuizers. So we must content ourselve with 4 measurements of 1890, which give an average of 57.9 (Old Groterps av. 59.5) and indicates a longer upper-face. Different indices

For the palatum index also there are only 5 data. These show an average of 61.6, which is much lower than that of the Old Groterps (77.5). This agrees with the longer face.

For the upper-facial height : malar breadth index the measures have been given for only five crania, showing an average of 69.6, therefore longer than that of the Old Groterps. The average of the os frontis-height: greatest height index of 5 crania is 64.7 as against 66.8 of the Old Groterps. The fronto:jugal index of 5 crania give an average of 74.8, against 74 for the Old Groterps. However but little can be determined with any certainty from this small number of crania.

Nasal index

Nasal index

Cl. Broca	leptorrhinous						mesorrhinous					
nas. in	34 35	38 39	40 41	42 43	44 45	46 47	48 49	50 51	52 53	av.	lept.	meso r.
21 O. G.	0	1	3	0	3	5	0	4	5	47.6	57%	43%
13 M. G.	1	1	3	0	3	2	1	2		44.1	77%	23%

The nasal index of the Middle Groterps is slightly lower than that of the Old Groterps in consequence of greater length and lesser breadth. Therefore the leptorrhine element is more developed among the former, which emphasizes the contrast between the Groterps and the Friterps. As regards the nose-index the Middle Groterps are parindicial with the Franks of Namur, who belong to the Nordici with the narrowest noses.

Orbital index

Orbital index

Cl. M.	chamaekonch			mesokonch			hypsikonch									
In	77 78	79 80	81 82	83 84	85 86	87 88	89 90	91 92	93 94	95 96	97 98	av.	chan.	meso	hyps.
21 O. G.	2	3	2	1	5	2	0	2	2	0	2	85.9	32 %	36 %	32 %
13 M. G.		2	2	2	2	2	1	1			1	86.1	30.8%	46.1%	23.1%

The orbital-index again shows close agreement between the two series.

Especially where we have complete measurements and indices of the Middle series, there appears to be a large measure of agreement between the Old and the Middle sets. The similarity is sometimes most striking in the height : length indices; and it is also great in the breadth : length and height : breadth indices. These figures confirm what was already shown by the reduction to Standard Skull. Though there may be some difference between the neurocrania of the Old and the Middle skulls, on which in fact Folmer had grounded the supposed difference. The resemblance is so remarkable, that some affinity between them cannot be doubted.

Folmer was of opinion that "the Middle heads would be shorter and broader .... when compared with the Old Franks and Alamanni" (1885 p. 14). But this comparison was itself faulty, because the Middle Groterps were longer than the Rowgrave crania of Virchow, and narrower than those of Ihering. We consider it of some importance to have demonstrated that *this difference does not exist between the only autochthonic Old and Middle material of Groterpia, which is the only material from the whole of Terpia available up to this day.*

II. MODERN FRITERPIANS

Material

The material of modern Friterpia is extremely scarce.

Properly speaking we have only at our disposal the index cranicus of 27 Hallum skulls. A. Sasse stated concerning his Sneek skulls that they were derived from a couple of villages in the environs of Sneek. As this town is situated on the border of the Terp-region, the skulls were possibly obtained there. Considering the similarity of the index cranicus of the Hallum and the Sneek series (76.9) and the limited nature of our material, we can only look upon these villagers as Terpians.

in. cr.	69	70	1	2	3	4	5	6	7	8	9	80	1	2	3	av.	dol.	meso	brach.
45 O. F.		2	3	5	7	6	6	8	3	1	2	0	2	0		74	64.4%	31.1%	4.5%
27 r. F.			2	0	1	4	0	4	3	2	1	3	5	1	0	1	76.9	25.9%	48.1%	26 %
9 r. F.						1	1	3	0	2	0	0	1	1			76.9	22.2%	55.5%	22.2%

From the above curves it becomes apparant that the dolichocranic element, which was in the majority among the Old Friterpians, has receded to the background. The mesocranes have replaced it, and even occupy one half of the series, whilst the dolichos have fallen off to one quarter of the Modern Terpians.

From this preliminary survey we may therefore infer that the composition of the population of Terpia has altered since the first centuries of our era, in consequence of the immigration of a new element. The constancy of the Groterpian headform from those centuries to the Middle-ages renders it probable that the phaenotype of the Friterpians had not undergone such a change as Folmer and other investigators had thought probable.

Without going so far as to suppose there has been a change from dolichocephaly to brachycephaly, the alteration in the composition of the Friterpians may easily be explained. If, moreover, in the following remarks we succeed in proving the intruding stream of the new element, this will strengthen the probable correctness of our demonstration.

Such will be the case if the brachycephalic element in the chief town on the border is stronger than in the open country of Friterpia. Especially if we consider that the town population is generally more dolichocephalic than the population on the surrounding land, it becomes highly probable that the brachycrania are indeed allochthonic and not Friterpians of an altered phaenotype.

The inquiries of Pearson (1904), Hagen (1906), Boas (1907), E. Fischer (1913), Castle (1916), Bryn (1920), Hauschild (1921), Schreiner (1923) and Frets (1924) have demonstrated the probability of the headform being hereditary. Therefore we cannot very well attribute the increase of the mesocranic element to an increase of brachycrania. Still, the increase of the mesocrania from one third to one half of the population is less easy to trace than the rapid increase of the brachycrania. Yet we will also make an attempt to bring the problem as to whether the mesocrania are autochthonic or allochthonic nearer to a solution.

Besides the limited data obtained from the two series of Terp skulls, we have only Folmer's measurements of 35 Leeuwarden skulls and those of 10 skulls measured by A. Sasse, which were obtained from the churchyard of Hoek, one of the oldest quarters

of the town of Leeuwarden. This burial ground was closed in 1680. Further, J. Sasse (Mayet) gave the index cranicus of 87 Leeuwarden skulls, whilst we were able to combine three smaller series from Friesland so as to form a group of 15 skulls, of which the index cranicus is known.

Consequently we now proceed to consider more particularly 1. a small series of Modern Friterp villagers, 2. one series somewhat larger from Hoek, and 3. a large series from the principal town on the border of the Terp-region (Leeuwarden). This population is probably for a great part allochthonic, therefore the results of our inquiry cannot be applied to Terpia without qualification. Yet they afford a view of the changes that may be expected to take place in Terpia in the near future; and as such they are certainly of importance for the Anthropography of Terpia.

Absolute Measurements

NEUROCRANIUM

Capacity

44 F.	28 ♂ 1577 ccm.	16 ♀ 1345 ccm.	♀ 1493	sex in 85.3
8 r. F.	4 ♂ 1522.5 ccm.	4 ♀ 1322,5 ccm.	♀ 1422	,, ,, 86.9
33 l.	17 ♂ 1494 ccm.	16 ♀ 1334 ccm.	♀ 1416	,, ,, 92.3

For the Leeuwarden group we can only state the capacity, calculated according to the modulus.

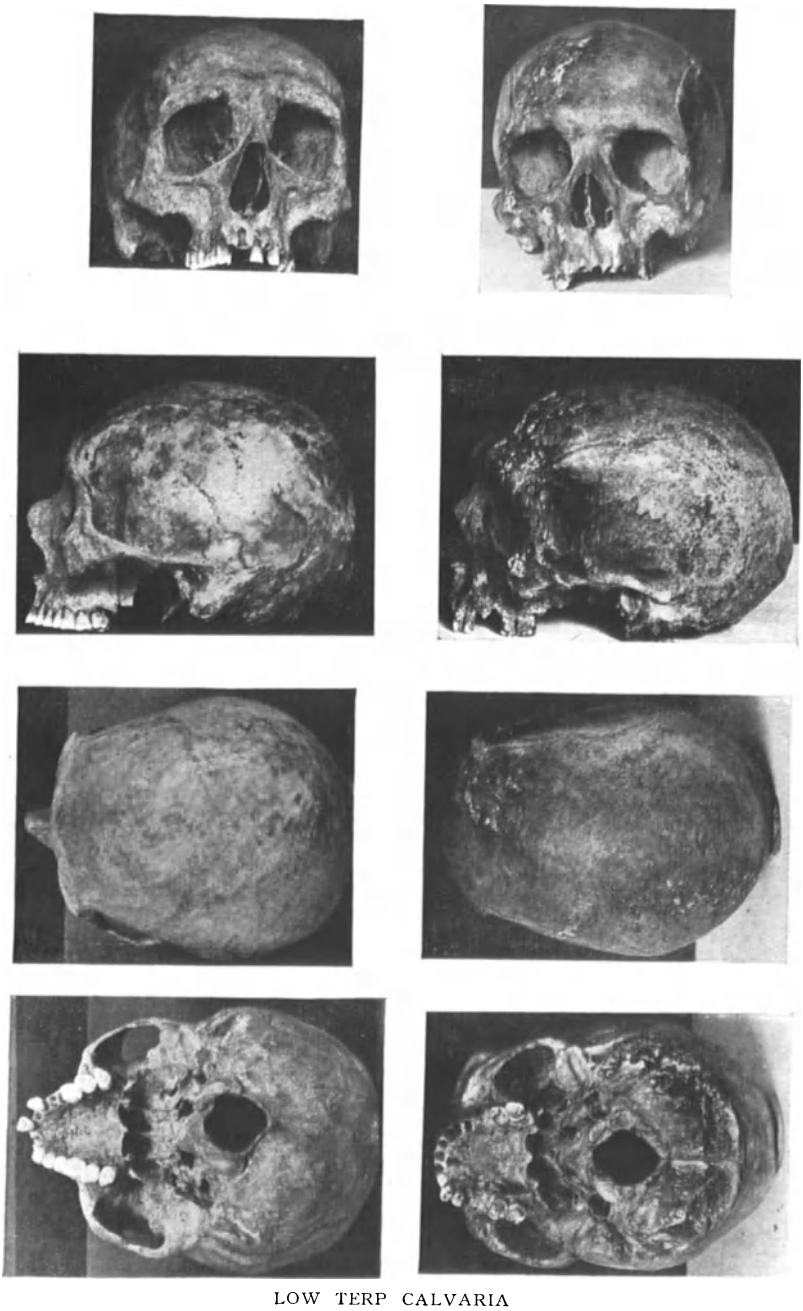
From this it appears that the female crania in all three series have remained almost equal. They all belong to Sarasin's greatest group of the aristencephalics.

However, the capacity of the male townspeople is considerably smaller; that of the Modern Friterpers again approximates the Terpbuilders. Yet all three come under Sarrasin's aristencephalics.

According to Sergi's division, the Modern series are metriocranic; the Old series is megalocranic. According to Flower and Turner the Modern skulls are mesocranic, the Old ones megacranic.

The sex index of the Old Friterpers is 85.3, that of the Modern 86.9, that of the Leeuwarders 92.3, so that also in this case the Modern Friterpers again resemble the Old closest.

Length Although the series of Modern villagers is very small, the resem-



LOW TERP CALVARIA

Length

Cl. T.	Short	medium long					long							
L.	165 169	170 174	175 179	180 184	185 189	190 194	195	196 199	200 204	205 209	210 214	av.	short	m.	long
45O.F.		2	0	10	14	3	6	3	4	2	1	189	0 %	75.5%	24.5%
8r.F.			2	1	3	0		2				186.7		75 %	25 %
35 l.	1	4	14	6	8	1		1				181	2.8%	94.3%	2.8%
10 h.		2	2	2	4							180.6		100%	

blance with the Old group is most striking. The proportion between medium and long, as given by von Töröck, is almost equal in both groups, and the averages differ but little. Yet the Modern Friterpians are longer than the Old Groterpians (183 mm.) and Mediaeval ones (185 mm.). The apices of the two Friterpian curves coincide.

In the two series of townspeople long crania are almost entirely absent. On the other hand the first short skull occurs here. The apex of the Leeuwarden series is notably lower, and the averages also differ much more than in the Old Friterp group.

The average length of the skull for 768 inhabitants of the province of Friesland which Prof. Bolk figured, we calculate to be 190.6 mm.—7.5 mm. = 183.1 mm. This lies between the averages of the Friterpians and the townspeople.

If we calculate the average length-figures according to Standard Skull, we find for the Modern Friterpians 166 (146—197), so just the same as that of the Old Friterpians, 166. The length figure for the 35 Leeuwarden skulls is 162, which is considerably less. Although in consequence of its greater inaccuracy this method is less applicable to small series, yet it proves very valuable in this case in order to show the great agreement existing between the Old and the Modern Friterpians on the one hand, and the townspeople on the other.

Breadth

Breadth

Cl. T.	m. broad				broad				
breadth in mm.	130 134	135 139	140 144	145 149	150 154	155 159	av.	m. br.	br.
45 Friterpians	8	12	9	12	4		141	91.9%	8.9%
8 Mod. Friterp.		1	3	4			142	100%	0%
35 Leeuwarders	3	9	10	7	5	1	142	83%	17%
10 Hoekers		4	2	4			142.3	100%	0%

The apex of the Modern Friterp series coincides with the apex of the Old Terpians, and the averages vary very little, as also in the division into broad and medium of von Töröck. The Modern Leeuwarders, however, differ considerably, because the broad element has greatly increased in number.

In fact a breadth of 156 mm. does not even occur among the Old crania. This extreme breadth points to a new element in the town-population, which is probably still absent among the Friterpians on the land. And yet the apex of the modern townsmen lies between those of the older series. There is also too great a similarity in the movement of the two curves to make a general broadening of the skull probable. This presumption is confirmed by the small series of skulls from Hoek. Reduced to Standard Skull the difference between the Old and Modern series is considerable (Old Frit. 121, Mod. Frit. 126, Leeuwarders 127).

The skull-breadth according to Prof. Bolk's figures is 153.4 mm—7.5 mm = 145.9 mm.; considerably broader than the figures in the above series. Reduced to Standard Skull, the Modern Friterps give an average of 126 (125—149) which exceeds the average of the Old Friterps (123.6). The breadth-figure of the Leeuwarders, however, is 128. Consequently in breadth also, the Old and Modern Friterpians approach nearer to each other than to the Modern town-population, which therefore again points to the influx of a broader element via the towns.

Length + breadth

Length + breadth

L. B.	305 309	10 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	av.
45 F.	1	6	4	5	7	6	2	4	4	4	2	0	331
8 r. F.			2	1	2	0	1	0	2				328.7
38 l.	2	8	4	6	5	5	4	0	1				323
10 h.		1	2	2	4	1							330.3

The apices of the curves coincide for the Old and Modern Friterps and the Hoek skulls, whilst their averages show but little difference. But the apex of the Leeuwarden Moderns is considerably lower, however, and this average also shows the greatest difference — considerably lower — with the Old series.

The average length + breadth of the skull, which Prof. Bolk

figured for 768 Frisians, gives 328.5 mm. after subtracting 14.5 mm. Therefore it is the same as that of the Modern Friterpians.

Total height

Height

tot. H.	114 115	116 117	118 119	120 121	122 123	124 125	126 127	128 129	130 131	132 133	134 135	136 137	138 139	140 141	142 143	144 145	Av.
38 F.					1	3	3	3	1	2	6	6	2	7	1	3	134.7
8 r. F.			1	0	0	0	0	1	1	2	0	0	2	0	1		133
31 l.	1	0	0	1	0	7	2	4	1	6	2	3	1	2	1		130
9 h.				1	0	3	1	0	2	0	1	1	0				128.2

Whereas the total height of the Modern Friterpers differs but little from that of the Old series, the figures for the Modern townsmen are considerably lower. Yet the extreme low element (114—121 mm.) in the Modern series is of little importance. The apices of the Leeuwarden series lie 15 mm. below those of the Old Friterp series.

In the greatest height figures the Old and Modern Friterpians again show the greatest measure of agreement. The average of the other height-figures also reach a little higher.

Greatest height

Gr. H.	120 124	125 129	130 134	135 139	140 144	145 149	150 154	av.
27 O. F.		2	7	3	10	5		139
8 r. F.		1	1	1	3	1	1	139.6
11 l.		1	3	2	5			137
9 h.	1	0	3	5	1			134.4

The difference in the averages of Schmidt's height is larger. The modern group appears to be lower. There is also agreement between the curves.

Schmidt's height

S. H	119 120	121 122	123 124	125 126	127 128	129 130	131 132	133 134	135 136	137 138	139 140	141 142	143 144	145 146	av.
31 F.	0	0	1	2	1	1	2	4	4	6	5	2	0	3	135.6
34 l.	1	0	2	2	5	3	4	1	3	5	2	5	1	0	132.1

If we reduce the two series to Standard Skull, we find an average height of 118.8 for 3 Friterpians, and of 117.9 for 34 Leeuwarden skulls. Therefore the height of the Modern series is al-

most equal to that of the Old series. If we divide up both the series into dolicho, meso- and brachycephals we find for the average height of 24 Friterp dolichos 119; and for 4 Leeuwarden dolichos also 119. The mean height of 13 Friterp mesos is 117, and of 21 Leeuwarden mesos also 117. The height of the two Friterp brachys (117) and of the 8 Leeuwarden brachys (118) does not quite agree however. But the small number of the first group makes comparison very difficult and makes it impossible to point out the possible allochthonous element in the second one.

The excess of the dolichocranic element in the Friterpian series also appears in the fact that the apex just reaches 119. In agreement with the mesocranic character of the Leeuwarden series, the apex here just reaches 117. Consequently Schmidt's height, which by the vertical position on the two axes is so eminently suited for reduction to the height of Standard Skull, leads us to the presumption that the mesocrane element, both of the Old Friterpians and of the Modern townspeople, is relatively lower than the dolichocrane and the brachycrane elements. Also that a relation may be found between the numerous dolichos of Friterpia and their scarcity among the population of the Frisian Capital.

However the brachycranic element among them does not appear to agree with the few brachycrania among the Old population. The last-named skulls also approached near to the lower mesocrania in the height-figures, which confirms our presumption that real brachycrania were wanting among the Old Friterpians. The number in this group is, however, very small.

Basion bregma height

ba.	114 115	16 17	18 19	20 21	22 23	24 25	26 27	28 29	30 31	32 33	34 35	36 37	38 39	40 41	42 43	144 145	av.
38 F.					3	2	3	2	1	6	4	6	3	4	2	2	133.7
8 r.			1	0	0	0	0	2	1	1	0	0	2	0	1		132
32 l.	1	0	1	0	3	5	4	2	3	5	4	1	1	2			129
9 h.				1	1	2	1	1	1	0	2						129

As the basion bregma height runs parallel with the figures of the total height, we may refer to the latter. The basion bregma height of the Modern Friterpians agrees with that of the Scots as given bij Turner; the Modern Leeuwardeners agree with the Cal-

mucks of Reicher (127 mm.), and the Hoek skulls with the Merovingians of Frizzi (129 mm.).

If we calculate the standard figures for the total height, we find for the Modern Friterpians an average of 118 mm. (min. 118, max. 123 mm.) therefore just the same as for the Old Friterpians (min. 108 mm., max. 128 mm.) As for the Hoek skulls, A. Sasse neglected to measure the capacity, before returning them to the anthropological Exhibition at Paris in 1878. The total height for 31 Leeuwarden skulls is 111 (min. 107 max. 123) so considerably less.

Therefore it appears that this large series has the same maximum as the much smaller series of villagers.

Their greatest height is 123 mm. (min. 114 mm.; max. 132 mm.).

Judging from the limited number of absolute figures for the neurocranium, from which comparisons can be made between these skull-series, we cannot but conclude that there is a greater similarity between the Modern Leeuwarden skulls, which are shorter, broader and lower.

The reduction to Standard Skull also points to a similarity between the villagers of Friterpia and the Terp-builders. A comparison of Schmidt's height between Terp-builders and Modern townsmen shows that the inferior height of the latter is attributable to the numerically stronger mesocranic element, which is relatively lower than the dolicho- and brachycranic. The dolichos among the modern townspeople are generally related to the population of Friterpia. The Modern brachycrania are distinguished by greater height from the sporadic brachycrania among the Old Friterpians, which coincide, as far as the third dimension goes, with the mesocrania. Therefore this is one proof more that the Modern brachycranic element is allochthonous.

Conclusions

The cubic capacity of the Modern crania is smaller than that of the Old ones.

Whereas the sex-index of the Modern Friterpians is remarkably similar to that of the Old, the index figure of the Leeuwarden crania is considerably higher.

The length of the Modern crania is much smaller than of the Old; the Modern Friterpians come nearest to them. When reduced to Standard Skull, the length of the Modern Friterpians equals that of the Old, and that of the town-people is smaller. The average length-breadth of the Modern skulls is less than that of the Old, as is also the

case with the total height and the basion-bregma height. For Schmidt's height this is only so with the Leeuwarden crania. The only exception is found in the greatest Height of the Modern Friterpians, who surpass the Old crania in this dimension. When reduced to Standard Skull, the difference between Old and Modern skulls becomes less, whilst the figures for total height of the Old and Modern Friterpians are equal. So the agreement between these two latter series proves to be greater than between the others.

SPLANCHNOCRANIUM

Folmer's Leeuwarden skulls were more or less damaged as regards the facial part. Consequently we can only give comparative figures of a few dimensions.

Upper facial height

Upper facial height

H.	57/58	59/60	1/2	3/4	5/6	7/8	69/70	71/72	3/4	5/6	7/8	79/80	1/2	3/4	5/6	av.	min.	max.	♂ mm.	♀ mm.	sex. in	rst
36 O. F.		1	3	2	1	2	2	6	1	9	3	5	0	0	2	73	60	85	75	69	92	64
7 r. F.					2		1	2	1	1						70.3	65	75	72	68	94	62
20 l.	1	0	1	1	3	4	2	1	2	3	2					69	58	74	71	66	93	61
6 h.			2		1		1	1	1							67	61	74	66	68	103	—

The apex of the Leeuwarden curve lies considerably further to the left. Once again the Moderns agree most with the Old Friterpers as to the averages. The greater length of the upper jaw of the Hoek females, a deviation from the general rule, makes it very likely that accidental selection has strongly influenced this group. The sex difference is greatest among the Old Friterpers, and least among the Hoek skulls.

Reduced to Standard Skull these figures show 36 Friterpers to have an upper facial height of 64 (min. 54 max. 72) 7 Modern Friterpers 62 (min. 58 max. 66) and 20 Leeuwarders 61 (min. 54 max. 72). So on an average the Modern Friterpians again come nearer to the Old in height of upper face, than the Modern townspeople. The greater variation of these crania indicates stronger mixture.

If we divide these series into three groups according to the breadth: length index, the dolichocrania appear to have a longer-upper face than the mesocrania. The brachycrane group is too small to allow of any conclusion being drawn.

Upper facial height and cranicus

	av.	dol	meso	brach
36 Friterpians. . . .	64	64	63	
7 mod. Friterpians .	62	63.6	62	61
20 Leeuwardeners . .	61	61.5	60	62

Zygomatic breadth

Zygomatic breadth

Br.	115 115	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46	av.
35 O. F.				2	3	2	5	2	2	1	3	6	7	0	1	1	133
7 r. F.					2	2	0	3	0	0	0	0	1				128.1
17 l.	1	1	0	4	1	0	1	4	0	1	3	0	1				125
6 h.				1		1					4						131.3

The faces of the Hoek and Modern Friterp skulls are somewhat narrow; but those of the Leeuwarden skulls are still far narrower.

Reduced to Standard Skull we find for the Friterpians an average of 116. 1 (109—121); for the Modern Friterpians we calculate an average of 113 (min. 109, max. 121) and for the Leeuwarden skulls an average of 112 (min. 107, max. 121).

Therefore the Modern townspeople have a narrower face. The Modern Friterpians are here again found to approach nearest to the Old Friterps. The variation is almost equal for these series, in which the figures are in any case extremely devious.

Zygomatic breadth according to sex

sex	male	female
Old Friterpians	132 mm.	126 mm.
Modern Friterpians	131 mm.	125 mm.
Leeuwardeners	133 mm.	142.2 mm.
Hoekers	131 mm.	125 mm.

When divided according to sex the Modern Friterpians still agree with the Old, but the difference in breadth of the townspeople is greater. In all series the females have narrower jugal bones than the males.

The division into three groups according to the breadth length index gives but a meagre result on account of the small number

contained in the series. It only shows that the dolichocrania have a broader face than the mesocrania. From this the narrowness of face of the Modern series may be explained.

Nose

Nasal length

Nas. L.	27	37	43	4	5	6	7	8	9	50	1	2	3	4	5	6	7	8	av.
38 O. F.	1	0	1	0	1	0	0	2	2	4	4	5	3	5	3	2	2	3	51 mm.
7 r. F.											2	0	0	2	0	0	3		54.4 mm.
27 l.		1	0	0	1	0	3	3	3	0	1	4	3	1					51 mm.
6 h.							1	0	1	1	0	0	2	1					51.4 mm.

The nose length of the Moderns is greater than of the Old Friterpians. This is the more remarkable as the upper facial height of the Modern skulls is less than that of the Old skulls. The nose length of the Leeuwarden skulls agrees with the Old ones.

Nasal breadth

Nas. B.	30	9	8	7	6	5	4	3	2	1	20	9	8	av.
37 F.	1	3	2	4	6	5	2	1	1	1	0	1	0	25 mm.
8 r. F.						1	0	0	0	1	2	1	1	22.5 mm.
20 l.		1	0	1	1	1	5	4	4	1	0	1	0	23.4 mm.
6 h.						2	2	0	1	1	0	0	0	22.6 mm.

In accordance with the narrower upper-face the width of the nose of the Modern series is smaller. The Modern Leeuwarden skulls closely approach the Old Friterpians, both in the length and the width of the nose. Both the other series are too small for much to be concluded from them.

Orbita

Orbital height

H.	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	av.
38 F.	0	0	0	1	0	4	2	3	2	9	5	10	2	0	0	36
7 r. F.					1	2	1	1		1			1			33.9
22 l.				1			1	4	4	2	6	3		1		36
6 h.	1						1	3		1						33.2

The Apex of the Leeuwarden series lies close to that of the Old series, and the averages are also equal. The height of the two other series is slightly lower, but the small number of skulls, makes it impossible to draw any conclusions. This is also the case in the next table of orbital breadth.

Orbital Breadth.

or. B.	35	36	37	38	39	40	41	42	43	44	45	46	47	av.
35 F.	0	0	0	4	5	3	4	3	4	6	2	3	1	42
7 r. F.		1	1	1	2	1	1							38.4
22 l.		1	1	3	3	2	3	5	2	1	1			41
7 h.			1	3	1	1	1							38.5

As is shown by the averages and the apices of the curves, the orbital breadth of the Leeuwarden skulls is less than that of the Old series. Both the Modern Friterpian and the Hoek skulls are narrower between the eyes also.

A comparison of the facial parts only allows of a few conclusions being drawn.

Conclusions

The Modern crania, and more especially the townspeople, have narrower faces than the Old skulls.

The faces of Friterp dolichos are in general broader than those of the mesos. As the latter element are more prevalent in the modern series, this partly explains the greater narrowness.

The average upper-facial height of the Moderns is less than that of the Olds; that of the dolichos is greater than that of the mesocrania. This presents a reason for the shorter upper-face of the Moderns.

Both in breadth and length of the upper-face, the Modern Friterpians approach nearest to the Old Friterpians.

The Modern crania have narrower noses, and lower and narrower eyes. The Leeuwarden crania differ little from the Old Friterpians in the width between the eyes.

Relative Measurements

A. Sasse mentioned no modulus. It is on an average 152.2 for 33 Leeuwarders, so less than for the 38 Old Friterpians. So only for the Old and the Leeuwarder series can we compare the other relative measurements connected with these. As the latter series, as we proved from the absolute measurements, nearly always constituted the extreme type, while the Modern Friterpians were between those and the Old series, we can form some idea of the Hoeks kulls and Modern Friterpers by comparing both series.

Relative length

Relative length

Class. of Schmidt	short				mediate long					long				very long			in %							
rel L	111	2	3	4	5	6	7	8	9	120	1	2	3	4	5	6	aver	short	med. l.	long	very l.	dol	meso	brach.
38 Friterp						1	0	4	1	4	4	8	6	3	6	1	122			58	26.2	123.3	121.2	118.5
33 l	1	1	1	1	1	1	3	5	3	10	3	1	2				118.9	12.1	39.4	48.5		121.4	119.9	116

In this table there is evidence of a short group among the Leeuwarders which does not occur with the Old Friterpers, and is also wanting with the rural folks of Friterpia. The Leeuwarders show a greater resemblance to the Old Groterpers (rel. l. 120) in length, and are relative longer than the Merovingians (rel. l. 116). However, there too, the group of "shorts" is wanting.

Relative breadth

Relative Breadth

Cl. S.	narrow						med. broad				broad									
R. B.	86	7	8	9	90	1	2	3	4	5	6	7	98	av.	nar.	m. br.	br.	do.	me.	br.
38 F.	1	2	5	5	9	4	4	3	1	4				91	68.5%	31.5%		84.7	92.7	95.2
33 l.		1	1	1	2	3	5	8	1	2	7	1	1	93.6	27.2%	48.5%	24.2%	89.3	89.3	96.8

The average relative breadth of the Leeuwarders is greater. While among the Old and Modern Friterpers no broad skulls occur, this group is almost as large for the Modern town population as that of the narrow ones.

Relative height

Relative Height

Cl. S.	extra		very low				low				med. high					high	in %								
R. H.	8	9	80	1	2	3	4	5	6	7	8	9	90	1	2	3	av.	extra l.	very l.	low	m. high	high	do	me.	br.
35 F.	1	0	1	0	0	1	3	0	4	6	8	6	3	0	0	1	87.4	2.9	5.7	28.7	48.6	2.9	87.1	86.1	86.2
34 L.			3		1	1	1	5	6	5	3	6	2	1			86.8		14.7	50	35.3		87.3	86.6	87.5

Though the Modern skulls proved to be lower, as regards absolute height, the relative height presents quite a different aspect. The averages do not differ much, nor are the curves widely divergent. The division into groups proves, that half of the Leeuwarders is low; half of the Friterpers is on an average high. As half of the Friterpers are dolichocranic, we look for a relation between the height and the skull index.

If we divide both series according to the index cranicus into three groups, we actually see that the dolichocranic part is higher than the mesocranic, in accordance with our results on reducing to Standard Skull. So why half of the Leeuwarders is relatively low, may in some measure be explained from this. This again is relevant to the high percentage of mesocrania. Moreover the Leeuwarder brachycrania again prove to be higher at present than those which occurred among the Friterpers. This once more confirms the mesocranic nature of these "brachycrania." However the Leeuwarder dolichocrania are as high as those of the Friterpers, which again strengthens the connection between the two groups. Relatively the mesocrania are almost equally high in both groups. If we compare the relative measurements of the Friterp and Leeuwarder brachycrania with the 19 typical Reimerwalers of J. Sasse (1891), a difference is at once apparent.

Relative height and index cranicus

	dolicho	meso	brachy
Old Friterpians	26–87.1	11–86.1	2–86.2
Leeuwarders	3–87.3	23–86.6	7–87.5

Relative measurements of Frisians and Zeelanders

	L.	min.	max.	B.	min	max	H.	min	max
F.	118.5	118.4	118.6	95.2	95	95.4	86.2	86	86.5
l.	116	116.6	121	96.8	95.3	98.9	87.2	80.9	90.9
R.	113.2	110.8	115.9	96.2	92.7	99.4	90.6	87	94.7

The Reimerwalers (R) are much shorter than the Friterpers and Leeuwarders. They are also somewhat less broad and considerably higher. The habitus, too, is quite different. So there can be little doubt that we are here dealing with a type quite different from that among the brachycrania of our Northern provinces.

Breadth-length index

The number of skulls which we have for comparison here, is large, but of most of the series we know hardly anything. Thus, of the Hallumer series we only know the index cranicus. We need not say that we only make use of it "faute de mieux", though we are very grateful for the opportunity.

Breadth: length index

I cr.	9	70	1	2	3	4	5	6	7	8	9	80	1	2	3	4	5	6	7	9	do.	me.	br.	av.
45 F.	2		3	5	7	6	6	8		3	1	2	0	2									64.4%	31.1%	4.5%	74
27 r. F.			2	0	1	4	0	4		3	2	1	3	5	1		1						25.9%	48.2%	25.9%	76.9
8 r F.						1	1	3		0	1	0	0	1	1								25 %	50 %	25 %	76.9
35 l.				2	0	2	1		5	7	5	4		1	2	2	0	2	1	0	0	1	11.4%	62.8%	25.8%	78.4
87 l.			1	1	2	7	7	8	13	8	9	5		8	7	4	1	2	0	1	1	2	20.6%	49.4%	29.9%	77.1
15 f. [1]			0		1	0	0	1	3		1	3	3	0	2	0	1						6.6%	73.3%	20 %	78.3
10 h.						1	0	0		2	0	3	1	1	1	0	0	0	0	1			10 %	60 %	30 %	78.9
438 Hamburgers Dr. Trost																							19.6%	56.5%	23.7%	77.42
777 Amsterdammers Prof. L. Bolk																										78.3

If we observe the number of dolichocrania, a considerable difference between the Old series and the Modern series appears to exist. Still, both the Modern Friterp series resemble the Old closest; then follows the Leeuwarder series of J. Sasse. Also in the groups of meso- and brachycrania there is a very great similarity between these three series, the averages of which are about equal. From this it appears that half of the present-day Friterpians are mesocranic, and the dolichocrania and brachycrania each constitute one fourth part. In the towns the brachycrane portion (28.8 %) is stronger than in the country (17.4 %) which again confirms its allochthonous nature. Among the Leeuwarders of Folmer the dolichocranic element was quite thrown into the background by the mesocranic. However there appears to be a state of affairs here which undoubtedly differs from that in Friterpia. Also among the Hoek series the mesocrania are more numerous. Strongest, however, in the Frisian series of J. Sasse, where the dolichocranic part has dwindled down to 6.6 %.

	doli-chocranic	brachy-cranic
country series	24.0%	17.4%
Urban series	20.0%	28.8%

In the Modern series the dolichocranic part is 18.7 %, the brachycranic 28 % of the total number.

The average index cranicus of the townspeople is 77.6, that of the Friterp rural population 76.9, so a little lower. Therefore the average for Friterpia 77.4 tallies with the average ind. cranicus 77.4 of the Modern Hamburgers (before 1805), who were mainly re-

[1]) Frisians (J. Sasse)

cruited from Hannover, Schleswig-Holstein and Mecklenburgh before modern traffic began. It is only a little lower than the average for the Modern Amsterdammers (78.3). The great similarity in the averages and the divisions with those of Friterpia, indicates that a similar state of affairs has existed all along the shores of the North Sea, leading one to expect an almost similar anthropographical environment from Friterpia to Denmark.

Prof. Bolk (1920) found an index cranicus of 80.4 for 768 Frisians. We have already reduced this to 79.9 by subtraction for soft parts. Yet this is still about 3 units higher than what we found as the average for the Friterpians, and one unit higher than the average highest urban series. This difference can only be ascribed to the selected material of this investigator, and probably not to the extremely rapid increase of the brachycranic element. So, for the present we must consider Prof. Bolk's result too high for our anthropographical sphere.

Besides the higher averages and the increase in meso- and brachycrania, the Modern series, especially those of the townspeople, differ from the Old series by their considerably greater variability. The extremes of the Old series differ 11 units. Those of the Hoek-skulls 14 units, though the number of skulls is but 22%. The extremes of the 87 Leeuwarders of J. Sasse differed 18 units. The law of increase in variability with the heterogeneity of the type here clearly points to a greater mixing of the Leeuwarders, and suggests immigration of the brachycrania into the capital.

While the difference in variation breadth with the Old and Modern series below the limit 80 is comparatively small, it is very great above it. So the mixture with new dolichocranic types is of little moment; but that with brachycrania is the reverse.

The small series of Hoek skulls shows that this does not depend on the size of the series. The townspeople have also assimilated extreme brachycranes. However, among the rural population of Friterpia the brachys do not yet occur so numerously. The country folk have remained freer from mixture.

"Sollen wir zur Erklärung der Brachycephalie so vieler Ostfriesen supponiren, dasz der niedersächsische Kopf das brachycephale Element nach Friesland getragen hat?" asked Virchow. On the strength of 34 skulls from Friesland and 12 skulls from East-Friesland Virchow arrived at a contrary conclusion. J.

Sasse did not agree with this and Prof. Bolk set up his Saxon theory as an explanation of the brachyzation. As Hamburgh, however, is situated much nearer to the Saxon centre of brachycrany than Friterpia, Hamburgh would probably have a great percentage of brachycranials, if this centre was indeed so active. However this is not the case. As moreover, the whole interior of Europe from Auvergne to the middle Urals is inhabited by brachycephalics and they even spread farther than the Central European highlands, in our opinion it is of little use ascertaining where the brachycrania of Friterpia hail from. The pure strain of the Mediaeval Groterpers and the comparatively pure strain of the Friterp country folks suggest, that the considerable increase of the brachycrania is only of recent date. Means of Communication in all directions have been rapidly increasing since the beginning of this century. The government has been totally reorganized since the establishment of the Kingdom of the Netherlands, so that officials have been removed from one part of the country to another, without any regard being paid to anthropographical conditions. New commercial and industrial enterprises have spring up enlisting labour from native and foreign parts. Consequently a provincial town like Leeuwarden has attracted more and more allochthonous elements, the influx of which has been steadily increasing since the end of the Middle Ages. So it is of little use to begin comparing the small number of Friterp brachycrania with the Zeeland skulls of J. Sasse in order to ascertain whether the Zeeland type may occur among them (See p. 187). Even though all specimens show a distinct difference, no positive judgment can be based upon it as shows the opinion of older anthropolographers such as A. Sasse proofs, who sought a connection between the two elements at a time when there was a strong tendency to regard all brachycrania as racially equal. For that, the number of comparable specimens is too small, and the mixture with dolichocranic elements too great. We can easily come to the same conclusion by comparing crania from any other centre of brachycrany.

The difference in index cranicus between the Old and the Modern Friterpians is 2.9. This is somewhat greater than that between Friterpians and Groterpians. There are reasons to assume that at the beginning of our era a considerable portion of the population of N. W. Germany was mesocranic and that the low,

medium-broad, medium-long type formed an important element of it. However, the number of data from those times is very limited. The Old Bremen people of Gildemeister (50.5 % mesocranic), the N. W. Germans from the IX—XIV centuries of Martin (49 % mesocranic), the Rimbecker Hünengräber of Schliz (42.9 % mesocranic), the Old Wendian graveyard skulls of Asmus (50 % mesocranic), about half of them all consisted of mesocrania. It is true, these data are defective and partly of later date, but the skull series from Denmark and Sweden agree with them.

Percentage of mesocrania in N.W. European series

	dolicho	meso	brachy	investigator
Hamburgers	19.6	56.6	23.7	Trost
Bremen	38.6	50.5	10.9	Gildemeister
Schleswig Holstein	23	52	25	Meissner
N. W. German (IX—XIV century)	34	49	15	Martin
Reihengräber of Allach (Bavaria)	33.2	48.8	18	v. Hölder
Hünengräber	57.1	42.9	—	Schliz
Sweden				
a. Neolithic	54.8	38.1	7.1	Retzius
b. Bronze age	65	20	15	
c. Iron age	68.3	24.4	7.3	
Sweden				
a. Bronze age	67	14	19	Martin
b. Iron age	62	31	8	
Denmark Neolithic	29.6	49.7	22.5	Scheidt
Hünengräber	85.7	14.2	23	Schliz
Ostorf				
Allamanni	40	45	15	Martin
French Merovingians	44	41	15	Martin
Denmark (Neolithicum)	47	23	30	Martin
Mecklenburg Old Wendian	31	50	18.8	Asmus

Among the Old Groterpers the mesocrania were also most numerous, among the Merovingians of Katwijk they were almost as numerous as the dolichocranic element. So from this one may assume, that the pre-eminently long-headed district of Friterpia formed one of the probably not very rare exceptions of that time.

So the mesocranic race, being numerically stronger in other parts of the country and in the adjacent rigions, helped to produce the majority for the mesocrania, who were originally not so numerous among the long-headed Friterpians, by immigration and infiltration. Perhaps too, a portion of the dolichocephalics has been ousted by them. Thus the increase of the mesocranic element and the rise of the index may by easily explained. No attempts need then be made to trace other factors, such as selection, difference in heredity of the dolichocranic and mesocranic type, and change in pre- and postnatal growth, which will undoubtedly have influenced the plasticity of the Friterpian type.

The exceedingly rapid increase of the allochthonic brachycrane element is explained by the predominance of brachycrany over dolicho-and mesocrany and by a greater adaptability of the brachycrania.

Increase of mesocranics

Series	do	me	br
♂ O. F.	65.5%	31 %	3.5%
♀ O. F.	56.3%	37.5%	6.2%
♀♂ O. F.	62.2%	33.3%	4.5%
♂ O. G.	50 %	35.7%	14.3%
♀ O. G.	22.2%	66.6%	11.2%
♀♂ O. G.	34.8%	47.9%	17.3%
♂ 1.	15.7%	52.6%	31.6%
♀ 1.	6.2%	75 %	18.8%
♀♂ 1.	11.4%	62.9%	25.7%
♂ Hamb.[1]	23.2%	50.4%	26.3%
♀ H.	16 %	62.9%	20.9%
♀♂ Hamb.	19.6%	56.6%	23.7%

Sex and index cranicus

series	♂	♀	♀
Hamburgers (Trost) .	77.4	77.43	
Frisians (Martin) . .	77	79	
Reihengräber (Martin)	73.1	74.1	
Anglo-Saxons (Martin)	75	75	
Old Friterpians . . .	71.4	74.4	73.9
Old Groterpians . . .	75.4	76.8	76
Leeuwardeners . . .	79.4	77.9	78.7

Division according to sex and index cranicus.

	♂	♀	♂	♀	♂	♀	♀	♂	♀♂
O. F	19–72.5	9–72.4	9–75.6	6–76.5	1–80.4	1–80.2	72.4	76.1	80.3
O. G	7–72.8	2–74.3	9–76.5	6–77.2	2–80.9	80	73.1	77.1	80.6
1.	3–73.8	1–72.2	10–78	12–77.6	6–84.5	81.5	73.4	77.8	83.5
	dolichocranic		mesocranic		brachicranic		do	me	br

[1]) Hamburgers (Dr. D. Trost).

If we divide the Friterp, Groterp and Leeuwarden series according to the sex into three groups, the great similarity in average index cranicus strikes us. It is only considerably higher for the two brachycranic groups. This indicates, that here we have the actual difference between both autochthonic and the partially allochthonic series. In this the allochthonic brachycrania come out clearly.

The entire height: length index of the Old (70.7) and Modern series (mod. Frit. 71; Leeuwarders 71.9; Hoekers 71.8) do not differ very much in the averages. While the lowest indices of the Old series are wanting in the Leeuwarden series, a few high crania occur here, which are not found in the Old series. For the rest both series well-nigh agree. Height: length index

Height: length index

Cl.	chamaecranic								orthocranic							hyps		cham.	orth.	hyp.
ba. l.	62	3	4	5	6	7	8	9	70	1	2	3	4	5	6	7	av.			
39 F.	2	1	0		3	6	4	7	6	0	2	5	1	0	0	2	69.8	58.9%	35.9%	5.2%
8 r. F.		1							2	1	1	2		1			71.2	12.5%	87.5%	
31 l.			2		1	1	2	7	2	3	1	3	4				71.5	41.7%	48.4%	9.9%
10 h.						1	2	1		2	2		1				70.6	33.3%	66.6%	

While the Old series, according to the basion bregma height: length index, is chiefly chamaecranic, the Modern series are chiefly ortho- and hypsicranic. Though with the Leeuwarders more than 40 % are chamaecranic, nearly half are even orthocranic; and the hypsicranic element is greater than with the Old series. So the chamaecrania seem to sink into the background among the Modern series, as was already the case among the Old Groterps. As the Modern series are shorter, the average hight: length index is slightly greater.

Though the dolichocrania exceed the mesocrania in relative height, both groups differ little in basion bregma height: length index; nay, the dolichocrania generally have a lower index, in consequent of the greater length.

Basion bregma height: length index according to sex

series	number	sex	ba L. in
O. F.	28	♂	69.6
O. F.	10	♀	70.3
O. F.	38	♀	69.7
r. F.	4	♂	71.6
r. F.	4	♀	70.8
r. F.	8	♀	71.2
l.	15	♂	72.4
l.	16	♀	70.7
l.	31	♀	71.5
h.	6	♂	71.1
h.	3	♀	69.7
h.	9	♀	70.6

Height: length index and Garson's classification

series	dol.	meso	brach.
O. F. . . .	69.5	70.7	74.3
r. F. . . .	67.3	71.9	73.8
l.	70.1	70.7	74.3
h.	71.3	69.8	71.7

Divided according to sex the males of all Modern series appear to have a higher basion-bregma height: length index. However, with the Old Friterp series the average is lower for the males, in consequence of the great length of some crania.

Schmidt's height: length index.

H. L. in	62	3	4	5	6	7	8	9	70	1	2	3	4	5	6	7	8	9	80	av
31 Friterpians	1	0	0	2	1	0	4	2	2	6	3	1	7	0	0	2				71
31 Leeuw			1	0	1	1	2	0	3	5	5	2	2	1	3	2	1	0	2	72

In the Friterp series the apex comes more to the right than that of the Leeuwarden curve.

Yet the average of the Modern curve is somewhat higher, a result of the smaller length of these crania. That the difference is not greater is again relevant to the greater number of low mesocrania in this series.

Height: breadth index

Height: breadth index

Cl. M.	tapeinocranic												metrio-cranic						acrocranic													
B in	79	80	1	2	3	4	5	6	7	8	9	90	1	2	3	4	5	6	7	8	9	100	1	2	3	4	5	6	av.	tap.	met.	ak.
37 O				1	0	0	2	1	0	0	1	2	3	1	5	3	7	4	2	3	0	1	0	0	0	1	0	1	94.7	24.3 %	25. %	21.7%
8 r										1		1			1					2		1		2					96.8	25 %	12.5%	62.5%
32 l	1	0	1	1	0	0	0	1	2	4	5	1	6	4	1	0	0	0	4	0	0	1							90.5	68.8 %	29.1 %	3.1 %
10 h						1		1				4	1	1			1	1											90.8	70 %	30 %	

The averages for the basion bregma height: breath index of

both Friterp and both Leeuwarden series, differ considerably. While the former are mostly metrio- and acrocranic, the two others are principally tapeinocranic. The acrocranic element is well-nigh wanting among them. The apex of the Old series is at 95, that of the Leeuwarders at 91, so much more to the left.

basion bregma height: breadth	dolich.	nesocr.	achycr.
37 O. F.	96.4	92.3	90.1
8 r. F.	95.4	96.8	98.6
30 l.	95.4	91.1	87.4
10 h.	96.4	91	88.7

If we divide the series according to the index cranicus into three groups it is evident, especially for the Old Friterpers, that the dolichocrania were considerably higher than the mesocrania. The difference is rather more than four units, so as much as between the Old Friterpers and the Leeuwarders. In the Modern Friterp series the 2 dolichocrania are somewhat lower, but the small number has a strong influence. The number of brachycrania is too small to show a distinct relation to the other groups. As in the Modern series the mesocrania preponderate, their basion-bregma height: breadth index must also be lower than that of the Old series. Here the height: breadth index proves to be of much more value in clearly showing the cause of the change, than the height: length index.

Schmidt's height: breadth index

H. B. in	82	3	4	5	6	7	8	9	90	1	2	3	4	5	6	7	8	9	100	1	2	3	4	5	6	7	8	av
37 Friterpians		1	0	1	0	0	1	2	0		2	3	1	1	0	2	4	8	2	4		2		1	0	0	0	1	1			94
33 Leeuwardeners		1	1	0	0	1	0	1	2		4	3	5	4	4	1	0	1	0	2		2									1	93

The averages of the two series differ little. However, the apex of the Old series again comes much higher, a proof that among the Olds there is a considerably higher group, which is well-nigh wanting in the Modern group. While in the Old series 67.6 % is above the index 94, of the Leeuwarder series 79 % is under this index.

So we may say that in a sense both series lie in one line. This is again the result of the greater height: breadth index of the dolichocrania.

SPLANCHNOCRANIUM

Fronto: zygomatic-index

The average of the fronto: zygomatic index of the Modern Leeuwarders is 75.2 (min, 69.2 max. 83), which is higher than that of the Old Friterpians 73.9 (min. 67.1 max. 79.3) and more like that of the Old Groterpians 74.7 (min. 65.6 max. 80.9). The variation-breadth of the Modern Leeuwarders is much greater than that of the Old Friterpians.

Upper Facio: zygomatic index

The Upper facio: zygomatic index of the Leeuwarders (55.4) is a little higher than that of the Old Friterpian series (54.5). As with the Friterpians the leptene element is most important.

Upper facio: zygomatic index

Cl. M.	euryene					mesene					leptene					hyp.							
In	45	6	7	8	9	50	1	2	3	4	5	6	7	8	9	60	61	av.	var.	eur.	mes.	lept.	hyper.
36 F.	1	0	2	3	0	0	3	3	0	4	5	7	2	2	0	2	2	54.5	45 –61.5	16.7%	27.7%	44 %	11.6%
18 l.				1	2	1	0	2	1	2	4	1	1	1	1	1		55.4	48.8–60.9	16.6%	33.3%	44.4%	5.5%

Nasal index

The nasal index of 20 Modern Leeuwarders is 47.5 (min. 39.2 max. 55.1) so lower than with the Old Friterpians (49.2) and nearly the same as the Old Groterpians (47.6).

Eye-index

The average eye index of 22 Leeuwarders (88.2) is higher than that of the Old Friterpians (86.2) and of the Old Groterpians (85.9). The variation breadth (min. 75 max. 102.7) is also greater than of the Friterpians (38 Fr. min. 71 max. 100).

Cl. M.	cham.			mesok.				hypsikonch											
Eye- index	71 72	3 4	75	76	7 8	9 80	1 2	3 4	5 6	7 8	9 90	1 2	3 4	5 6	7 8	9 100	3 4	cham.	mes.	hyp.
38 Friterpians	2	0			2	3	5	6	6	2	3	4	1	3	0	1		5.3%	42.1%	52.6%
22 Leeuwarders			1				1	2	5	3	6	2		1			1	4.5%	13.6%	77.2%

Whereas more than half the Old Friterpers are hypsikonch, more than threequarters of the Leeuwarders are in that class.

The averages of the two series differ little. However, the apex of the Old series again comes much higher, a proof that among the Old series there is a considerably higher group, which is wellnigh wanting in the Modern group. While in the Old series 67.6 % is above the index 94, of the Leeuwarder series 79 % is under this index.

In summarizing we found *that the Modern townspeople have a smaller skull capacity than the Old Friterpians. Their skulls are relatively shorter, broader and somewhat lower. However the dolichocranic part of the Old series is higher than the mesocranic part. As the latter has increased, the modern series have become relatively lower. The average height: breadth index of the Modern townspeople is lesser. The Modern Friterpers approximate the Old, also as regards relative measurements.*

As regards skull index, the most important difference between the Old series and the Modern series is the predominance of the mesocranic type, which, perhaps even in the first centuries of our era, was more numerous than the dolichocranic. Of secondary importance too, is the great increase of the brachycrania, who have already outstripped the dolichocrania.

Though in this respect the Frisian capital is ahead of the rural parts of Friterpia, where conditions still agree most with the old state of affairs, the consonance of the whole population of Friterpia with the Hamburgers is striking. This indicates that all along the shores of the North Sea, a mainly mesocranic population is found, whose ind. cranicus is about 78.

The number of brachycrania in our series is too small to ascertain which centre they hail from. As the brachycephalics inhabit the whole of Central Europe, it is extremely difficult to trace their origin. The Friterp brachycrania are longer, broader and lower than the Zealand brachys.

Whilst comparison of the height: length indices only teaches us that the chamaecrania have sunk into the background, the basion bregma height: breadth index clearly shows a difference between the Olds and the Moderns. To a great extent this is to be sought in the low mesocrania.

The averages in height: length indices do not differ very much; the Moderns are chiefly orthocranic. The averages in height: breath index of both Friterp series and both urban series differ considerably. The Modern Friterpers are chiefly acrocranic, the urban population tapeinocranic.

As regards the splanchnocranium we could not ascertain many differences between the Old and Modern series.

The nasal index of the Moderns is lower. The Modern Leeuwarders are much more hypsikonch than the Old Friterpians.

III. MODERN GROTERPIANS

Material

The only particulars known about the Modern Groterpians are the measurements performed by Folmer on 30 living inhabitants of Hunsingoo, viz. the length and breadth of the head.

Further we have at our disposal, from the districts adjacent to Groterpia, the details supplied by Joh. Sasse about 48 inhabitants of Nieuweschans, and also of 46 skulls of Nieuweschans and 10 of Bellingwolde, besides the measurements performed on 292 Groningers intra vitam at the request of Prof. Bolk.

The Hunsingoo group consists of an equal number of males and females.

Contrary to our former calculation, whereby we adopted the customary formula, skull - index = head - index — 2, we now intend, like Folmer, to attempt a determination of the index cranicus by deducting the thickness of the layer of muscles and skin. This method is only reliable if there is no correlation between the proportions of the skull and the thickness of the skin.

Most comparisons of index cephalicus and index cranicus have been made after the investigation of a restricted number of corpses; the difference between the two indices of the same individual seldom exceeds 3 units (Czekanowski). But the cases in which a measurement intra vitam has afterwards been repeated on a corpse are extremely rare (Hagen). So there is much that is questionable in the relation between the indices of head and skull and the differences given by divers inquirers do not agree at all.

Röse observed that the thickness of the soft portions of the parietal part is generally greater than of the forehead and occiput. The relation between these two sections of the soft portions is mostly greater than the relation between breadth and length of the head. Most investigators agree on this point, so important for the comparison of index cephalicus and index cranicus. Broca gives 8 mm. and 6 mm. respectively, Weisbach 9.6 to 12 mm. and 6 to 7.5 mm.; Stieda 9.7 mm. and 7.4 mm; Fürst 9.1 mm. and 7.3 mm. In white-bread eating countries like Ile de France (Broca) and Alsace (Pfitzner) a smaller difference is to be expected than in Pommern, Northern Scotland and Groningen,

wehre coarse rye or barley bread is eaten. Hagen found a difference far exceding 2 on a few of his South-Sea Islanders, who lived on roots, and which he investigated both intra vitam and post mortem.

But the thickness of the layer of muscles and skin is also dependant on the race, the degree of nourishment, the age, and the proportions and capacity of the head. So mesocephaly may be combined with greater thickness of the integument than brachycephaly (Czekanowski); the difference between dolychocephaliae and the respective skulls, is greater than between brachycephaliae and the respective crania.

The measurements of Czekanowski facilitate the reduction of head-measures to skull-measures. They were performed at Zürich on 120 corpses, partly from a population that lived on rather coarse bread; so in this respect perhaps comparable to Groningers.

Sometimes Czekanowski's figures [1]) are higher for the females, sometimes for the males. But they also contain some improbabilities, perhaps resulting from the small groups into which he had to divide his material. He deducts a larger figure at the glabella for medium-fed women than for very fat, wellnourished ones; for these latter he gives even thicker masticating muscles than for men. As there is always some difference between the thickness of the soft portions on living men and on corpses, it is impossible for us to make use of Czekanowski's data unaltered.

Folmer subtracted 6 mm. both from the length and the breadth. This is not in accordance with most investigators. Therefore we have decided, in conformity with several other workers, to subtract 7.5 mm. from the length figure, both for males and females; 8 mm. from the breadth figure for males, and 7.5 mm. for females. These amounts are rather too low than too high for this well fed, mesocephalic population.

Absolute Measurements

The length of the Modern Groterpians is less than that of the Old Groterp skulls, and considerably less than that of the Middees.

The apex of the modern curve is considerably lower; this points

[1]) As Martin gives them on p. 417.

Length

Length

C. T.	sh	medium long					long						
L	165 169	170 174	175 179	180 184	185 189	190 194	195	199	200 204	205 209	av.	sh.	med.	long
23 O G	0	6	1	4	6	1		2	2	1	184.7		78.3%	21.7%
18M G	0	1	4	4	2	5		2			185		88.8%	11.1%
30 r. G	2	3	12	4	6	2		1			180.5	6.6%	90 %	3.4%
35 l.	1	4	14	6	8	1		1			181	2.8%	94.3%	2.8%

to an excess of shorter skulls. The length of the males is 184.2, and of the females 176.9 mm., so again the sex difference is notable (sex. ind. 96).

The average head-length of 290 Groningers, given by Prof. Bolk is, 192 mm.—7.5 mm. = 184.5 mm. Therefore just as long as those of the Middles and much longer than those in Folmer's series. This seems to show that our subtraction of 7.5 mm. for the length is not too much.

Breadth

Breadth

	nar-row	medium broad					broad					
Cl. T.	125	129	130 134	35 39	40 44	45 49	50 54	55 59	60 64	av.	med.	br.
23 O. Groterps.		1	3	8	4	5	2			140	91.3%	8.7%
13 M. Groterps.		0	1	9	4	2	2			142	88.9%	11.1%
30 r. Groterps.			2	4	9	4	8	2	1	145.6	63.3%	36.7%
35 Leeuwarders			3	9	10	7	5	1		142	83 %	17%

The breadth of the Modern Groterps is much greater than that of the Olds and Middles. Whereas the apices of the Olds and Middles coincide, that of the Moderns rises higher, and a second apex appears for the breadth figures, viz. 150—154 mm., which is the greatest breadth of the Olds series.

The breadth of the males is 150.4, and of the females 140.7, so the sex index is 93.5. Therefore the sex difference is here greater in the breadth than in the length.

The average breadth of Prof. Bolk's 290 Groningers is 156 mm. — 8 mm. = 148 mm., therefore a good deal higher than that of Folmer's Modern Groterpians. This indicates that, in connection

with the greater length for Bolk's Groningers, our subtraction of 8 mm. for the breadth is probably not too great.

Relative measurements

As regards the breadth: length index, we found for the 30 Hunsingooërs an average of 80.6, which agrees pretty well with Folmer's average of 80.71, in spite of some errors in his calculation. For Prof. Bolk's 192 Groningers we found an index cranicus of 80.2, which also agrees pretty well with Folmer's. The difference with Bolk's index cephalicus (81.2) is only a little higher (1 against 0.73) than Czekanowski's difference between both indices found for 9 corpses (3 lean, 4 medium, 2 well fed). Breadth: length index

Now we will compare these results with the breadth: length index of the Modern series of Joh. Sasse (Mayet). These crania are derived from Nieuweschans and Bellingwolde, two places in the Province of Groningen, close to the German frontier, and situated in one of the gateways to our Northern provinces.

Index cranicus of Groningen and Friesland series

In. cr.	70	1	2	4	4	5	6	7	8	9	80	1	2	3	4	5	6	7	8	9	av.	do	me.	br.
23 O. G.		2	0	0	4	3	3	2	4	1	1	2	1								76	47.8%	47.8%	4.4%
18 m. G.		1	0	2	2	0	5	2	1	3	1	1									75.9	27.7%	66.6%	5.7%
30 r. G.		0	0	0	1	0	0	1	2	4	4	7	4	1	3	1	1	0	0	0	1	80.6	3.3%	36.6%	60.1%
48 n.[1]		1	3	0	1	4	3	7	11	4	2	3	4	3	1	0	0	1				77.6	18.7%	56.3%	25 %
46 n.		2	1	3	0	1	6	6	8	2	4	2	6	4	0	0	0	1				77.7	15.2%	56.5%	31.3%
10 b.					1	0	0	1	1	3	2	0	1	0	1							78.6	10 %	70 %	20 %
134 r. G.		3	4	3	3	5	9	17	22	13	12	12	15	8	5	1	1	2				78.4	13.4%	54.4%	31.1%
27 r. F.		2	0	1	4	0	4	3	2	1	3	5	1	0	1							76.9	25.9%	48.2%	25.9%
8 r. F.					10	1	3	0	1	0	0	1	1									76.9	25 %	50 %	25 %
35 l.				2	7	2	1	5	7	5	4	1	2	2	0	2	1	0	0	1		78.4	11.4%	62.8%	25.8%
87 l.		1	1	2	7	7	8	13	8	9	5	8	7	4	1	2	0	1	1	2		77.1	20.6%	49.4%	29.9%
10 h.					1	0	0	2	0	3	1	1	1	0	0	0	0	1				78.9	10 %	60 %	30 %
15 f.				1	0	0	1	3	1	3	3	0	2	0	1							78.3	6.6%	73.3%	20 %
182 f.		3	1	6	13	10	17	26	19	21	16	16	14	6	3	4	1	2	1	3		77.5	18.1%	54.4%	27.5%

The apices of the Nieuweschans and the Bellingwolde series coincide pretty closely with that of the Old Groterps. But the apex of Folmer's Modern Groterps inclines far more to the right. This is the only series with an excess of brachycrania. Whereas the difference between the averages of the Old and Modern Fri-

[1]) n = Nieuweschansers, b = Bellingwolders, f = Frisians.

terpians is 3, the difference between the Old and Modern Groterpians on the one hand, and of the three Modern Groningen skull-series on the other, remains less than 3. Here we are a little struck by the fact that the inhabitants about the gate of ingress from Germany, whence the hypothetical brachyzating Saxon element was supposed to come, show a lower average index cranicus than the two series of living inhabitants of Groningen. This leads us to expect many new surprises if we get more skulls from our Eastern provinces.

But also when arranged according to the three groups of skull-indices, the Nieuweschans and Bellingwolders approach nearer to the Old and Middle Groterpians. The percentage of mesos has here remained almost equal. For the two series of Nieuweschans it is even below that of the Groterpian Middles. Although the dolicho element has much decreased, it is still important, whilst among Folmer's Hunsingooërs it had almost disappeared. The dolichocranic part (13.4 %) of the Modern Groningen people is less important than that of the Friterpians (18.1 %), the brachycranic part (31.1 %) is greater than in Friterpia (27.5 %), the mesocranics are equally strong in both provinces.

And yet the Groningen averages (78.4) are higher than those of the Modern Friterpians (77.5). The Nieuweschansers have higher averages than the Modern rural Friterpians; the Hunsingooërs and Bellingwolders higher than the rural Friterpians.

But the difference is much smaller than between the Old Friterpians and Groterpians. The averages of Folmer and Prof. Bolk are more in accordance with this difference.

As for Prof. Bolk's data, these require further elucidation, as we have repeatedly pointed out. They were probably obtained from selected male material, all young, well-fed men. [1]) When we consider that Folmer's males were all brachycranic except two, and the brachycrane percentage is twice as large as that of the other modern series, there is perhaps reason to suppose that the desire to demonstrate the difference between the Old and Modern crania has unconsciously influenced Folmer's selection.

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[1]) The av. in. cr. (79.9) found by Dykstra (1927) for 92 Groningen crania agrees with Bolk's figure. But it was obtained from fresh material in the dissecting room, which is not to be compared directly with churchyard material. Moreover, Dykstra substractet one unit. If two units are subtracted, his results agrees with our calculations of Bolk's data.

Subtracting 7.5 from the length, and 8 from the breadth of Prof. Bolk's data, in order to calculate the index cranicus for the Netherlands provinces, the average for the modern Groningers, according to Folmer, appears to be higher than that of the males in the most brachycranic province in Holland, viz. Noord-Brabant (80.4) In Folmer's figures the difference between males and females is 2 units, consequently, if he had only measured males, the index cranicus would have been considerably higher. This is most improbable, however.

If we keep to the old difference of two units between the index cranicus of modern Friterps and Groterps, we find for the Groterps an average of 78.9, therefore slightly higher than for Friterpia. There are reasons for presuming that these results approach nearer to reality than figures rising over 80.

In conformity with the Modern Friterp and Groningen series we may take it for granted that the brachycrania constitute a quarter of the Groterpian population. They will probably not exceed one third and certainly not half of the population [1]). The opinion of Prof. Barge (1912, p. 121) that the brachycephalic element at present forms the chief part of the Frisian people, certainly does not accord with the results of our inquiry.

The material on headform secured by Parsons (1919) in his measurements on war prisoners, is very significant. Taking this into account, and the not numerous other data which are available, it appears to Prof. Dixon, "that there is no portion of the whole area of Germany, Austria or Czecho-Slovakia in which the present population shows an average cephalic index which is dolichocephalic. The nearest approach to it occurs in Westphalia, where the index is just over 80, i.e. almost on the lower limit of brachycephaly. Hannover, Schleswig, and the Rhineland lie still nearer the limit, and all other areas are frankly brachycephalic" [2]).

Prof Dixon makes no difference between index cranicus and index cephalicus however, so his data are not immediately comparable with ours. As a result of this negligence, the greater part of his modern Germans will appear brachycranic.

Averages, however, as Dixon has pointed out many times, are of little real significance. We can only be sure from the high figure of

[1]) Dykstra's 129 crania from the environment of Groningen (in. cr. 79.9) included 48.8 % brachycranes and 7% hyperbrachycranes.

[2]) p. 110.

the average index in the whole of South Germany that there can be but a small dolichocephalic element in the population. "In the North-West, however, the lower average makes it certain that there must still be in this region a considerable dolichocephalic factor". We remember that Prof. Dixon eliminated the mesocrania. He concluded that, "Here, therefore, and here alone, do we find any considerable survival of the old Neolithic blend of dolichocephalic types, which is commonly spoken of as the "Nordic race"."

The results of our inquiry are in accordance with the last assertion of Prof. Dixon. The number of mesocranes will be about one half of the population of Friterpia, and the dolichocranes will certainly not exceed one quarter [1]). But it is only with the last element, as purely Nordic, that most anthropographers are reckoning, though the mesocrania always formed a considerable element of the Nordic series.

The problem whether the mesocrania are Nordic or not, is however of much importance. We believe it impossible to consider them as a cross between dolichos and brachys as Dixon and Scheidt do. The old Anthropographers looked too much at the latter type. But the mesocrania deserve our attention far more. In case of a negative answer to this question, a large portion of the inhabitants of Germany and the Low Countries at the beginning of our era cannot be classed as Nordic, and the Nordic population of N. W. Europe must have been limited. As long as no definite judgment has been formed, we are obliged to regard the mesocrania as Nordic, although we feel there are many objections against it.

The head length of adult Norwegian males is, according to Halfdan Bryn (1926), 191 mm. and the greatest breadth 148 mm. If we deduct from these figures 7.5 and 8 mm. respectively, we come to an index cranicus of 76.3. Race-mixture is so slight here that Bryn says that the Nordic race is found pure and unadulterated throughout a number of districts. According to Alette Schreiner (1924) the head length of the females is 184.8 mm.; and the head-breadth 149.3 mm. Deducting 7.5 mm. for thickness of skin and tissue, we come to an index cranicus of 79.9 for the Norwegian females. So the mesocranic portion of the Norwegian females must be considerable; that of the male population

[1]) In order not to pretend to a measure of accuracy which is so rarely obtained in anthropographic science, we do not express the proportions in percentages.

must also be of some importance, though the averages don't give much information on the subject.

Therefore, according to the latest data, the index cranicus of the Norwegians may be fixed at 78.1, which is slightly higher than that of the Friterpians, and probably slightly lower than of the Groterpians.

As Norway forms one of the most Northern parts of the North West division of Europe, it follows again, that in headform at least, the Friterpians certainly, and the Groterpians most likely, are no exception to their Nordic anthropographic sphere, which tallies with the conviction that has induced us to make this investigation.

Will Groterpia retain its Nordic aspect? This is a question that is difficult to answer. From the frequency curves, there appears to have been a notable rapid increase of the brachycrane element since the Middle Ages; and this is accompanied by the slow disappearance of the dolichocrane element.

IV. COMPARISON

In conclusion, let us investigate the relation between the other parts of the Low Countries and both halves of Terpia with respect to headform, pigmentation and bodily height, as far as Prof. Bolk 's data will allow.

According to the altered skull indices that we have adopted, Groningen forms with Drenthe (ind. cran. 80) and Overysel (ind. cran. 80.4) a group of provinces with a male population having an index cranicus of 80 and over.

Friesland forms a group with the likewise Holocene province of North-Holland and the partly Holocene Utrecht and Guelderland, where the index cranicus comes to 79—80. The index cranicus of Limburg and Zeeland is also below 80. South-Holland has a lower index than the preceeding group (ind. cran. 78.5) although this province may be classed in one group with North-Holland, Utrecht and Guelderland.

In greatest height of stature, according to Prof. BOLK's figures obtained from conscripts of 1898—1907, Groningen comes nearer to Friesland with 48.4 % over 170 cm. than Drenthe (35.73 %) and Overysel (40.68 % over 170 cm.). The greatest bodily height

is however a measure that is exceptionally subject to all kinds of factors, such as difference in social welfare and pathological influences. Now, in this matter, the agreement between Groningen

and Friesland is as great as the conditions of life in the Dollart Polders differ from those in Drenthe and Overijsel.

Therefore it is the more remarkable that the dark ribbon, which in Bolk's Körperlänge (1911) indicates the 5 % rejections for the conscription on account of insufficient height (< 155 cm.), extends across the Pleistocene of North-Brabant, Overijsel and

Drenthe to Groningen, where it follows the Western Frontier (Map p. 236). On the other hand, Friterpia is left almost entirely untouched like the Pleistocene in the Veluwe and the unfertile parts of Guelderland and Utrecht. If it were only a consequence of economical environment, the people in the Veluwe would show many undersized individuals, and Groningen only a few. This large number of undersized in a fertile district is certainly of no less importance as a racial mark, than the number of the oversized, upon which hybridization i.a. has a strong influence.But we must not forget that a large number of these small people are pathological (Enklaar; 1912). These minimum figures are the more remarkable because, as early as 1857, Dr. J Zeeman, who possessed a wide knowledge of local circumstances, drew attention to this large number of undersized men in the Western quarter of the province of Groningen.

In this connection, he wrote of the community of Oldekerk: "The inhabitants who were all inspected, not during a period of a few years, but for a quarter of a century, proved to be undersized for a third part of their number and more." Bodily defects appeared to be very rare. Dr. Zeeman jocularly remarked on the many little fellows in the villages called *Grootegast*, and *Lutjegast* (Greatfellow, and Littlefellow). So we see that we are not concerned with a merely temporary phenomon, but with an important sign of racial difference which has been known for a long time. This element of short stature again calls attention to the racial conformity between the three Northern Provinces, and directs our attention to the Terra Incognita of our Scandinavian Pleistocene.

As regards the Pigmentation of the Northern Provinces, we have at our disposal only the brown-eyes chart of Prof. Bolk (1908) .Although we agree in a general way with the objections proposed by De Wilde (1911) against Prof. Bolk's inquiry among schoolchildren, yet we consider his results valuable for determining racial differences. But the contrasts are not so great as Prof. Bolk supposed. De Wilde reduced them to one third of the number stated by the former statistician.

From this chart it is clear that there is a difference between the Friterpians with a maximum of 10 % brown-eyes, and the Groterpians with 15—20 %. This latter figure conforms again to South Groningen and North Drenthe. Yet it is remarkable that

the pigmentation line exactly follows the Eastern border of the Terp region. In Frisia the pigmentation zones run North-South, parallel with Friterpia; in Groterpia East-West, but much more independent of the Terp country. Westergoo shows less pigmentation than the N. E. part of Friterpia, which agrees with the higher index cranicus and the more mixed character of the Old population of East Friterpia. The allochthonous enclave of Het Bildt is also clearly set down as more pigmented. In Groterpia the only connection between the Terp region and the pigmentation line is observable on the North Western shore of Groterpia. The newly reclaimed polderlands are inhabited by a population of low pigmentation (< 10 %). But it does not follow that they are derived from the fair people of Friterpia, though we suppose there was some Friterpian influence in our Mediaeval Hunsingooërs.

It is just as likely that the more Nordic and most enterprising elements of the Groterpians may have settled on the new lands of North East Fivelgoo and the Dollart Polders, as the Friterpians have done in the new polders South of the Lauwers Sea. Perhaps there were more aboriginal settlers, from the Pleistocene, who tinted the new comers, just as in the old marshes.

Along the Eastern frontiers of Overysel, Drenthe and Groningen there runs North South a more highly pigmented district, extending as far as the border of Groterpia. But in North Drenthe and Groningen the pigmentation zones run East-West. A. Folmer, J. Sasse and Gallée also considered that part of the Drenthians show more pigmentation. The darker region along the frontier is interrupted in the middle by a thinly populated tract which is said to be fairer.

It is a fact that the agreement in pigmentation between Groterpia and the remainder of the three Northern Provinces, seems to be greater than that of Friterpia with the rest of Friesland. Here we may see at the present day a state of affairs that perhaps has its roots far in the distant past. Evidence of this is, among other things, the row of Terps that connect the Pleistocene near the present capital with Hunsingoo; and to which we shall call further attention.

Although this rapid survey is merely an indication of the direction in which future investigation of the population of the Netherlands will have to be carried out, we considered it our duty to conclude this chapter with it.

CHAPTER V

GENERAL CONCLUSIONS AND PROBLEMS

In a young science like Anthropology there are still many things that have not yet reached maturity. Much of what has been attained bears an exceptionally premature character, while there are still wide gaps waiting to be bridged over. Consequently any one who seriously applies himself to this study, cannot but experience a continual desire to criticize, though at the same time he finds much to appreciate.

After going over almost the whole field of the investigation performed by Dutch Anthropologists,[1]) we have attempted to set down in this paper the results of our inquiry, and thereby to draw special attention to the lack of clearly defined problems, the want of system, and the neglect of inductive method, during the three periods into which we have divided the history of Anthropology in Holland. We have called these periods respectively the age of *The Collectors*, *The Workers* and *The Interpreters*.In each of these periods we have come upon many errors resulting from the want of systematic inquiry. So we were able to demonstrate that Prof. Bolk's figures, which are at present generally accepted as the most reliable on the index cranicus of the population of the Netherlands, are in all probability too high. In consequence of the interest of older Anthropographers for the brachycranes (short skulls), who were discovered in the middle of last century, his figures lean too much towards the side of the Alpine type. The mesocranes (middle skulls) were generally neglected.

During the last half-century too much stress has been laid on the brachycrane element in Holland, to the neglect of the mesocrane element.

[1]) In this section we give only the more important conclusions in a form intelligible also to the non-expert. For further details we refer to the different chapters.

To our regret we felt ourselves obliged to devote our introductory remarks partly to criticism of the results hitherto obtained. Therefore we have attempted in a close study of a small portion of the Dutch People to set forth the grounds of our objections, and to show how, by starting on a new basis, other and perhaps better results may be obtained regarding the origin and growth of our nation. For this purpose we selected the population of the Terp-region because these districts have been more accurately studied than any other part of Holland and, moreover, they form a subject of interest to foreign scientists.

With a view to the International Anthropological Congress that is to be held in Amsterdam in the ensuing summer, and which will include a visit to the Terp-region, there is a special demand for a monograph on the subject.

In the first chapter we present a survey of what has been brought to light by other investigators, especially from a geomorphological, archaeological and biological standpoint.

Research work on the Terps has up to the present day been extremely unsatisfactory and one-sided. Until 1910 there was no proper control of the levelling of the Terps. Not until the diggings had been going on for several decades, was any particular attention paid to these operations by scientists; but only of late years has the conviction arisen that Anthropologists and Biologists should coöperate with Geomorphologists and Archaeologists in this inquiry. Yet, from the idea to the practical effect, it is often a far cry.

The archaeologist, Maitre P. C. J. A. Boeles has left his mark upon the work in Friesland. Valuable as his achievements in his own sphere are, it is the more to be regretted that in this extremely important part of the Terp-region the other branches of the research work, and more particularly the highly important anthropological part, have been neglected by the Dutch scientists. As an instance, we may mention the collections in the Frisian Museum at Leeuwarden. All the show-cases are filled with specimens of old earthenware; but, as I found on my last visit, the bones of the makers of all this pottery, the ancient Friterpians, one of the most interesting peoples in the world, have been relegated to the lofts. There they lie forgotten; and it will require years of labour to make good this neglect. When Science has freed herself from the trammels of written history and reverence for the Classics, our

elder brothers, — and, thanks to the rapid development of Pre- and Proto-history, that time is much nearer at hand than is supposed in slow-going Holland — the Dutch people will be ashamed of the vandalism with which the remains of our Oldest inhabitants are treated in our Northern provinces.

In Groningen the situation is much more favourable. There F o l m e r did much good work in the eighties, also on the Anthropography of Frisia, and there lies the chief sphere of action of the biologist V a n G i f f e n, who has achieved almost more in the way of biology, archaeology and geomorphology than is to be expected from a single worker. As however Dr. V a n G i f f e n's operations extend through all the Northern provinces — and the archaeological investigation of the Terps and Hunnebedden [1]) alone exceeds the powers of one scientist — the anthropological part of the inquiry has been neglected for almost half a century. All the Terps are one after another being sacrificed to the demand for the fertilization of the newly cultivated grounds of the old peat-diggings. The moment is approaching when they will have become a matter of history, and we must repeat that the investigation of the Terps is still unsatisfactory and extremely one-sided.

All the Terps in the Netherlands were probably built upon a substratum of recent sea-clay, though some have a base of peat and some of the East Frisia Terps, as D o d o W i l d v a n g showed, are built upon a fluvial substratum. Consequently their origin dates from the latter part of our present geological period, the Holocene. The construction of the Terps only became necessary when, in consequence of a positive change of level after the beginning of our era, the sea encroached ever further upon the Holocene; and the construction has been no less influenced by the want of fresh water. Probably the Terps began as settlements upon the higher parts of the marine clay (kwelder) [2]). As the inlets between the dunes widened, and the sea flooded the flats more and more, the Terps were raised higher. As however the ground level around them rose through silting, the Terp-sole sank considerably lower than the foot of the mound.

Van B e m m e l e n divided the history of their construction into

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[1]) Megalithic monuments.

[2]) Dodo Wildvang (1926) supposes that it has been upon the peat near the sandy grounds.

four phases. The last phase coincided with the time when dykes came into use, so that the three earlier phases are of greater importance. About the first, that of the fishermen, but little is known with certainty. It was succeeded by the phase of the cattle-breeders, and the phase of agriculture. According to Holwerda, there was still a close connection between the Terps and the Pleistocene before the period of the cattle-farms. There the Terpmen hunted, and perhaps they also buried their dead there, just as the Batavians did on the hills skirting the Veluwe. Perhaps, they also spent the winter season there, when high tides rendered life on the Terps more or less dangerous. The earthenware in the oldest Terps, and also van Giffen's finds in the graves at Godlinze, probably bears this out.

The Terp-row (Wetzinge, Valcum, a.o.) running from the Terp-district of Hunsingoo to the Pleistocene near the present capital — and perhaps also another possible connection from Fivelgoo to the North end of the Hondsrug (via Wittewierum) — point to a close connection of the Terp centre of Hunsingoo with the sandy grounds. It is true that in laying the drain-system in Groningen recently, no antiquities were found older than the early Middle Ages, but this is of no great consequence. The first named Terps are too evidently built in a direct row stretching from the Pleistocene, not to indicate that intercourse existed between them. In all probability archaeological finds will prove this in future [1]). Though the waterways that run from the Pleistocene at the end of the Hondsrug throughout Groterpia in all directions, are partly of recent construction along old riverbeds, for drinking and commercial purposes, they make it probably that a close connection existed between the Pleistocene and the Terps. Van Giffen found Saxon pottery already along riverbeds running from the Pleistocene. This connection would have had a strong influence upon the two populations. Van Giffen's excavations at Peeloo (Drenthe) (1925) already prove similarity of culture with the Terps.

But there was no such close alliance between Friterpia and the Pleistocene. The only small river that made it at all possible, was the Boorn [2]). As the Frisian Pleistocene was afterwards for the grea-

[1]) The row along the Damsterdiep is interrupted; but it is not impossible that some more dwelling-places have been silted over, and escaped detection through want of height.

[2]) The Middelzee was perhaps the estuary of the Boorn, perhaps also of the IJsel.

er part covered with peat, it did not offer the same attractions as the Hondsrug, which was populated long before Terpia was. At the same time the Hondsrug was the best road to the South. From the Frisian Pleistocene it was a long way to this road. Although, therefore, in Friesland a connection between the Terp-region and the Pleistocene cannot be so clearly indicated, yet traces of it can perhaps be seen in the succession of villages with names ending in "terp": Ureterp, Olterterp and Wynjeterp [1]) on the upper reaches of the Boorn and the lower edge of the Pleistocene. Not far from the lower stream of the Boorn lies Lekkerterp half-way to Westergoo, which possibly points to a connection between the ancient centre of culture and the sandy ground. Parallel to the Boorn, in fact, there is still an important road, and in the vicinity are the peat patches (pontes longi) of Drachten, Fochteloo and Appelscha. As roads have a very tough existence, and often go back far into the past, this may perhaps be taken as another proof of connection, as also the roads running from the town of Groningen through Groterpia.

The connection between the Terps and the Pleistocene probably is an important factor.

In the third and last phase of the Terp-building the Terpers were farmers. At that time they probably lived on the Terps all the year round. Now the Terps were raised considerably by means of earth, and not manure as in the preceding period. This strengthens the presumption of agriculture, as the manure was probably used on the fields. These farmers required a larger number of labourers, who were naturally more accustomed to spade-work than the cowherds of the former period.

In the fourth, and last phase, villages were built on the Terps. This has been the salvation of many, and probably in a short time only those parts of the Terps that are built over, will remain to remind us of the past.

In connection with the construction of the Terps, and the geomorphology of the surrounding strata, it is possible to determine, with fair certainty, the age of certain parts, by means of the ergologica (hand-made implements). Therefore accurate Terp-pro-

[1]) Mr. Boeles and Schuiling are of opinion that this „terp" means simply „dorp" (village) and does not signify a mound; if this is true, the fact that outside the Terp-land this suffix is only used on both sides of the Boorn indicates perhaps a closer relation with the Terp-country.

files are of the greatest importance. If these are made of every Terp, it will still be possible to study them, even after they have been levelled. Careful attention should be paid to the human remains, and the places where they have been found should be accurately marked on the profile as an important help to accurate definition; especially so if all the ergological finds are also marked. This would render it possible to find a connection which might escape one's notice in a single visit paid ot the finding-place. Where all the data are wanting, later study of the human remains alone would be of little value, as the history of the Terps covers too long a period for all the skulls found to be simply classed as Terpskulls.

It is a great pity that the careful collection of such data has been so much neglected in consequence of insufficient control and the resulting risk of the finds getting mixed up. This is the more likely to happen as neither the depth alone, nor the nature of the strata, forms a reliable guide to their age. The investigation of the Terps being so difficult, and leading to such great surprises, and the number of investigators being so small, the work far exceeds the powers available. No wonder then that the standard of the requirements has been lowered, much as it is to be regretted. The lack of interest shown by Anthropologists and the whole Dutch nation in these relics of their ancestors, has led to less attention being paid to this part of the digging-operations than it deserves.

A quantity of material has been brought to light from various Terps, e.g. from the probably Saxon grave-field at Godlinze, dating from Merovingian-Carolingian times, which is of great importance for the Anthropography of Terpia. Moreover the date of the latter Terp has been determined with fair certainty, which renders comparison with the grave-field at Looveen in Drenthe, which is perhaps Saxon also, and others in Terpia dating from the same period, more valuable. As both at Godlinze and at Looveen cremation and earth-burial were found side by side, the question arises whether this is the result of mixed immigration, just as in England, where the Saxons mostly practised earth-burial, and the Angles cremation. Many other problems might also be taken in hand, such as whether these Saxons brought in the broader Groterp skulls as Prof. B o l k supposed. But the material will probably not be treated for a considerable time; and in the meanwhile

it will probably be exposed to accidental circumstances by which its value is generally diminished and but seldom enhanced.

By studying the condition of the adhering mould, and the physical state of the bones, in the laboratory, it is also possible, to a certain extent, to form an opinion about the age of the skeleton-parts. But this should certainly not to be relied on. The more data are supplied by the allied sciences in support of the inquiry, the better will be the result. Especially where the number of specimens is as small as that of available skulls from the deeper Terp-strata, anthropometric investigation in the laboratory alone is of little value for the purpose of Anthropography.

Anthropography is based on a close connection between the objects of inquiry, and the groups of population represented by the specimens studied. If we do not keep this connection clearly in view, it may possibly prove to be merely illusory. This has repeatedly happened where skulls from the monasteries have been mistaken for skulls of the local population. Nothwithstanding that earlier Anthropographers were continually asking themselves whether certain crania might not be derived from the Northmen, the monastic skulls were accepted without question.

Therefore the Anthropographer should in the first place inquire whether his material be autochthonic or allochthonic. As long as this point is not certainly decided, his researches are pretty well valueless.

For anthropographical investigation, only autochthonic material is of value.

The only Anthropographer, whose investigation of the Terps was based on personal inquiry, and from whom we have more guarantee for the autochthony of his material, was Dr. Arend Folmer, whose works appeared between 1881 and 1892. Up to this day his example has found no imitators, greatly to the disavantage of our knowledge of the population of the Northern provinces of the Netherlands.

It is true that, apart from this, there has been some investigation in the laboratories, but the results are not such as to make up for the neglect of a matter of such national concern. On this account Folmer's inquiry acquires increased importance, and we have treated it to amore exhaustive discussion. In this we have critisized his work from a one-sided point of view, because we have mostly

confined our attention, as he principally did himself, to the index cranicus, a matter which, by modern investigators, is not considered of so much importance as it was formerly.

Folmer's knowledge of Terp-construction cannot have been very complete, as his books date from a time when the matter had not been properly taken in hand. He was not only guided in his research by the burial gifts and the nature of the earth-layers, e. g. by the green Terp-material, but also by various other considerations, such as the type of the skulls. This was however a dangerous experiment, among other things, because he chiefly relied on the results of Virchow and others, instead of on his own unbiassed opinion in comparing the various Terp-types, after carefully determining the periods.

Although we cannot always agree with his opinion as to the age of a relic, on the whole, the accuracy of his conclusions deserves great praise and is generally to be relied upon. Folmer divided his Terp-material, both stratographic and historical, into two groups:

a. skulls from the deeper, or from the upper strata.

b. skulls from ancient times, or from the Middle Ages.

Although there is not a perfect agreement between the two systems, Folmer's Classification is practical and satisfactory, especially as regards his Groningen skulls, which were partly dug up under his personal control. As for the Frisian skulls, these we are less confident about. We have carefully sorted them out and eliminated the very doubtful ones; but we could not be too particular, on account of the very limited number of the crania.

Folmer believed in the possibility of deformation through the influence of the soil, but he has produced no example of this. He was intensely interested in the problem of „brachyzation" [1]), and this has guided his inquiry perhaps more then was useful. He thought he had solved the question for the Frisian skulls, but his research was not critical enough, in fact the phenomenon seemed to be of such common occurrence that for many a scientist it had become an axiom.

Where we now ask the question: Is brachyzation the result of a change in environment, or of selective action, or of immi-

[1]) We use the term "brachyzation" for the shortening of the skull, in order to avoid a long explanation.

gration? Folmer thought only of environmental change. In this respect he was still more or less obsessed byVirchow's idea that the Frisians had continued unchanged for two millennia.

After studying only two dolichocrania ,Folmer concluded that there existed an agreement with the Rowgrave type of the Middle Rhine. And yet this was a conclusion of great importance. In 1874 Sasse had indeed pointed out the greater length of his Terpskulls, but he had chiefly centred his attention on a comparison with the brachycranic Zeelanders. Virchow (1877) had called the Frisians short-headed, and it was certainly an important fact that Folmer, who was only a beginner, at once observed the agreement with the Nordici. In his other conclusions he was less fortunate, as when he considered that the Frisian headform had undergone no change of any importance during the last four centuries. His opinion also that the Terp-dwellers on either side of the Lauwers resembled the Franks and Alamanni was ill-founded, but agreed with Virchow's opinion that the Groningen crania did not differ from the Frisians.

Folmer paid little attention to the interesting brachycrania of Enum (80.7) and Heidenschap (84.1) [1]. Folmer's second study (1883) was especially important on account of the measurements of 30 Hunsingooers, taken intra vitam, whereby he tried to confirm his opinion that the present population have a considerably higher skull-index. In the same work he published particulars of his most important group of Mediaeval skulls. In both of his studies Folmer expressed his opinion that his skulls were not low enough to justify a connection with the Neanderthaler or Batavus Genuinus.

Another important study was published by Folmer in 1887. In this work he classified his material in the same way as Kollmann has done, viz.

1. Leptoprosope dolichocephalic (long face-long head),
2. Chamaeprosope dolichocephalic (short face-long head),
3. Leptoprosope mesocephalic (long face-medium head),
4. Chamaeprosope mesocephalic (short face-medium head).
5. Leptoprosope brachycephalic (long face-short head),

[1]) A. Sasse at once saw in them remains of a proto-population, whilst H. C. Folmer thought the former might be the skull of a young Roman, not considering that the Mediterraneans were for the greater part pronouncedly dolichocranic.

6. Chamaeprosope brachycephalic (short face-short head).

The leptoprosope dolicho-mesocephalic group was by far the most important, but the number of the brachycephalic groups was small.

In his later works Folmer became more careless with his dates. In 1887 he brought forward Mediaeval allochthonic material, on which he based the conclusion that a more brachycranic people had appeared in the Middle Ages. In connection with his Hunsingoo heads and Leeuwarden skulls he decided that the Modern heads are shorter, broader and lower than the older ones. He thought the low heads were not inherited from the original inhabitants, but he had overlooked the Old low skulls. In this case he was again guided too much by the averages.

In 1890 Folmer increased his skull material with 38 new specimens, and so rendered his collection the most important in literature. He also extended his modern Leeuwarden material. That he still thought of two races, is proved by his remarking that skeletons lying beside weapons of Germanic style were dolichocranic and high, with strongly developed brow-ridges and a protruding occiput.

Wherever other attributes were found, such as the coins at Enum, the type was different also. But the skeletons with ergologica of the latter sort, were too few in number to render the difference of much importance.

Folmer's conclusions are, for the most part, extremely doubtful. *The great value of his investigations rests especially upon the measurements of Ancient and Mediaeval skulls, which are unsurpassed in number, extensiveness and accuracy of dating.*

Prof. Bolk gave in Prof. Gallée's work "Het Boerenhuis" (The Farmhouse) 1908 a number of particulars about some Terp-skulls that he had studied and the greater number of which were preserved in the Frisian Museum. No datalia [1]) were known about these skulls, nor did Prof. Bolk give any particulars in connection with the physical characteristics. Part of this collection is, moreover, almost certainly allochthonic (Anjum Monastery). Generally speaking, a Museum is not the place where an extensive collection of skulls may be studied with accuracy; and, in fact, Prof.

[1]) Particulars enabling chronological dates to be determined, such as ergologica and minerals.

Bolk had to content himself with taking a few measures only. Of these we learn from "Het Boerenhuis" nothing but the number and the index cranicus, as the frequency curve is incorrectly drawn. Prof. Barge published a few more particulars in 1912, though not of every skull separately, so that we cannot determine the value of the few individual figures. Consequently, these measurements have been of but little use to us. The value is diminished by incomplete publication.

In 1908 already, Prof. Bolk noticed the uniformity of the Frisian crania, and in connection with the relatively slight variation in the values of the index, he considered the Frisians to be a people of fairly pure race.

Three brachycrania led Prof. Bolk to presume that there had been earlier Keltic inhabitants of the Terp-region, and he also sought a connection with the Zeelanders. He supposed the South of our country to have been inhabited by a brachycranic people as early as the commencement of our era, but Holwerda had already pointed out that the proof of this is wanting.

A valuable book on the Terp-dwellers has been published by Prof. Barge in 1912. This investigator had attempted to increase the knowledge of this ancient part of our people by accurate study of the literature and of the skull-groups at his disposal, in connection with the newest anthropometrical technical methods.

Like the older Anthropographers, however, this scientist was not always equally critical with respect to his material. In the first place, he did not assure himself of its being autochthonic; and as convents had once stood on the spot that formed his chief finding places of the skulls, there is every probability that a a deal of the Mediaevals are allochthonic.

The number of skulls, measured by Prof. Barge himself, was not considerable, in comparison with the number that he has made use of from the literature. But even as regards these he was not critical, and compared skulls of different periods. Nor can we agree with his accepting Folmer's conclusion, that the index cranicus has grown higher in course of time, so entirely that he made use of it to calculate the age of the crania without paying any attention to datalia. Without question, he also accepted the supposed similarity between Frisian and Groningen crania. As Professor Barge's inquiry has been conducted in many things contrary

to our view of the principles and demands that an Anthropographer should set himself, we regret to say that we have been unable to make so much use of his extensive investigation and results as we should like to have done.

With regard to the Modern Friterpians, inquiries have been far more numerous. J. van der Hoeven. J. B. Davis, Lubach, Spengel, A. Sasse, R. Virchow, A. Folmer, J. Sasse, have all published more or less valuable studies on the subject.

Virchow's investigations were of very special importance because they aroused a desire in the scientists of Holland, in spite of national indifference, to inquire into the racial composition of the Dutch People. Still, it is remarkable that Virchow succeeded in arriving at weighty conclusions with the help of his small and often unreliable material; e.g. the exceptionally low type of the Frisian skull.

A. Sasse was unfortunate in his treatise of 1874, as a little while after, his material was shown by Virchow to have been allochthonic. Of far greater value were his measurements in 1877 of Modern West-Frisian skulls (18 specimens; mean ind. cran 76.9) in which the low type was also very pronounced, whilst his investigations of skulls from Leeuwarden and Sneek are also of importance.

A. Folmer examined some thirty Hunsingooërs and 36 Leeuwarden skulls.

With Prof. Bolk's inquiry a new epoch began in the history of the Anthropography of Holland, whereby the accurate study of crania was more neglected, as was the case abroad, and the statistical side, sepecially in connection with the investigation of living men, came to the fore. No doubt a chief cause of this change of method was the disappointment at the negative results of anthropological research in the past century, which was openly avowed by Virchow at the Anthropological Congress of Lindau, and later by Czekanowski (1925) and Jens Paulsen (1927). Although this increased interest in living human beings is certainly most praiseworthy, we must not lose sight of the fact that many details were again forgotten, and that the technical difficulties inherent in inquiry intra vitam, necessitate a resort to dead material.

Other important points in Bolk's work are his communications

about pigmentation and the head index. Most valuable for the purpose of our inquiry is his hypothesis about the brachyzation of the inhabitants of our Northern provinces, in which he based his argument on the differences of pigmentation, and the shape of the skull.

Most important are his observations showing that the index cephalicus in Holland increases in an Easterly direction.

We must point out a regrettable defect in Prof. Bolk's publication of 1920 on the Head Index of the Hollanders, namely that he has neglected to take account of the difference between the skull- and the headindex. In consequence of this, the average index cranicus for 10 out of 11 provinces would surpass the limit of brachycephaly, and too much stress would be laid upon the Alpine portion of the nation. Generally speaking, the value of averages is not great, but when calculated for such heterogeneous groups as whole provinces and states, they are of small account.

In our discussion of this subject we arrived at the following conclusion:

The figures given by Prof. Bolk regarding the brachycranic portion of our population are too high.

In 1924 Prof. Bolk ascribed a considerable share in the building up of the Dutch nation to the Frankish and Saxon elements. Neither of these terms are of much importance to anthropological science, and may be left out of consideration as determining factors in the composition of a race. And besides, such mass-invasions of Franks and Saxons are in a great measure hypothetical, and should be treated with as much reserve as geological details in explaining the dispersal of these immigrants.

Contrary to Prof. Bolk's opinion, who looked upon the Saxons as blond Alpines, we must point out that, also in conformity with this inquirer's statements on the index cephalicus, the present-day inhabitants of our North-east provinces cannot be designated as Alpines, notwithstanding their breadth index is probably somewhat higher than that of the coastal provinces. Of the only known skull-groups in the Saxon region, those of Zutphen (5 spec. ind. cran. 77.9), Eibergen (7 spec. ind. cran. 80.8) and Bellingwolde (10 spec. ind. cran. 78.45) only the second set slightly exceeds the limit of 80. Among these 22 skulls there are only two, with an ind. cran. of 83.6, which might possibly be classed as

Alpine on account of the head-form. Moreover, the sets are far too small to justify any conclusion being drawn from them as to the population of the greater part of our Pleistocene. No skull-measurements have been published for ancient Saxons in Holland, but they are not likely to be brachycrania, judging from the skull form of Anglo-Saxons in Britain, and of the probably Saxon finds at Godlinze and other graveyards in Terpia.

Prof. Bolk's opinion that the Saxons were blond Alpines, and therefore must be considered as the brachycephalizing element, requires further confirmation.

The American Anthropologist R. Dixon (1922) gives certain particulars about the Frisians. In order to avoid the paralyzing influence of the averages, he invented a system of formulae that has great drawbacks. Nor did he arrive at any new conclusion about the Frisian people. We discovered in his book a few decidedly incorrect statements; as where he says that South-and North-Holland are inhabited by a brunet, strongly brachycephalic people.

The fact that most of our scientists publish their results in Dutch, is doubtless to a great extent the reason why foreigners are so ill-informed about Holland. Prof. Pittard's discussion (1925) is not wholly free from this want of correct information. He still seeks a connection between the old "Celts" in the south of our country and the Zealand "towns" that have been overwhelmed by the sea in recent times, and he represents the Zealanders as perched on the Terps and struggling against the waves.

The study of Dutch Anthropography is hampered because the results of research work are so seldom published in one of the world-languages.

Dr. Van Giffen, in his treatise on the Oldest inhabitants of our country (1925), once again draws special attention to the contrast between our knowledge of the inhabitants of the Western clay and peatbog, and the sandy ground of the East. Dr. van Giffen also compared the results of the palae-ethnological investigations of Holwerda with those of Prof. Bolk, and found the latter but seldom confirmed. If we remember that there is still very little connection between the investigation on living and dead material, it is no wonder that there is no alliance between Anthropography and Palae-anthropography.

The connection between Anthropography and Palae-anthropography is generally lacking in Holland.

As there is generally so great a lack of cooperation, we rejoice that a closer tie has been formed with one of our younger branches of science by Dr. M. Van Herwerden in her book on Eugenics (1926). We feel convinced that in the near future this science will bring about an entire change in the general view of life and arouse an interest for anthropologic studies in wider circles.

Without a knowledge of races, there can be little "gaudium bene nati"; and without more intense anthropological research, a true insight into the problems of eugenics is pretty well non-existent [1]).

THE TERP-REGION

The Terp-region consists of the young marine clay-lands extending along the Zuyder Sea and the Wadden shallows from Workum in Friesland to Termunten in Groningen. It is only interrupted by the region of the Old Middle Sea, Lauwers Bay and Fivel Bay. We have divided it into two halves: Friterpia on the West side of Lauwers Sea, and Groterpia on the East side; but we might more properly divide these again into four quarters, separated by the Middle Sea and Fivel Bay.

For the purpose of prosecuting our inquiries into the anthropological characteristics of the Terp population, we have at our disposal the measurements taken on 293 skulls and 768 living persons in Friterpia, and on 175 skulls and 320 living persons in Groterpia. However, only a small portion of this material has been exhaustively investigated.

The first problem awaiting solution was: Is the whole of Terpia inhabited by people of one uniform race? In order to simplify the question we formulated it as follows: Is the population on both sides of the Lauwers of the same race?

For this purpose we have compared the data for the two halves, and also those of the ancient skulls, with the data given by J. Sasse (1912) of the Merovingians at Katwijk. In this inquiry we applied a much more extensive method than the older Anthropographers, who relied chiefly on the mean of relative dimensions and indices. Among other things we carefully studied the absolute dimensions, as being of great value (Czekanowski 1925). These

[1]) The skeletons of the Zeeland towns that have been overwhelmed by the sea were not „washed up to the mother country" p. 104, but dug up from the sea-bottom.

we also compared mutually, as well as with the index figures and absolute figures; then we tested the results obtained by comparison with some of the correlations, and finally rested our conclusions on strongly marked differences only.

By studying the absolute figures of the splanchnocranium, we came to the conclusion that the ancient Friterpians had a longer and lower skull than their neighbours on the East side of the Lauwerszee. The difference in the length was especially conspicuous; Friterpians surpassing in this matter even the modern Norwegians, who are generally considered, at least in part, as the purest representatives of the Nordic race.

As far as the facial part is concerned, the Frisian and Groningen Terpdwellers differed no less, though, in consequence of imperfect material and technical difficulties, this was not so easy to demonstrate. The height of the entire face, and of the face without the lower jaw, was greater for the Friterpians; and the cheekbones were considerably broader. But also in the case of the malar breadth — the distance of the two zygomaxilar points — the length of the palate and in the width of the facial angles, the Friterpians exceeded their neighbours. As all theFriterpian skulls are larger than the Groterpians, we must presume this to be the explanation of the above differences. Yet, when we reduce the figures to Standard Skull the difference remains. Consequently there is both relatively and absolutely a difference between the heads of the two Terp-peoples. The breadth-variation proved to be greater with the Groterpians, which points to greater mixture. The sex-difference was also more pronounced than for the Friterpians.

The absolute Dimensions show important differences between the two Terp-peoples.

As regards Schmidt's relative dimensions, the difference between the two groups was considerable for the length figures, small for the breadth, and rather large for the height.

In connection with the relative dimensions, we follow the classification of Schmidt and Eykman in order to determine the frequency of typical Nordic skulls among the Terpians (long or super-long and narrow). The high Row-grave type of the East Germans, which claimed so much attention from the older Anthropographers, was also found in a pure type in the Terps, as appears

from the Beetgum skull 35. But in our anthropographical sphere a longer and lower type is much more numerous, especially among the Friterpians; more than a quarter being very long (E y k m a n's class 6). Moreover, many of these skulls are still narrower, and exhibit the Nordic type so strongly that we placed them as a sub-type beside the Row-grave type. Of the Friterpians, 65 % belong generally to the Nordic type, but only 39.1 % of the 23 Groterpians, because almost half of the Groterpians are too broad to fall under this class. The remaining crania were of mixed types, though they approached much nearer to the skull of Homo Nordicus than Homo Alpinus, which latter type was not found among the Groterpians at all.

Only a small number of these Nordici were Row-grave skulls. Whereas of the Merovingians of Katwijk only 13.2 % belonged to the Row-grave type, we find 20 % among the Friterpians, and 34 % among the Groterpians. The latter figure is still below that of the Bremen skulls of Gildemeister, which gave 38.6 % of Row-graves. The considerably higher percentage of Row-grave skulls among the Groterpians, as also among the „Saxon" Bremen skulls, perhaps indicates closer contact with the Baltic peoples. We have called the very long, narrow, low sub-type *"The Friterp type"* because almost half of the Friterpians belong to it, against only 20 % of the Groterpians. The long face preponderates among the Nordici, and especially among the Friterpians, where there existed a remarkable agreement between the proportion of Nordic leptoprosopic and dolichocranic.

The Nordic type was much more strongly represented among the Friterpians than among the Groterpians. The former generally presented the low Friterpian sub-type, and among the latter the Row-grave type was more pronounced.

The average *breadth*: *length-index* showed the Friterpians to be dolichocranic, and the Groterpians mesocranic. Whereas the Friterpians were mostly long-headed, the majority of the Groterpians were meso- and brachycranic like the majority of North West Europeans. So the Friterpians made an exception to the rule.

If possible, the difference is still more apparant in the *height*: *length-index*. The Friterpians were mostly chamaecranic (low skulled) and the Groterpians for the most part orthocranic (me-

dium). In this the Friterpians form an exception to the majority of mankind, who are generally orthocranic or hypsicranic (high-skulled). Consequently it is one of their most typical characteristics, which, as we have seen, has given rise to all kinds of speculations.

In the *height: breadth-index* the difference was far less noticeable. The facial indices also show the difference much less clearly than the absolute measures, from which they have been calculated. Both the facial height and the zygomatical breadth of the Friterpians giving higher figures, these indices showed but little difference. There was a decided difference in the nose-index; and the lower palatal index agreed with the longer heads of the Friterpians. According to Broca's classification the Friterpians were mesorrhine and the Groterpians leptorrhine. But the smaller facial indices are subject to disturbing influences. The variation and the sex difference was much greater with the Groterpians.

The Friterpians were found to be dolichocranic and chamaecranic, the Groterpians mesocranic and orthocranic.

Although the agreement between the two Nordic peoples that inhabited the Terps before the Middle Ages was not to be denied, the differences between the two were so pronounced that we may very certainly distinguish a difference in racial composition between these groups.

Was there a greater racial resemblance between both couples of the four groups of Terps at Westergoo, North-East Friesland, Hunsingoo and Fivelgoo? The very different connection with the Pleistocene, their earliest dwelling-place, induced us to ask this question.

The accessibility by sea was of course almost equal for these four divisions. Westergoo was in such an isolated position that the inhabitants were probably the first to be forced to erect Terps, because it was not possible for them to take refuge on the higher grounds. Hunsingoo formed, as it were, a continuation of the extreme North point of the Pleistoceen, "Een stert van Drentlant" (the tail of Drenthe) as it was called [1]), and it was connected with it by a row of Terps. Even at high tide it was pretty easy to reach the higher land via this bridge of islands. On the other hand, Fivelgoo was situated at the mouth of the Eem, which gave access to Germany.

[1]) Rengers ten Post.

The very restricted quantity of our material from each quarter, but especially Fivelgoo, did not promise any great result from this inquiry. In the case of groups of such close affinity, it is most difficult to determine differences by morphological means, and therefore we only adduce the most pronounced divergences. In Groningen we had little more than the material from Hunsingoo at our disposal, which proved an adventage on the whole, as there was no necessity to divide it up.

The population of the old Terp-region at Westergoo probably had a longer skull than those of the North East Terp-region. This average length exceeded that of all now living peoples (194 mm. Martins Maximum: ♂ Turks 194; the West Friterpers were ♂♀. So the West Friterpian males were longer than the Turkisch males). The mean length approached nearer to that of the Neanderthalers (199 mm.) than of any modern European people. In the breadth and height of the skull, the difference between the two groups was much less. Yet in East Friterpia there was greater divergence in the dimensions of the splanchnocranium, and this greater variability was met with almost everywhere in the East. For the facial dimensions, there was a marked difference in the width of the cheek-bones; whilst the facial height was slightly higher in Westergoo. And this difference persisted also when the difference of the size of the skull was eliminated by reduction.

In the age of the Terpbuilders in Friesland the length of the head decreased eastward, and the faces grew narrower and shorter. The variability was greater in East Friterpia.

The relative figures showed but little difference between the two groups, though probably the heads in the Eastern part were relatively lower than those of the Western group of Terps. Almost three quarters of the Westergoo people were Nordics, whilst only 57.8 % or rather more than half of the East Friterpians represented the Northern race. The Row-grave type was far less numerous in the West than the low "Friterp" type.

The Nordic type was represented most strongly among the Western Terp-dwellers.

The Westergoo people were exceptionally dolichocephalic, proportionally even more than the Swedes of the Iron Age. The average length was even greater than among the Franks of Hainault,

and it is probable that they were one of the most dolichocephalic people of our anthropographical environment.

As the heads were shorter in the East, the index cranicus was slightly higher in this part. This part was more chamaecranic (low skulled). In the facial indices there was little difference between East and West.

On comparing the skulls of Westergoo, East Friterpia and Groterpia with each other, we observed a gradual transition. The Terp-skulls grew steadily shorter towards the East (194—187—184 mm.), and at the same time the relative breadth-figures increased, so that the index cranicus rose steadily. The facial length also increased, but the breadth of the cheekbones decreased strongly. Whilst in the East the percentage of Row-grave type increased, the proportion of Nordic types was strongly reduced. But there is agreat divergence between East-Friterpia and Groterpia as regards the relative height, the height of the upper face, the basion bregma height: breadth index, and especially the basion bregma height: length index.

The increase of the breadth: length-index from West to East, which is assumed for the modern inhabitants of the Northern-provinces of the Netherlands, already existed before the Middle Ages.

In order to control the points of agreement and difference between Friterpians and Groterpians more accurately, we have examined various correlations. At the same time, we wanted to find out whether the difference between West and East-Friterpia was so considerable as to render division necessary.

Generally speaking, we found our results confirmed. Nearly always there appeared to be a considerably greater affinity among the Friterpians. Several times we obtained a division into three groups, but seldom a division into two groups,which would doubtless have been the case if there were a sharp distinction between Westergoo and East Friterpia.

This repeated formation ot three groups probably shows that the Friterpians are made up of three racial elements, which have mingled together through living together during long periods in an isolated district. In strong contrast to the homogeneity of the Friterpians the want of uniformity among the males of Groterpia is particularly noticeable.

The autochthonic material from the Middle Ages (= Middles)

is extremely rare; because the skulls that have so far been looked upon as belonging to that period, were for the greater part dug up from Terps on which monasteries had stood.

As far as Friesland is concerned, we have, in fact, no data from the Middle Ages.

Nearly all the material available has come from Hunsingoo; and this enables us to compare the Old and Middle skulls of the same region, because the Old Groterp skulls were chiefly derived from the Western part of the Province.

The Hungingoo Middles had nearly as long a skull as the Old Groterpians. At the same time they were slightly narrower. This points probably to the influence of the neighbouring Friterpians. As regards the face too, the Middles resembled the Olds, as is proved both by the absolute figures and the indices.

Therefore, contrary to our earlier opinion, we can only conclude that but very little variation in the type has taken place here up to the Middle-Ages. Yet we may not suppose that this applies to the whole of Friterpia. Lutjehuizen was situated on an island which was almost entirely separated from Hunsingo by *slenks* [1]). Possibly this isolation has contributed to the stability of the type. In fact, the remarkably uniform shape of the Lutjehuizen skulls confirms this. However, almost half of the Middle skulls were obtained from other Terps.

These results are the more remarkable as they contradict the supposition that the change of type was caused by an entire change of the conditions of living. The shape of the Old Terp skull was supposed to have been the result of the continuous struggle with the elements. Folmer gave it as his opinion that as cattle-breeding and agriculture succeeded fishing, the type was also gradually changed. Nowadays we should speak of domestication as influencing the heredity of living beings that are more or less withdrawn from direct contact with Nature. But in this case we think of more direct influence, e.g. of wolves bred in captivity, where it has been observed that the head becomes shorter in a few generations, without attributing the phenomenon to special selection or inbreeding.

If increased domestication were indeed the cause of a variation in the type, the change would have been carried out before the be-

[1]) Creeks which sometimes run dry.

ginning of the Middle Ages. For there is good reason to suppose that the stage of fishing in the first centuries of our era, at least for most of the Friterpians, had been replaced by the stage of cattle-breeding. The building of houses had by that time made considerable progress, and in the late Carolingian times the demands of agriculture obliged the Terpians to extend their Terps far beyong the limits required for grazing. For agriculture is impossible on lands that are repeatedly flooded by the sea. By the tenth century the history of the Terps was closed. Moreover the finding of baked bricks in the immediate vicinity of most of the Mediaeval skulls, leads to the conclusion that they are of a later date. Consequently we may certainly assume that the domestication process was completed long before.

The crania of Lutjehuizen are just like those of the ancient Groterpians, therefore, if the domesticating process has indeed reacted strongly on the bodily form of the Terpians, this must of course have happened before the period to which our oldest skulls belong. Hence, if at a later time we find a change to have taken place, we cannot attribute it to further domestication. So it is not a change in the phaeno-type, but rather a far more important change of idio-type (hereditary), in consequence of crossing or selection.

Another problem to be solved, is the question whether there was no change of any kind in Terpia before the Middle Ages. Also in connection with the Middle Frisian skulls, which probably are not all allochthonic, this does not seem very likely. And yet we consider it a highly remarkable fact that in one district the type has remained practically constant, the more so as it is situated at the end of the exit from the Pleistocene.

The constancy of the Hunsingoo type shows that the phaenotypical change resulting from domestication must have been completed before the period of the Terp building.

In studying the modern Friterpers, we are at once struck by the great change that has taken place since the time of the Terp-builders. The people have shorter and broader skulls, and the heads are slightly lower. Relatively also, the breadth has increased; but yet the capacity of the skull is smaller. The Modern faces are all narrower and not so long, especially among the people of Leeuwarden. Also when the mutual difference between the skulls is elimi-

nated, the difference remains. The relative figures indicate a difference between the Old and the Modern Terp-population, but least in the height. If we classify the Leeuwarders according to the index-figures, the mesocrania prove to be the lowest. As these are the more numerous among Modern crania, the low figure may perhaps be explained by the increase of the mesos. But as we have already seen in studying the correlations, a classification according to the dimensions or indices is of little use, so that in this direction but little progress is to be looked for towards a solution of the problem of the low character of the Modern skull. The average of the large Amsterdam series of Bolk (777 crania) also lies only just wihin the limit of orthocephaly (length 183.3, breadth 143.8, height 128.6 mm.; ind. cran. 78.3, height: length ind. 702 mod. 454).

The shortening and broadening of the crania of course leads to a raising of the breadth: length-index. In the different series there is a far greater stability in the proportion of brachycrania than in that of the dolichocrania; the former already exceed the latter. And yet the dolichos form but one fifth of the entire modern population, whilst the brachycranic element already forms more than a quarter.

If we divide the Friterpians, Groterpians and Leeuwarders into 3 groups according to the index cranicus, we find a strong agreement between the Old and Modern dolicho- and mesocranic elements. But, on the other hand, we find a strong difference between the Old brachycrania, which had a highly mesocranic character, and the Moderns. This shows that the Modern brachychania are probably allochthonic, and therefore the explanation that the originally short-headed element gradually formed a larger part of the population by more vigorous propagation and greater adaptabiliy, is most probably erroneous.

The Brachycranic element is much more pronounced in the town-series than in those of the open country, though, generally speaking, the town population are more inclined to acquire a dolichocranic type. Therefore we may determine with great certainty from our observations of the Middle Friterpians, that the brachycrania were immigrants who entered Terpia via the towns.

The variability of the Modern skulls is considerably greater than that of the older ones, and the law of the increase of variability, in consequence of greater mixture, indicates increased crossing

among the townspeople, and consequently the penetration of a foreign element.

The Brachycranics are allochthonic. They have penetrated into the Terp district, probably through the towns, and already comprise a fourth part of the population.

We have attempted to arrive at an agreement between Prof. Bolk's high figures and our own, by calculating a reduction for the soft parts, but still they remained one unit higher. This we must partly ascribe to his using only selected material of young males inhabitants of the two provinces, whereas we specialy considered the Terpians. As, moreover, we do not know by whom the measurements were performed, we cannot place less reliance on the results of Anthropographers like Folmer and Sasse.

Prof. Bolk's results, after careful reduction, are higher than those we ourselves found for our anthropographic district.

Yet there is such a rapid increase of the brachycranic element that we may well ask: "how long will Prof. Bolk's figures continue to be too high?"

J. Zeeman (1876), Rudolf Virchow and A. Sasse already asked who had brought the broader element to Friesland. Prof. Bolk has attributed it to the Saxons, but these latter formed a complex of tribes of which dolichocephaly undoubtedly formed a considerable proportion. Therefore Bolk's reply offers no true solution.

Although we consider the whole problem of the origin of these brachycrania of secondary importance, as all Middle Europe is full of them, we agree with Zeeman and Bolk in the view that they chiefly came from the East. There can be no doubt that direct immigration from the South falls far behind that from the East. France is a country with very slight emigration. Except in times of great stress, such as the Reformation and the World-war, the number of French and Belgians that have settled in Holland has always been small. The Limburgers remove to Belgium in large numbers, but very few Belgians to Limburg. And we find the same thing in North-Brabant and most of our other provinces.

The strong pressure which, as Zeeman already pointed out, is exerted on the Dutch nation from the East, is almost non-existent in the South. On the contrary, there has been a continuous influx of round-heads from the East

The greater part of Germany, except the North-West and North,

is inhabited by sub-brachycrania and brachycrania. Consequently the immigrants will in a great measure have consisted of these types.

As the extreme dolicho type of the Friterpians formed an exception to the generally mesocranic type of N. W. Europe (and perhaps the Groterpers also, though in a far less degree), the increasing intercourse with other peoples would naturally cause the index figure to rise. This circumstance carries us a long step further towards the solution without calling in selection, heredity and other factors, difficult to demonstrate, as an explanation. Moreover, this does not require all one's attention to be fixed on the brachycrania, as was the case with the older Anthropographers.

The Friterpians formed an exeption, by their extreme dolicho type, to the generally mesocranic type of N. W. Europe.

Whereas the Old Friterpians were chamaecranic (low-skulled), the modern population are orthocranic (medium height). The height-breadth index shows a considerable difference between the Friterpians and the population of the towns. This again emphasizes the close resemblance between the Old Terp-people and the Moderns. Yet the allochthonic character of the townspeople should not be exaggerated. It was already pointed out by F o l m e r that the occiput of the Leeuwarden crania showed affinity with the Old Friterpians.

For his measurements of living heads,Folmer also confined himself to Hunsingoo, which is, anthropographically speaking, the best-known part of Groningen. His figures prove that the modern people of Hunsingoo have much shorter and broader heads than the older inhabitants. The sex-difference in Modern Groterpia is much greater than on the other side of the Lauwerszee, a phenomenon that we had already observed among the Old Terpians.

The skull-index in Hunsingoo is much higher than that of the Modern Friterpians, and even than of the Frisian town population. In Groningen the country people have rounder heads than in Friesland. At the present day still, the percentage of dolichocephaly is considerably higher than in Groningen; whilst in the latter province the brachycrania are more numerous, though they probably do not exceed a third part. The mesocrania are about equal in both provinces, so restoring the balance.

We found no confirmation of Prof. Barge's opinion that at the present day the greater part of the Frisian people are brachycephalic. It supports our assertion that too much stress has been laid on the brachycranic element.

A comparison of the population of Friterpia with that of Norway shows an average general agreement, although, as Halfdan Bryn says, the Norwegians are the purest representatives of the Nordic race. As the dolicho's amount to one fifth, and the brachy's to one third of the Terpians, the mesos form the greater part of the population, just as in Norway. We have demonstrated the probability that, at the commencement of our era, such was also the case all over N.W. Europe, Friterpia and perhaps other more isolated districts excepted. We found a strong mesocranic element in almost all the series of that time. Often it surpassed the dolichocranic part. It is perhaps more productive for anthropographical investigation, if we consider the mesos, not as a cross between dolichos and brachys, but as a distinct head-form. Yet, in connection with his study of Neolithic skull material (1924), Scheidt considers them to be the result of crossing, which is in accordance with other palae-anthropological results. But Scheidt's investigation was a preliminary one and, so far, was effected mostly by literature. Should Scheidt's opinion indeed prove to be right, the difficulty is only shifted to a determination of the limits of dolicho- and brachycephaly and the question arises whether the mesos may still be defined as Nordic. If the answer should be in the negative, there would remain but a very small percentage of Nordici in N. W. Europe. As, however, the dolichos do not form a unity among themselves, but i.a. include a chamaeprosope type resembling the Cromagnon race, we cannot be satisfied with merely rejecting the mesos, but are obliged to fix on one of the sub-types of dolichos as the true Homo Nordicus. This being quite impracticable, we shall have to content ourselves with regarding them as a combination of "Schlägen" [1]). In that case there would be no objection in principle to the inclusion of the mesos. Especially so, if we adopt Röse's statement that the absolute length is the most reliable standard, and every head exceeding 19.0 cm. or every skull exceeding 190 mm.—7.5 mm. = 182.5 mm. in length, is to be considered as nearer to the Nordic

[1]) After Kant; Scheidt Rassenkunde 1925 p. 338.

type than the Alpine. Consequently, the essential characteristic of the Homo Nordicus must be sought in the greater l e n g t h of his skull rather than in its relation to the b r e a d t h. The average head-length of Prof. Bolk's 290 Groningers is 192 mm.; of his 768 Frisians 190.6 mm. So both averages are above Röse's limit.

This brief discussion shows the difficulty of the problem, and also the indefinite nature of what is called the Homo Nordicus main-race [1]) at the present day. Therefore, as long as no fixed decision is come to on this point, we see no reason for excluding the mesos, and in conformity with our suggestion expressed at the end of the Introduction, we come to the following conclusion:

The population of the Terpcountry is no exception to the chiefly Nordic character of our anthropographic sphere.

In the next place we have examined the two divisions of the Terp-region in order to compare the influence of environment in connection with Prof. Bolk's inquiries as to head-form, bodily stature and pigmentation. In the head-form we found a connection between Groningen and the two other North East provinces situated on the Pleistocene. Friesland forms a group with the provinces of Holland, Utrecht and Guelderland. In greatest bodily height Friesland seems to come nearer to Groningen, but this is an extremely unreliable factor. Probably the Mediaeval Nordici were no taller than the Modern Mediterraneans (Wieth-Knudsen). Prof. B o l k even thought he could distinguish an undulating line in the height-figures for the population of Holland in the 19th century. Bodily height doubtless depends in a great measure on conditions of wealth and social station. In these matters Groningen agrees more with Friesland than with Drenthe. And yet, in spite of the greater prosperity of Groningen, in length it only takes the middle place between the two last named provinces. This is because Groningen contains, as Bolk's map shows, but a comperatively small area with a population above 170 cm. in stature, and a larger one with a population below that figure. Friesland, on the other hand, agrees with North-Holland. But the general difference between West and East Friterpia appears again in the stature of the present-day population. Perhaps a more reliable standard of racial affinity, though also influenced by environment and especially by pathological causes (E n k l a a r 1912), may be sought in the large number

[1]) After Lenz in Baur-Fischer-Lenz 1923; Scheidt 1925 proposed: "sub-species".

of persons under 155 cm. in height, found in Groningen, Drenthe, Overijsel and North Brabant. Here we meet with a strong contrast between the taller population of the Holocene(except in Zeeland) and the shorter people on the Pleistocene, to which only Guelderland and Utrecht form an exception. These small dwellers on the Pleistocene indicate the presence of a non-Nordic ele-

ment, as also in the West of Groningen. Prof. Bolk states that they are not found in Friesland, though we suspect that they occur in the South-Eastern corner of the province.

As for the colour of the eyes, Prof. Bolk's inquiry shows a difference between Friesland and Groningen. In the former province blue eyes prevail, but in the latter the colour is more generally brown, which agrees more with Drenthe. In Friesland the pigmentation limit coincides with the boundary of the Terp district, but in Groningen it is entirely independent of locality. Yet a connection can certainly be shown between pigmentation and the

Terp-region. Along the Eastern boundary of the three Northern provinces, there is a district with higher pigmentation running North-South until it comes close up to the Terplands, but in the North of Drenthe we clearly distinguish a gradual decrease of pigmentation in an East-West direction, just as in Friesland in a South-Northern direction. This undoubtedly points to the influence of the Nordic Terp population.

The results of Prof. Bolk's inquiries concerning the pigmentation and height of the present-day population, support our own results concerning the difference between the Western and Eastern part of the Old Terp-people, thereby adding greatly to their value. They prove that the present relation of the anthropographical condition has existed in general outline for a long period, though the index cranicus has been raised everywhere. We should be glad to compare these results with those obtained elsewhere. As far as we know, the fact of a people having continued in a practically similar anthropographical relation for more than a millennium has not been met with anywhere else. It is true that Meyers in 1912 thought he could point to an unchanged condition since prehistoric times among the Egyptians, but for this purpose he compared only a few data from a population extending over an area of hundreds of miles, and which therefore, on that account alone, could scarcely be set down as homogenious.

There is a demonstrable connection between Friterpia and the population of the Western Holocene as regards skullform, bodily height and pigmentation; whereas Groterpia shows more resemblance with the people of the Eastern Pleistocene. Recent conditions reflect those prevailing prior to the Middle Ages.

RELATION BETWEEN PROTO- AND PREHISTORIC ANTHROPOGRAPHY

Many of our skulls originated from the lowest Terpstrata which were built op during the first few centuries of our era. Though our datalia were not sufficient to prove with certainty how many skulls were from this age, we may suppose that they formed a large part of our Old series. This makes it probable that in that period there was already an increase of skull-index Eastwards, and also that this increase already existed before the Great Migration.

We have pointed out the difference between the Old Friter-

pians and Old Groterpians, whereas the augmentation of the index cranicus in Eastern direction is confirmed by analogous differences between the Moderns. The similarity between the Old and Modern Terpians is very apparent, in spite of the differences. The present situation in our Terp-country resembles, in many respects, that in other parts of N.W. Europe where similar conditions exist. So, in Sleswick Holstein where Meissner in measuring the recruits of North Frisia, found a taller population on the islands than along the coast of the mainland; though the latter are taller than those on the Pleistocene of the interior, where the population was mixed with brachycranes from Jutland. The Nordici settled in the lowlands along the sea.

In our country also, the population of the Wadden Islands are taller than on the mainland. The people of Tessel are the tallest in the Netherlands (177. 3cm. Bolk). One is particularly struck by this climax on travelling Eastwards from the West coast of Friterpia, as one approaches nearer to the high Pleistocene of Drenthe. But the contrast is more striking in our country than in Sleswick-Holstein, because we could demonstrate that the increase, in an easterly direction of the skull index, bodily height and pigmentation generally agree with each other.

So we presume that in the Low Countries the Nordici also settled along the coast. Consequently, there is a great resemblance between anthropographic circumstances in modern, and proto-historic times. So, generally speaking, the Great Migration left the conditions as they were. It left the rest of our country racially almost untouched.

Besides the sudden break up of the Latin Civilization in South Limburg (Holwerda) very little is known with certainty of prehistoric catastrophic events. We are too distrustful of the early written records, which generally contain only second-hand information, to accept their statements, unless borne out by the facts. Schuchhardt's researches regarding the Lower-Saxons[1]), and Holwerda's assertions about the small ethnical influence of the

[1]) Für Nordwestdeutschland zweifelt niemand, dasz die Sachsen Wittekinds noch die unverfälschten Nachkommen sind der Steinzeitleute, die die groszen Megalithgräber erbaut haben.... im Gräberbau vollzieht sich ein so allmählicher Übergang von den älten Steinammern zu den Steinkisten und zu den von Steinen umhegten Urnen, und der Grabhügel bleibt so wie nirgend anders bis an die Schwelle des Christentums erhalten, dasz kein Punkt zu sehen ist, wo man sagen könnte, hier setzt eine neue Bevölkerung ein (Schuchhardt 1919 p. 341).

Franks, add to our doubts in this respect. The results of our inquiry agree with historic, proto-historic and anthropographic researches in establishing the opinion that the last Germanic wave exerted but comparatively slight influence, at least did not cause a complete revolution in the Anthropography of the Netherlands. They are not contradicted by historical facts from that period, these being almost wholly wanting.

The Migration of Nations did not cause a complete change in the Anthropography of the Netherlands.

In this way we are able to take a long step further back into the past.

Only the Northern half of the Netherlands was covered by the Scandinavian (pleistocene) ice-field. Probably the ice reached no farther South than the line Amsterdam—Arnhem, except on rare occasions. Consequently the Low Countries must have been habitable at that period. But were they indeed inhabited?

France and Belgium were inhabited during the later stages of the glacial periods. The nomadic hunters from Spy probably belonged to the same peoples as lived in France, so it is not unlikely that they extended their wanderings farther from home. In the time of the Neanderthal men, or soon after, the Aurignac man appears, who is also called the Lösz-man after the geological strata where the bones were found. He already displays a higher culture and artistic talent. These dolichocrania closely approach the later Nordic race; especially notable is the somewhat protruding occiput. The palaeolithic Laugerie-Chancelade men were distributed all over France and Belgium, so that it seems highly probable that they are also to be met with in our country, though the palaeolithic remains may be buried under a deep layer of detritus (rubbish). Perhaps the finding of the not yet dated Wylre lower jaw, which was dug up by Dr. A. Erens from a depth of 7 Metres below löss and gravel (Houzé 1897), promises greater things for the future.

Whereas the numerous late-palaeolithic crania derived from Baumes-Chaudes people, do not include a single mesocranium, and the South of France remained dolichocranic for a long period, the finds of Solutré in Central France already show indices of 88.2, which indicate the coming of a pronouncedly brachycranic race.

At this day the dolichocrania constitute no more than a third part of the population, the mesos a quarter, and the brachys already a third.

The Belgian Furfooz race is one of the oldest known short-headed races in Europe. The Grenelle type may possibly be a purer branch of it. Likewise the finds at Obercassel in the Rhine Province go to prove that the districts surrounding the Netherlands were inhabited in the Palaeolithic period. The high cultured reindeer-hunters of the Cromagnon race, who were apparently akin to the Aurignac race, were spread all over Central Europe, and most probably also over a part of the Low Countries. When the first five skeletons were found by Lartet (1868) they were taken for modern Frenchmen. On account of the great stature (1.80 Metres, Verneau) of many of them and the shape of the skull, they were also looked upon as the ancestors of the Homo Nordicus. Topinard supposed that they were blonds. But a number of the Cromagnon men were already mesocranic (ind. cran. 77.2) The low face with the low, slanting eye sockets at once strikes us.

Whilst Boule (1924) supposed that the Neanderthal man has later mingled with other races, many Anthropologists are of opinion that they recognize the Cromagnon type repeatedly in modern heads. This presumptive science in connection with Palaeolithic races increases the difficulty of unravelling modern problems.

At the end of the Palaeolithicum, not improbably, the Low Countries were inhabited by a mixed population.

The Skulls from Offnet in Bavaria prove that Germany was already inhabited by brachycrania in the „Mesolithic" period. Among the French Neolithici the meso- and brachycrania were represented in rather large numbers, though the dolichos were in the majority. In Belgium during the same period the brachys, who probably made their way into the country along the Meuse valley, formed an ever increasing section of the population. In the West of Germany, to judge from the small number of skulls that are known to be from that period, no brachycranics seem to have been settled there. But their occurrence farther eastward is certain however. The allochthonous brachycranics, probably came from the East of Europe or Asia. Less probably they were

merely another phaenotype, caused by more domestication — more retardated by changed hormonic function. — They spread over a vast area with great rapidity in the Neolithic age. England alone was for the greater part undisturbed by them during a long time; although the brachycrania from Barrington Coombe (Somerset) which Keith considers to belong to the Azylien, and Davis to the Neolithic period, prove that the state of "Splendid isolation" was not absolute even at that time.

The Swedish dolichocrania strongly resemble the megalithici of the Long-barrow type, but they are not so pure. Indeed it was thought by Fürst (1902) that they had reached Scandinavia along the coast, an opinion with which Scheidt (1924) concurs. The presence of megalithic graves and common manufacta, and also the fact that Scandinavia only became freed from the ice at a late period (12.000 B.C.?) support this presumption. Fürst supposed that the British dolichos had mingled in Sweden with the autochthonous brachycrania of the Borreby type, but had kept their race purer in thinly populated and entirely uninhabited regions.

Contrary to the prevailing opinion, the Swedish type was already rather mixed. Fürst distinguishes 3 types: I. a dolichocranic and rather long type of an elliptic to oval shape, with a narrow forehead, protrudung occiput, a low, narrow face, low orbita and a thin nose. II a mesocranic type inclining to brachycephaly, square, to oval in shape; protruding occiput, broad forehead and a wide, powerful face, III a brachycranic type with a narrow forehead, flattened occiput, broad low face and broad checkbones. Both Fürst and Retzius considered the first of these types as the most numerous Nordic long-headed type, and Fürst emphasized the fact that the shape recalled that of the Cromagnon type.

Scheidt (1924) distinguishes two principal groups. First a more numerous dolichocranic, ortho- to chamaecranic shape of long, narrow, low skulls (the Nordic long-skull type), and secondly a meso- to brachycranic and especially hypsicranic shape, formed by the high round skulls resembling the Danish Borreby type.

The Danish skulls, of which rather large numbers are known, are distinguished less by their small, absolute length than by their great absolute breadth. They seem to exhibit far greater di-

versity though this is possibly the result of their greater number. The brachoid and brachycrania, especially those known as the

Borreby type after the chief finding-place, are by far the most numerous. Here again the protuberant occiput is a marked fea-

ture. Scheidt could not discern any important difference between the Swedish and Danish Neolithics. Probably the two groups have been built up from the same elements.

From the above it is clear that more numerous dolichocrania prevailed chiefly in France, the West-European coast-districts including England, and also in Scandinavia. The people of the Marne centre, France and Switzerland were already more strongly mixed. The brachy's were more prevalent in Belgium, Denmark and South Germany. It further appears that at the moment when the Neolithicus, the first man we can with certainty greet in the Netherlands, arrived, the North West of Europe was already peopled by a mixture of races. In fact the classification of the various races is a matter of great difficulty, and Keith wrote early in 1920: "an anthropologist in the Neolithic period, if he had tried to account for the origin and distribution of the races of Europe, would have had to face just the same complicated problems as we have to grapple with now."

As we were able to demonstrate that in Terpia the change in the characteristics of the head has been but very slight during a period of many hundreds of years and the population has perhaps not changed in general lines from the first ages of our era, in spite of the ever increasing intercourse and mixture, it is easy to understand that during the relatively short [1]) period that separates us from the Neolithic age, no complete change in the racial character of the Netherlands population has taken place. If we consider that the Dutch Neolithicum probably set in very late — it continued partly even until proto-historic and historic times — it becomes evident how little cause our older Anthropographers had to suppose that one need but go back a score of centuries to come upon pure dolichocrania and brachycrania.

Did the Netherlands form an exception to their anthropographic sphere in the Neolithic period?

Probably not.

The Neolithic population in North West Europe, with the exception of Britain, was highly mixed.

Let us now attempt to explain on general lines the racial composition of Holland from a consideration of the different forces

[1]) Compared with the long duration of the Neolithic and especially of the Palaeolithic period.

that have combined in its formation in proto historic times. By-this means we may be better able to trace the origin of the elements from which the Terp-people have been built up. But what method are we to apply?

Having seen that various racial component parts have contributed to the rise of the nations, we can only partly rely on the unsatisfactory historical method, which knows but tribes and peoples, or on the pre-historic method, which traces civilizations, whilst modern Ethnogenesis has so far chiefly been guided by cultural and linguistic characteristics. Neither can we make use of the linguistic method, as probably the Germanic language did not begin to divide up into different sub-languages until some centuries after Christ. In what way this diversification was brought about is still unexplained; and still less is known about the older phonetic changes, though this may not be readily acknowledged. Moreover, as we cannot be at all sure either that the various names indeed belonged to the peoples that were afterwards known by them, or of the ethnographic distribution of those names, many things that were hitherto accepted as facts, are indeed very unstable and doubtful.

The historical-cultural-linguistic method holds out but little promise of useful aid in the study of the early population of the Netherlands.

The only way open to us, and which promises a fair certainty of success, though provisionally still with the help of other sciences, is the road afforded us by Anthropography. It begins with an exhaustive study of the present, and, if possible, the older population of the region under discussion. The next step is an inquiry into the racial composition of the peoples of the invironment, in our case of the peoples of North West Europe in connection with those of the whole continent and the adjacent œcumene, both in Modern times, and the various periods of the Iron and Bronze Ages and the Neolithicum; later also of the Palaeolithicum. As cremation was generally practised in the Bronze Age, we shall have chiefly to rely on the late Neolithic and Iron ages. As soon as chese periods have been charted, it will be possible to form a contection between the different parts of the environment where the nomposing elements of the population under study were origi-

nally settled, and their present dwelling places. Making use of geographic, cultural-economic and perhaps political factors, it will be possible to trace the road which the various elements followed, and to clear up different other problems. Though this method is a very difficult one, many questions that have so far been tackled in vain, may be answered with a greater measure of certainty. *The anthropographical method alone promises greater success.*

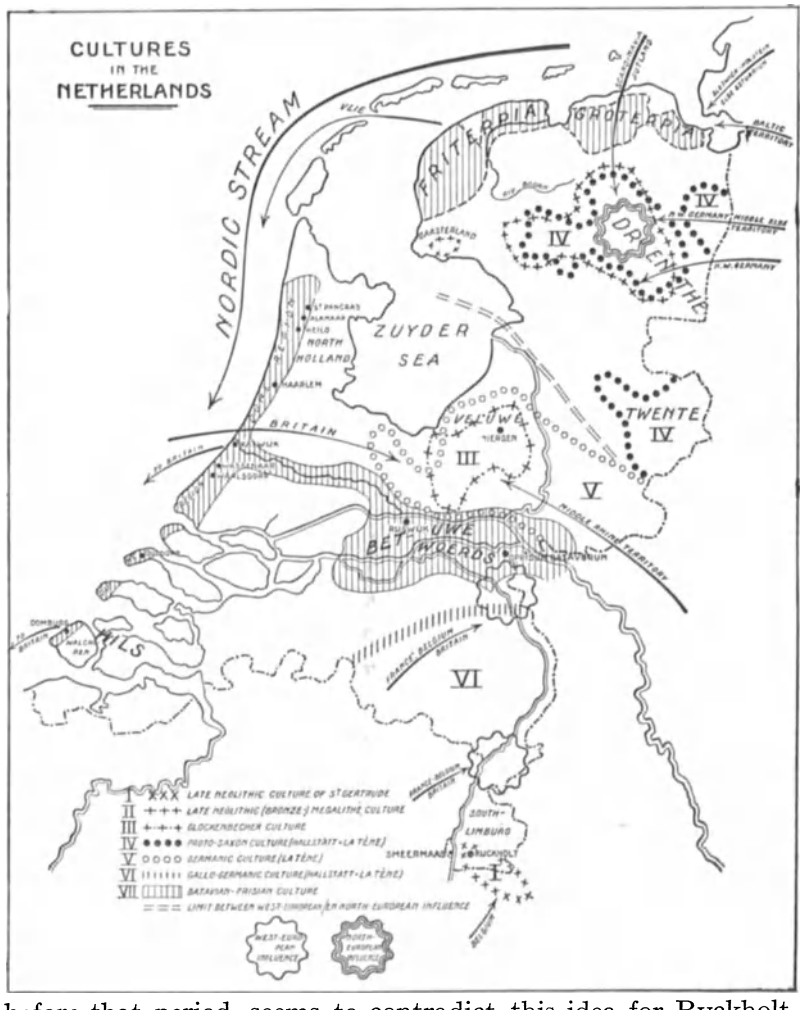
We are now only at the commencement of our anthropographic knowledge of the Neolithic period, and what we know about the Iron age has been badly blurred by the striving to find racially pure "Germans". In fact, anthropological science in Holland has still to take its first conscious steps; but having found the right road, the strength will come to follow it.

What was the racial condition of Holland in the Neolithic period? Let us attempt to answer this question with the assistance of the few anthropographical and cultural data at our disposal. "During the early part of the period," says Nils Åberg, "the Netherlands seems to have formed a part of the thinly populated region that extended between the Campignien people of France-Belgium-England on the one side, and the Ertebölle people [1]) in the North." (3000 B. C. Holwerda, Déchelette, S. Müller).

The South of the Netherlands was probably already more thickly populated, as is shown by the flint-quarries of Ryckholt and St. Gertrude. It is doubtful when these quarries began to be worked, and also whether the workings took place at different periods. Hamal Nandrin & Servais (1923) suppose it to have been in the early part of the Robenhausien period, but they are of opinion that they have found palaeoliths and microliths of the Tardenoisien period also. On the one hand, the finds, which consisted for the greater part of merely chipped flint implements, and the old-fashioned habitus of these objects, recalled the so-called Mesolithic Campignien and Ertebölle cultures, but, on the other hand, the fact that polishing was performed at the same place, suggested a middle-neolithic culture under West-European influence. Van Giffen (1926) came to the conclusion, on geological, biological grounds, and also from a study of the pottery, that the objects were not Palaeolithic, but, geologically dated, pure specimens

[1]) Kjo**kk**enmöddingers.

from the Holocene, either Meso- or Neolithic. Holwerda is also inclined to look upon many Dutch objects that are generally reckoned to the stone age, as backward products or survivals; but the fact that the Meuse valley served as a great highway long



before that period, seems to contradict this idea for Ryckholt. Van Giffen laid special stress on the more or less synchronic nature of the heterogeneous finds from a typological point of view. He presumed them to be traces of a mining population, such as are known in Belgium, Northern France, England, Sweden and also in Portugal and Italy. However, the Dutch inquiry has

not yet been so complete as to contradict the Belgian conclusions resulting from an extensive research.

The fragments of a skeleton were found on the northern slopes of the "Schoone Grub Ravine", at Ryckholt, therefore at some distance from the supposed dwellings, in a formation that has undoubtedly been caused by erosion. This secondary finding-place makes it impossible to determine the age of the osseous remains (Lohest & Fourmarier). The remains, which consist of a calvarium with half of the lower jaw, and a fragment of diaphysis of the right thigh-bone, appear to be derived from a single individual, a young female about 20—25 years old. The skull is hyperbrachycranic (ind. cranicus 88.3), even more so than most of the neolithic Belgian cave-dwellers (Fraipont & Stockis, 1922). It does not belong to the mixed Furfooz type, but to the pure Grenelle type. The calvarium shows Laponoide features, and a leptorrhine variation. Perhaps the resemblance with the Azylien brachycrania of Offnet is still more apparent.

It is clear from these uncertain details that a more exhaustive inquiry is desirable. It is therefore to be regretted that Scheidt (1924), when working over the entire Neolithic material of Europe, did not pay any attention to the Dutch skulls.

The flint-industry of South Limburg probably developed under Belgian and French influence, and these Limburg people were evidently closely akin to the Southern population. The fruitful country of Löss near Maastricht must early have attracted primitive agricultural people. The numerous digging implements at St. Gertrude prove that they had long been possessed of suitable tools for tilling the ground. Possibly the pile-village discovered by Ubachs in 1884 in the vicinity of Maastricht, indicates a dense population at an early date. As articles of handicraft from Limburg have been found as far away as Overijsel, this may perhaps indicate that these Southern brachycrania moved up northwards also.

In the Neolithicum the South of the Netherlands was populated by a partly brachycranic population.

Afterwards the Low Countries were divided into two parts. In the South the West-European cultural sphere extended, in continuation of that of Belgium, France and Britain, along the Meuse past Nijmegen. But their handiwork has been found as far as Fri-

terpia at Oostrum near Dokkum, and at Vlagtwedde in the vicinity of Groterpia, which makes it probable that there was already a mingling of races at that time between the Belgian brachys and the population of the Dutch Pleistocene. There are even grounds for supposing that a people akin to the brachycranics had the priority, and constituted the earliest population on the Dutch Rhine-Meuse Pleistocene.

In Drenthe, however, an independent centre of Northern culture seems to have developed; which is borne out by numerous megalithic and other graves. We may assume with a great measure of certainty that this region was densely populated. Herewith begins the varying struggle between the West-European and the Nordic cultures, as appears from almost all prehistoric finds, even if one does not attach much importance to the disconnected finds chiefly worked by Åberg. The Nordic culture shows signs of a remarkably expansive nature, as a result of the straining towards the South of the Nordic peoples, which is incessantly noticeable throughout history. It shows perhaps that a great deal of this culture was introduced by immigrants, instead of by traders, as was chiefly the case with the West European civilization. It is also the opinion of Montelius that 2000 B. C. the Nordici had pushed as far as West Germany. So it is probable that the Neolithic population of the Northern part of the Netherland Pleistocene showed a strong Nordic element.

It is remarkable how the Holocene region was avoided by both civilizations, which points to a sparse population. The number of Neolithic relics found, is strikingly small. Indeed, had there been many, they would certainly have come to light during the digging of the numerous Dutch canals. Even if we take into consideration that peat-digging began in very early times, the soil being ill-suited for tillage, and that the ignorant navvies and peat-diggers would not take much interest in the objects found, yet all this does not give a satisfactory explanation of the wealth of ergologica in the Pleistocene, and the poverty of the Holocene. It is to a certain extent a counterpart of the abundance of somatic remains found in the Holocene, and their scarcity in the Pleistocene, during more recent times.

Though a more brachycranic population for our Southern provinces has already been explained by the neighbouring Belgian

shortheads, yet it is possible that the British long-heads neutralize this in some measure. Can the almost pure dolichocranic British people have exerted such a strong influence upon the men of the Dutch Pleistocene, that the latter also became more dolichocranic?

We must bear in mind the much slighter cultural connection with Britain than with Scandinavia, notwithstanding that a connection by land presumably still existed between Britain and the continent during the Neolithic period. Nils Åberg points out the influence of separation caused by extensive peat-bogs.

The Dutch geologist Tesch (1920) estimated the origin of the Straits of Dover between 3000 and 2000 B.C. If this is true, and we let the Dutch Neolithic period coincide with that of Western Europe, it is possible that in the beginning an overland connection was still in existence. But it seems probable that the Neolithicum of Holland was of a later date, which would explain the lack of ethnological connection with Britain. Prof. Van Baren (1925) has demonstrated the probability that the Straits already existed during part of the Pleistocene and at the commencement of the Holocene. No doubt the channel was much narrower in the Gallo-Roman time, gradually widening since the days of the Romans until it assumed its present form. This would of course explain the absence of British articles of handicraft in the Dutch Holoceen, and would at the same time be a reason for not ascribing to the British dolichos any great influence on the Dutch population.

Yet we must not undervalue the navigators of Neolithic times. Montelius has shown that there were already seagoing ships in Sweden in the Bronze Age (1000 B. C.?) and Elliot Smith[1]) supposes that in other places this was the case at an earlier date. But the newly forming Holocene of Holland, except the Dunes region, cannot have been very inviting as a place of settlement for the passing mariners from the more civilized island of Britain.

The influences of the British dolichocranics upon the Neolithic Netherlanders will most probably not have been great.

The existence of a pretty dense population in the centre of the Netherlands on the mixed glacial and fluviatile Pleistocene, is

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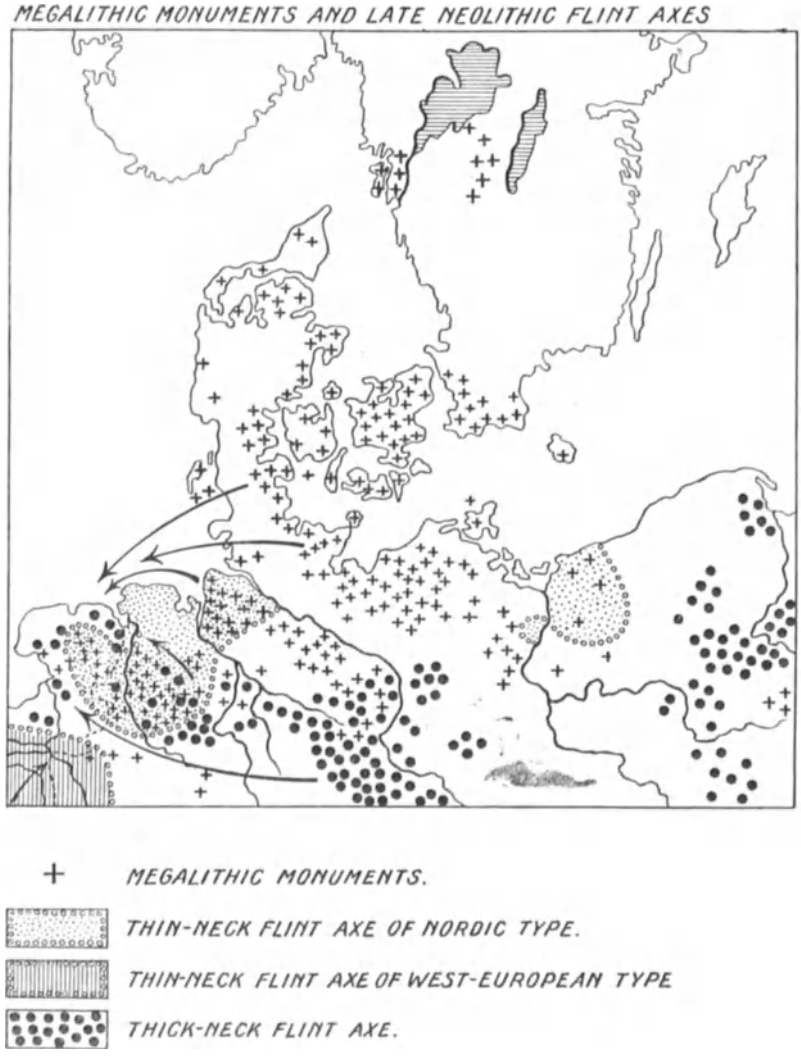
[1]) G. Elliot Smith, Rock Carvings in New Zealand; Times March 15, 1926.

proved by the "Glokken-becher" culture on the Veluwe, so close to the Nordic centra. This is most important, because the only Dutch Neolithic skeleton is that of a woman of that period. It was found by Holwerda in 1908 at Nierssen in one of the Tumuli on the Royal domain of the Queen. Whilst these Glocken-becher are frequently found in the company of brachycrania, and are most numerous on the Middle-Rhine and in the Saale basin, both regions that were mixed with brachys at an early period, the Dutch woman is probably dolichocranic. Holwerda dates the skeleton at ± 800 B. C. which is later than the usual dates, which place this culture before the middle of the second millennium B.C. The bones were however in a soapy state and difficult to examine. Prof. Nieuwenhuis notes a strongly receding forehead and heavy, protruding browridges, reminding us of the Terp type. Another striking feature was the strongly developed basic ridge of the jaw, which projected as a kind of thickening of the front part. The foramina mentalia are extremely large. The lower jaw contains a complete set of teeth, much worn by chewing coarse food. The processus styloideus is very strongly developed. The distance from the highest point of the skull to the extremity of the ischium is 98 cm., which indicates a tall race, though the slender, chamaecranic character reminds one perhaps of the Western dolmen race (Mediterranean). To the right of this skeleton, in "Hocker"-position, were found several osseous remains that probably belonged to the skeleton of a man. These have been collected together and laid by the side of the other skeleton.

Like Holwerda, one may object to the determining of periods and phases of culture merely on account of the shape of axes or other utensils as Åberg does, or from the apparent similarity of earthenware, which is often dependent on subjective judgment, as most archaeologist do. Yet, surely, no one will deny that such objects are indications of close trade relations. These certainly existed in the Neolithic period between Holland and Belgium together with Northern France and the Middle-Rhine on the one hand, and N. W. Germany, the Saale region, the lower Elbe region, Mecklenburg, the West Coast of the Baltic, and Denmark, on the other. In consequence of the bad roads, the insufficient means of transport, and the scarcity of domestic animals, the conveyance of commodities was chiefly performed, either by bearers, or by water in boats

made of hollow trees. This required a large number of people in comparison to the amount of merchandise carried, which would lead to increased racial intercourse. From the preceding remarks



it may be inferred, on good grounds, that there was a racial connection between the Dutch Neolithici and Belgium, South Germany, and Denmark, where the brachy's were in the majority; and also with West and East Germany, where the dolicho's were

far more numerous, and in the Saale region with its mixed population. The Netherlands also formed a link in the chain of megalithic graves, stretching from the Mediterranean coast in the South of France, along the Shores of the Atlantic Ocean as far as Bretagne, and from Great Britain to Scandinavia. Even if this does not prove the existence of trade-relations between the North and South-West, yet it certainly points to an affinity of mentality and a transmission of ideas [1]), which in those days depended almost solely on personal contact. For want of made roads, the sea beach will for a long time have formed an important highway. The people of the Neolithic age, who were chiefly hunters and fishermen, later also primitive agricultural farmers, will have been often interrupted in their march along the shore and the big rivers by the wide estuaries, the numerous creeks, and the geological State of the Dutch delta-lands. Especially people travelling along the coast from the South, just as people coming from the North had already been stopped by the German estuaries. Therefore we may also suggest an ethnical connection between the Dutch people and the wide-faced chamaecranic builders of the French dolmens.

In this way an agreement may be shown between the somatic finds, one of which is dolicho-chamaecranic and the other brachycranic, the cultural influences, and the great lines of geographical communication. It is also highly probable that there were in this country other and higher long-skulls like those of the English Long-barrow and Riverbed types and the Nordic long-heads; and also high dolichocrania like those in Eastern Germany. Presumably the population on the Dutch Pleistocene in the Neolithic period was more or less like that of the present day, and chiefly consisted of mesocranics.

What was the influence of the Bronze, and Iron Ages on Holland? Probably, in consequence of their isolation, the Scandinavians increased in purity during the Neolithic period, for the proportion of dolichos rose there in that time. During the Bronze, and Iron Ages especially, the Nordic races developed great powers of expansion. Montelius considered the three Northern provinces of Holland to have been entirely settled by the Teutons at about 2000 B. C.,

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[1]) Nils Aberg 1916 p. 29.

Kossinna, however, limits their territory to South Scandinavia, Denmark and the Weser- and Oder region from 1750—1400 B.C. He further states that it was extended from the Eems to the Vistula between 1400 and 750 B. C. Meanwhile the Kelts who were in a great measure Nordic, lived between the Elbe and the Middle Rhine North of the Main. According to Johansson, their territory may have extended from Groningen to Bohemia (Map p. 55). Although there is great diversity in all these hypotheses and dates, yet they all agree in showing that from Scandinavia and North Germany various Nordic waves of population have passed over an important part of Europe and Western Asia.

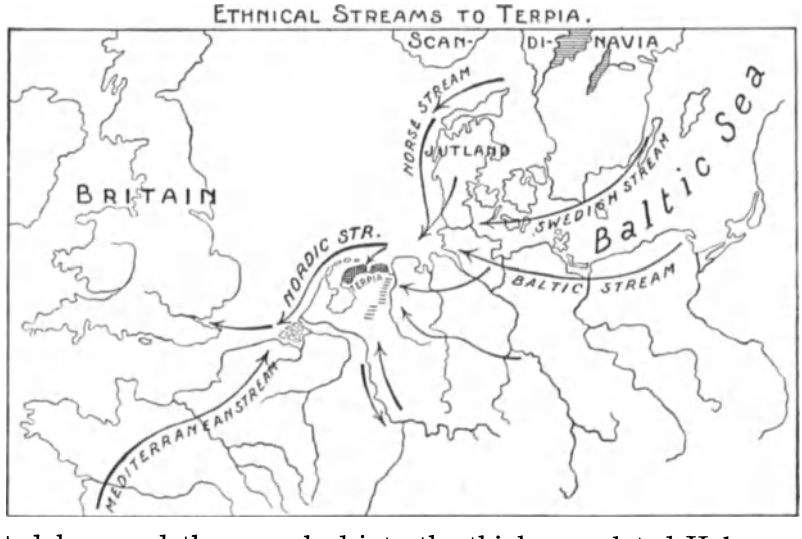
According to Arldt, from 120 to 600 A. D. and probably long before those dates, the Nordici wandered forth and spread over a great part of the West, Middle, and South of Europe. We do not share the opinion that they entirely abandoned their home-land. Different regions seem to have become partly depopulated, and new immigrants, or simply a few conquerors, would stream in, giving rise to seemingly new peoples, but in reality only minglings of the original people with the new elements. Sometimes the course of events was different, as in the Scandinavian peninsula, whence the Nordici have been streaming out ever since the Neolithic period, without depopulating the country, although but few allochthons have been absorbed. This also pleads against the hypothesis that the entire people have emigrated.

In this way the Southern Netherlands (Belgium) probably obtained a more Northern character. Both Dio Cassius and Ptolemy speak of the mixed nature of the people, though they probably referred more to a difference of culture between the original inhabitants and the later comers. So Holland will not have been left alone either, also because the Dutch river-mouths gave access to the heart of Europe. But the poverty and backwardness of the Dutch Pleistocene cannot have attracted large masses of people; whilst in the wet period that followed, the Holocene gradually became more inhospitable for new-comers.

We know too little about the exodus of a large part of the Dutch population during the Great Migration, to base any general change in ethnological conditions thereon; much less to draw racial conclusions. The reports of the classic writers are for the most part very unreliable. The explanation given by them, and later

writers also, are generally based on repeatedly varying names, and it is quite uncertain what geographical or technical value we must attach to them. Yet, in 885 the Annales Fuldenses still mention "Frisiones qui vocantur Destarbenzon" (Teisterbanders). In the course of history these names have been so often repeated that we have grown accustomed to them.

In the last centuries before our era the Dutch Holocene was sufficiently raised by continual silting up, to become habitable ground. The ethnical stream pouring out from Scandinavia and Denmark along the South shore of the North Sea, though interrup-



ted here and there, pushed into the thinly populated Holocene and mingled with the chamaecranic wide-faced settlers along the edge of the Dunes, the Mediterraneans of a few Pleistocene islands amidst the Alluvial plains, and the brachycrania of the Scheldt-region. We must not suppose such a stream to have been a continuous moving mass of people, but, apart from infiltration and internal colonization, a series of "treks", at longer or shorter intervals, of small, or sometimes larger groups, often from the same, but frequently from different Nordic districts. They all moved along nearly the same course and partly supported themselves by hunting and fishing. If the road was barred, they settled for a time, until the increasing numbers burst through again by main force.

As the Teutonic languages were much more similar than now, they easily combined. As however in the original homeland there had been rather large racial differences, and the combination of elements from different countries augmented this racial mixture, the settlers could not be of a single type, although they were most probably more purely Nordic than the inhabitants of the Dutch Pleistocene.

Some of the new-comers sailed up the Dutch rivers and carried Nordic blood deep into Germany. A counter stream of Nordici, who had reached the Middle-Rhine region by land, and had got very mixed on the way, came down the rivers to the sea and spread out along the coast. Yet another stream went along the Baltic coast westward, crossed the narrow neck of the Cymbrian Peninsula (probably there was still a navigable connection) and continued their way to the North Sea. Though partly stopped by the wide estuaries, they were reinforced by streams coming down the Elbe and the Weser, and people from the German and Danish Pleistocene. Also down the Eem, which at that time probably reached the sea further West than at present, came the Eastern stream. They crossed the uninhabited moors to avoid the estuaries, and being arrested in their march by the peat bogs of Drenthe, they settled on the Holocene in Groningen.

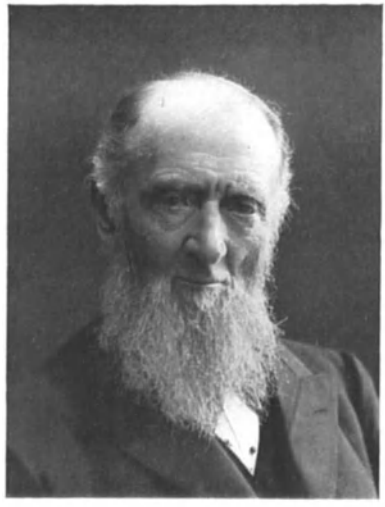
As the people of the Eastern Pleistocene of Holland belonged to the same well organised conservative and powerful group as those of Western Germany, who had probably lived there since the Neolithic period, no important ethnical or racial mutations will have taken place. And we do not consider it probable that large masses of people have entered the country through Twente and settled there. We should be more inclined to think this may have taken place through Limburg which has always been a throughfare from Germany into Belgium, where the roads through the valley of the Meuse meet those running along the Northern slopes of the German central range of mountains.

In connection with what we have observed of the difference between Friterpians and Groterpians, we think we are justified in assuming that the population of the former region take their origin from the Scandinavian stream, and besides this, also from the older Mediterranean stream. Both already included a short-headed

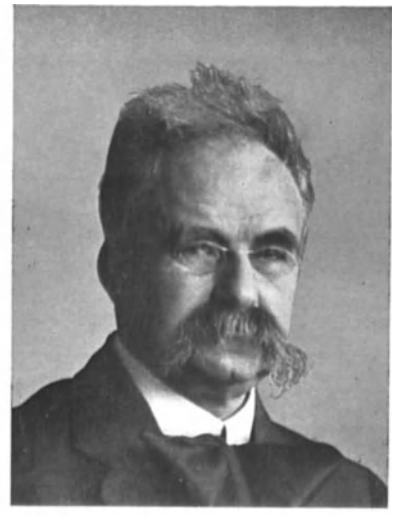
element, which, together with the two dolichocranic elements, has probably led to the trinomic character that has been so frequently met with in the Friterpian correlations. These three elements have become closely mingled in consequence of inbreeding, and their isolated condition in the Friterp region and more to the West. At a later date the Friterpians rose in culture above their surroundings and increased sufficiently in numbers to bring all the North-Sea coast, where they had already established outposts on their march westwards, under their influence as far as Denmark.

The Annales Fuldenses record one of these episodes, viz. the settlement North of the Eider, the inner road to Scandia (857): "Roric Nordmannus, qui praerat Dorestado cum consensu domini sui Hluthari regis classem duxit in fines Danorum et consentiente Horico Danorum rege partem regui quae est inter mare et Egidoram cum sociis suis possedit". This Frisian penetration was for the most part of a peaceable nature. Later, especially for building dykes round the new maritime lands. Similar emigrations went on up to recent times.

Groterpia, however, also owes its population in a great measure to the Baltic stream, which, in travelling mostly by land, lost some of its purity. The Mediterranean stream did not exert so strong an influence upon the Groterpians, but a mesocranic stream from Jutland so much the more, in consequence of which the broad-shouldered heavily built type became somewhat more prominent than the tall Scandinavian Nordic, and slight Mediterranean types. Although the difference was perhaps somewhat diminished at a later date by the Frisian counter-stream, the contrast with Friterpia was afterwards strengthened by contact with the mesocranic, partly even brachoid people of the Pleistocene. The addition of this later element may perhaps partly account for the increasing index cranicus since the Middle Ages. On the other hand, the brachyzation of the Pleistocene has been retarded by the absorption of dolichocranic elements from the Holocene, though the sandy grounds will not have attracted many immigrants till very modern times. Through the continual immigration of brachycranics to the Northern provinces of the Netherlands from the South-East (Middle Germany), especially in times of economic stress in Central Europe, the skull-index rose steadily, with



Dr. A. FOLMER



PROF. Dr. L. BOLK

Dr. A. E. VAN GIFFEN

Mrr. C. J. A. BOELES

agression towards the Eastern frontier. In this way the original difference between West and East was maintained.

The difference between the present-day inhabitants of the Western and Eastern provinces, and also the brachyzation of the former, may in a great measure be explained by the contact that has existed so long between the pure Nordic population of the Holocene, and the more mixed inhabitants the Pleistocene.

SUMMARY

Though our anthropographic environment is chiefly Nordic, during the last half century too much stress has been laid on the brachycrane element among the Netherlanders, to the neglect of the mesocrane element. The figures given by Prof. Bolk regarding the brachycranic part of our population are too high. We found no confirmation of Prof. Barge's opinion that at the present day the greater part of the Frisan people are brachycephalic. By our investigation of the Terpians we have shown that the mesocranics are indeed in the majority, as they were more than a thousand years ago. In order to do so, we laid down the following theses: The Connection between the Terps and the Pleistocene is an important fact in the investigation of the Terp-builders. Only autochthonic material has any value for anthropographic investigation.

The only Anthropographer whose investigation of the Terpians was based on personal inquiry, and from whom we have more garantee for the autochthony of his material, is Dr. Arend Folmer. As there are reasons for supposing that Prof. Barge's material was partly allochthonic, and very mixed, we could not make much use of his investigations.

An important problem that presented itself was: Were the old Friterpians and Groterpians of the same race? The older Anthropographers assumed this to be so without investigation. Another problem was connected with the increase of the index cranicus since the early centuries. *We found no confirmation for Prof. Bolk's supposition that the Saxons, as blond Alpines, must be considered as the brachycephalizing element of our Northern provinces.*

The absolute dimensions of the Old Friterpians and Groterpians showed that there existed great differences between them. The Nordic type was much more strongly represented among the Friterpians. The former generally presented the low Friterpian sub-type: and among the

latter the Row-grave type was more pronounced.The Friterpians were found to be dolichocranic and chamaecranic. The Groterpians were mesocranic and orthocranic. The Groterpians were more mixed and showed greater sex difference. Although there was no denying agreement between the two neighbouring Nordic peoples that inhabited the Terps before the Middle Ages, *the differences were so pronounced that we may distinguish a difference in racial composition between the two ethnical groups.*

In Friesland, in the age of the Terpbuilders, the length of the head decreased eastwardly, aud the faces grew narrower. The Nordic type was represented most strongly among the builders of the oldest Terps in Westergoo. The variability was greatest in East-Friterpia.

The persistence of a part of the Hunsingooers till the late Middle Ages shows that the phaenotypical change as a result of domestication must have been completed before the period of the Terpbuilding. The brachyzation is not phaenogenetic, but idiogenetic, and the result of the intrusion of allochthonous brachycranics. *The brachys have penetrated into the Terpdistrict mainly through the towns, and comprise already more than a fourth part of the population. In spite of this fact, the population of the Terpcountry makes no exception to the general Nordic character of our anthropographic sphere.*

In the Neolithicum the South of the Netherlands was settled by a partly brachycranic population. The influence of the British dolichocranics upon the neolithic Netherlanders will most probably not have been great: that of immigrants from the Baltic regions may have been important.

The Migration of Nations did not bring about a complete revolution in the Anthropography of the Netherlands. The present relations in the anthropographic conditions of our Northern provinces already existed in general outline before the Terps were constructed. The Friterpers formed an exception by their extreme dolicho type to the general mesocranic type in N. W. Europe. The increase of the breadth-length index from West to East, wich we were able to confirm for the Modern inhabitants of the Northern provinces, already existed however. The connection between the Terpcountry and the Pleistocene was close in Groterpia, less in East Friterpia and very loose in West Friterpia. Whereas Groterpia shows more resemblance to the people of the Eastern Pleistocene, there is a demonstrable

connection between Friterpia and the population of the Western Holocene. So it is probable that the higher index of the Groningers is the result of an early immigration from the Pleistocene. The differences between the two halves of the Terpcountry can be sufficiently explained by those between the mixed population of the Pleistocene, and the dolichocranics of the late Holocene, which was chiefly settled by Nordici. The brachyzation has since been augmented by the influx of round-heads from Central Europe, who are supplanting the Frisians more and more.

CHAPTER VI

THE LANGUAGE TEST

Up to the present we have purposely abstained from discussing philological and historic-cultural differences, because these are

not always reliable as a criterium of race, and frequently lead the inquiry in an undesired direction. If we now turn our attention to this matter, we do so in compliance with Prof. B o l k's expressed wish that *a posteriori* a common ground of agreement may

be found between anthropological and linguistic science. But, as was the case with the formulation of hypotheses as to the origin of Friterpians and Groterpians, this must be considered as a reluctant concession to the spirit of the age. It is probably still too early to be able to trust with confidence to these latter hypotheses and too late to base them on philology and cultural history.

Languages and Houses

The Frisian Terp-region lies entirely within the sphere of the Frisian language. According to Prof. J. Te Winkel's map, published in the Atlas to Gallée's *Boerenhuis*, the Eastern boundary runs for some distance pretty accurately along the tidal region of the old Mediaeval Lauwers. This is another proof that linguistic divergencies are not so easily erased.

In the border-region between Friesland and Groningen there is now a mixed dialect called the "Humsterlandic". K. ter Laan gives a boundary running from Kollum to de Wilp, so slightly farther east. The communities of Kollumerland, Nieuw Kruisland and de Achtkarspelen fall partly inside the Saxon boundary. Outside Woudic, a Saxon-coloured Frisian dialect is spoken.

The importance of this language-limit increases when we consider that the boundary line between the Frisian diocese of St. Willebrordus, in which the Frankish tongue had attained the ascendancy, and the diocese of Munster, already placed the Achtkarspelen (Eight Parishes) within the Saxon region (Huizinga). Considering what an excellent judge of the character and psychology of the people the Church has ever been, it seems to us not-improbable that a Saxon or mixed Saxon dialect was already spoken in the Achtkarspelen. So this district would come under the cure of Munster and be provided with preachers who spoke Saxon and had a character similar to that of the people. Altfrid, the biographer of St. Liudger [1]) ascribes the honor to this saint, and asserts that the district was added because he had preached there (± 785). But as biographers have a tendency to exaggerate interesting details about their subjects, we need not take this statement too seriously. Moreover, the fact that St. Liudger preached there, and not in the lands of the Frisians, may be considered as a hint that, at that time already, a different language was spoken there.

[1]) Vita S. Liudgeri.

It is remarkable that in the South the Frisian language-limit follows the little river Boorn, which we have already indicated as an important highway to the Pleistocene. Here a wide strip of pure Frisian extended eastward between the Friso-Saxon Stellingwerfic and the Woudic [1]) dialect.

Prof. te Winkel states that a dialect mixed with Saxon elements was probably spoken round about the Frisian towns. Can this indication on the map of his collaborator have had a share in forming the Saxon-hypothesis of Prof. Bolk?

Starting from the Fivelgoo region, one of the sub-districts of Groningen, the Eastern boundary of the latter dialect runs exactly along the Eastern limit of the Terpregion and the Western limit of the Dollart basin. This coincides partly with the limit of the district of tall conscripts (Bolk 1914). It also points to the long continuance of the differences in the dialects.

The close agreement between the Southern limit of Frisian and Friso-Saxon dialects, as marked on the map of Prof. te Winkel, and the limit of the Frisian type of houses on Prof. Gallée's map, shows that both dialects had probably been introduced into Groningen by immigrants, at least if the two scientists have not influenced each other in drawing their maps. Westerwolde has retained a particularly Saxon character, both in the build of the houses and in the form of the language, which, in connection with the course of the successive dialectical boundaries, points to a force acting in an easterly direction. As an argument against the opinion that both districts were at once inhabited by people of the same group, we may point to the style of the houses in the peat country of Duurswold, which has retained its deviating type, and where various old customs have been kept up also. Perhaps this goes to show that the Halle type was at one time dispersed over a large portion of Groningen.

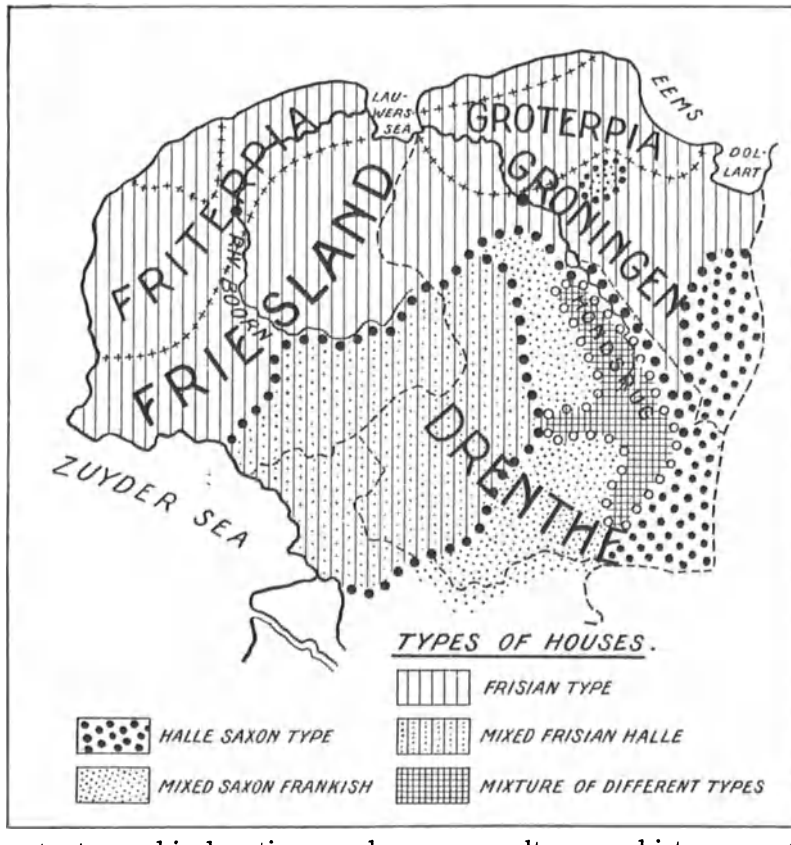
In Friesland the river Boorn again forms the dividing-line between the Frisian and the Friso-Saxon styles of building, which is another proof of the importance of this little river as a means of communication.

In Drenthe, the part with the most mixed styles is the Hondsrug hill region, along which ran the great high way from the South to

[1]) The topographic names in this district often terminate in „woud" (= wood): Dantumawoude, Veenwouden, Oudwoude, etc.

Groningen. There one may possibly even discern traces of influences from the South of the Netherlands. All this variety illustrates the mixture of races dwelling along this road and extending farther in the same direction.

But it is necessary to exercise extreme care in looking for analogies between such excessively complicated, and to a great



extent psychical notions as language, culture, or history, and the mainly somatic indications on which Anthropography is based; and we only set down these observations under extreme reserve. In order to avoid the risk of incorrect influences, and to keep our judgment as free from bias as we can, we have handled the psychic side of the problem as lightly as possible.

Yet we were obliged to treat the subject from this point of view, because the best known study of the differences between

Frisians and Groningers[1]), though almost entirely based on psychic characteristics, has finally resulted in the formulation of somatic conclusions.

The Boundaries of Frisia

Prof. J. Huizinga, one of our most sagacious authors and a fine stylist, has become famous in Holland by his descriptions of Mediaeval cultural and historic conditions.

The investigator commences his important discussion with the just remark that the assertions concerning the distribution of the Frisians as far as Flanders, rest in a great measure upon fantastic notions. He expressed the opinion that systematic inquiry, in which the anthropological method was kept strictly apart from the linguistic historic-cultural method, would prove highly useful. Therefore it is to be regretted that Prof. Huizinga proceeded to treat the anthropological, linguistic, and the historical-cultural ideas side by side, and as of equal value.

In a short study Prof. Huizinga attempted to show that before the late-Middle Ages the East-Frisians and Groningers were pure Frisians; not only on linguistic grounds, but probably also somatically. But these are two entirely different standards, which should be kept strictly separate. Yet the author did not always pay sufficient attention to this fact throughout his argument, and consequently, we sometimes get the impression that people coming from the town of Groningen and bearing Saxon names must be "indisputably of Saxon blood". For on page 37 the author assumes that as a rule", the occurence of Saxon names also means the occurrence of Saxon persons".

In order to give an instance of the resulting confusion, we print here the varying way in which the word Saxon has been used, though it would be hard to say always what exact meaning the inquirer has attached to it: Political, ethnol. p. 4; polit. p. 8; polit. p. 9; ethnol. p. 10; ethn., polit. p. 11, strategic p. 12; ethnol., econ. p. 13; church-hist. p. 14; ? (but this ground was Saxon from the oldest times) p. 17; polit. p. 20; ethn. p. 21; lingu., cult., anthrop. p. 28; ling. p. 30; lingu, lingu, lingu. p. 33; lingu., lingu p. 34; anthr. p. 35, anthr., lingu p. 36; anthr., lingu, anthr.

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[1]) J. Huizinga, Hoe verloren de Groningsche Ommelanden hun oorspronkelijk Friesch karakter? Driemaandelijksche Bladen 1914.

(racially pure Saxon) lingu, lingu, lingu, anthrop. p. 37; lingu p. 43; ethn. p. 45; lingu. anthr. lingu. p. 46; etc.

The list need not be extended. It would be enough to gauge Prof. Huizinga's treatise, as being mainly written on a cultural-linguistic basis. In fact, we should have treated it with less interest, did it not in other respects contain so much valuable information concerning our Northern population. The above examples are, however, sufficient to show that we are here but seldom dealing with an anthropological concept, but nearly everywhere with a psychical one, though, in some cases „Saxon" may be used in a somatic sense.

The author was frequently obliged to made a indefinite use of historical and cultural ideas, in consequence of insufficient data. He expresses the opinion that, "In contrast with the vagueness of the boundary on the south, the eastern boundary of the Frisian district, at least for the period since the Wanderings of Nations, is not subject to doubt". But, which boundary line is meant: political, cultural-historic, linguistic or anthropological? The land known as Frisian has probably never formed a political unity. From a cultural-historic point of view there were several divergencies, as we have seen from the finds in the Terps. Nor can any definite boundary line ever have existed either in an anthropological, or perhaps in a linguistic sense.

Afterwards Prof. Huizinga admitted that the Frisian limit on the "landside" remains extremely difficult to determine for the oldest times. And equally indefinite as the localisations in space, are the localisations in time. Almost all the data the author has supplied are either very doubtful or negative. So he writes that the Frisians did not expand considerably over the Western Holocene; they formed no united church, no central state, no geographic unity; they had no original laws of their own, and no emporia. The evidence for a distinct nationality of Frisians and Saxons is particularly weak. No facts, or feats of arms during there mutual struggles, are recorded. The distinction between Frisian and Saxon is mainly hypothetical. In the making of treaties no account is taken of difference in language or tribe. "What we can observe of the intrusion of the Saxon on Frisian ground, generally bears rather the characteristics of a peaceful, gradual, economic movement" wrote Prof. Huizinga (p. 13). But up to

the present historians have lacked the material for clearly recording a movement of this kind.Therefore, in this matter also, Prof. Huizinga's inquiry of the oldest times cannot but be unsatisfactory. But where then is the material for describing a racial struggle between Frisians and Saxons?

After all this vagueness, uncertainty and negation about the dawn of our history, it is remarkable that Prof. Huizinga can make the positive assertion that "Since the early Middle Ages the whole region from the Lauwers to the Weser, as well as the districts lying between the Vlie and the Lauwers, have been pure full-blooded Frisian" (p. 5).

The Chauci

Afterwards, it appears evident that Prof. Huizinga referred, not only to linguistic, and cultural, but also somatic conformity. But the opinon of the author about anthropology deviates from the common, for he writes that it makes no difference for his inquiry "whether the boundary line between Frisians and Chauci is drawn near the Eems or near the Lauwers, because, whichever of these two peoples inhabited the province of Groningen during the first centuries of our era, nobody can have any doubt but that since the Great Migration both Groningen and East-Friesland as far as the river Weser have been settled by the Frisians" (p. 5).

There are two possibilities: the Chauci were of the same origin as the Frisians, or they were not. After our investigation, the first supposition is not probable. But if the Chauci were different, the course of the boundary line is most probably of importance.

Evidently the investigator was himself in doubt about that unity, for later on he returns to the question of the Chauci and expresses the presumption that the East-Frisians had perhaps not been of such a pure race from the beginning. His argument was however entirely based on a study of names, and when this seemed to lead him nowhere, he ended the matter with the complaint "Here we have landed on quick-sands". A complaint which Prof. Huizinga has more than once had good reason to utter.

What do we know of the Chauci with respect to somatic evidences?

Already in the 16th century the Hamburg scientist Crantzius

asserted that the East Frisians were properly Chauci; Saxon by nature, and Frisian in name. So it is probable that the Frisians owe a good deal to these people. But what conception does the word *Chauci* call up in our minds?

Pliny the Elder († 79 A. D.) wrote as follows about them: "It is true that we have also mentioned various tribes dwelling in the Land of Dawn by the Ocean, who also suffered from this want (of trees). In the North we have even seen the Chauci, called respectively the Greater and the Lesser. With horrible force the Ocean bursts into the land twice in every twenty-four hours, spreads its waters out to a vast extent and covers a tract ever disputed by Nature, until it is uncertain whether it belongs to the mainland or forms part of the sea. Here dwell the wretched inhabitants upon high sand hills or upon mounds raised by human hands above the level of the highest tides, and upon which their houses are built. A people of navigators when the waters cover everything around, but more like shipwrecked mariners, however, when the sea retires and they chace the fish receding with the tide around their huts. These people are not permitted to keep cattle and live on the milk like their neighbours, or even to fight wild heasts, for not a shrub is to be seen far or near. They plait cords of seaweed and bulrushes to make nets for catching fish. They dig the peat up with their hands and dry it more in the wind than in the sun in order to cook their food and warm their starved bellies, benumbed by the north wind. Nor have they any other beverage than the rain water which they preserve in pits in the yards before their houses. And yet these tribes, were they to be conquered by the Roman Empire one day, would call it slavery! In truth, the Fates preserve many from just punishment." Liber XVI (1) 1:

This description, so remarkably trustworthy for the time in which it was written, being probably from an eyewitness, is certainly the most important source of our information about the Chaukians. But we cannot suppose that it is applicable to any considerable part of a great people, who perhaps inhabited the whole of East-Friesland, and possibly Groningen. Schütte suggests that it referred to the extreme outposts on the delta's projecting far into the sea. What do we know then of the real state of their civilization? These were poor fishermen using peat to cook their food and warm themselves. — That is all. Of

their character we may infer that they loved their freedom, but neither of their language nor their bodily form do we know anything with any certainty. Further we know, from other sources only that they were daring pirates. And yet they belong to the Roman border tribes, about whom we are most extensively informed. Of numerous others we only know the name. But, scanty as our knowledge of the Chaukians is, the mere fact that perhaps another people lived between the Lauwers and the Eems, is in itself of importance. If they differed somatically from the Frisians, which would not be surprising considering the exceptional racial habitus of the latter, the "Frisians" living between the Vlie and the Weser cannot have formed an anthropological unity either.

This throws rather a different light upon the supposed unity of the Frisians. Indeed, we have demonstrated more than once during our inquiry that the fact of an opinion being generally held as correct, does not guarantee its scientific exactitude. Therefore it is a pity that Prof Huizinga adduces no further proof in support of his opinion, than the following statements: "The Frisian language is spoken there, the people feel themselves to be Frisians, Frisian law is administered, and above all, the local names conform to the evolutional change of the Frisian tongue" (p. 6). Supposing this to be true, does it follow that the people formed a somatical unity with the Frisians? The answer must be an unqualified *no!*.

Before going into further explanations, let us divide the above generalizations into their four chief elements. As Prof. Huizinga founded the first opinion chiefly on the three latter suppositions, we ask: Assuming that the three latter assertions are mainly true, viz. The people felt themselves to be Frisians, the laws were Frisian and the local names changed with the evolution of the Frisian tongue, does it follow from this that Frisian was spoken everywhere from the Vlie to the Weser?

As is proved by the finds in the Terps (the Gold-treasure of Wieuwert a. o.) Friesland passed through a time of cultural and economic prosperity in the Merovingian and Carolingian period and probably also through a period of expansion. Frisian officials governed adjacent districts, the Frisians acquired landed property, and formed the better classes. Charlemagne sent presents of Frisian cloth to foreign princes. Frisian merchants sold their cloth all over Western Europe. Dorestad and Tiel, the principal

trading cities of the Netherlands of those days, were known as Frisian towns, although they were situated far from the parts were Frisian was spoken. The name of Friesland was applied to an extensive region, and, no doubt, numbers of "Frisians" spoke no Frisian, though the dialects did not differ so widely but people could understand each other.

The suggestive power of a name must not be underestimated. In those days it was far greater than at present, nor were people very particular about such matters. The Old English called their language Englisc (Anglisc) though they considered themselves to be Saxons, and many were, in fact, ethnical Britons. Prof. Huizinga tells us of the Groningen writer Rengers ten Post, who belonged by descent to the province of Drenthe, but who, though he lived in the 16th century, was so charmed by the Frisian name that he felt himself a true Frisian, and even thought his low Groningen dialect was pure Frisian. So it is no wonder that the peasantry of Groningen thought themselves true Frisians because they were called Frisian. The possession of such a name, though the owner may genetically belong to another group, arouses as national, provincial, or local a spirit, as the name "Zeelander" does to this day among the men of Staats-Flanders, or the name Hollander in Limburg, where two or three generations ago the people were half Germans. Even a difference of language has little influence on this. Though a feeling of common unity may rest on a historical, cultural or political basis among educated people, yet the masses will usually be led by names and symbols held in common.

An affinity of language, on the other hand, does not always mean national unity, even if the speakers belong to the same political group. In reply to Charlemagne's demand for military service as far as Sincfal (the frontier of Flanders) the Frisians requested the right "to defend the fatherland between the Vlie and the Weser by sea against the Northmen" (Richthofen Friesische Rechtquellen p. 16). So it seems that the Frisians did not include West-Friesland in their territory, though it was generally supposed to have a Frisian-speaking population. And though North-Friesland was probably already partly inhabited by Frisian speaking people, and is so still, yet it was not reckoned as part of the "fatherland" by the Friterpians either.

So here, language and racial affinity were no more proofs of

unity than language and nationality. In many cases these supposed relationships rest merely on names held in common.

Far too great importance has been attached to names, for want of more reliable data from these almost proto-historic times. This we have repeatedly pointed out. The fact has also been overlooked that many tribes were known to their neightbours by other names than they used themselves, and authors took the name of a small group for that of the whole people, whilst tribes adopted the name of a more powerful neighbour, just as vassals and dependants took those of their overlords. In the time of the Great Wanderings a common name formed the first and most natural bond of union. In the same way, the Frisian tribes will doubtless have joined together and extended their forces against the Northmen, against whom united action was of the utmost importance on such a long coastline.

Modern Ethnology has brought so many things to light about the naming of primitive and half-civilized peoples that we must be most careful in drawing conclusions of a linguistic, political, cultural, and, above all of a somatic nature, from the fact that the name of Friesland was applied to a great part of the Holocene extending from Flanders to Denmark.

Probably this name was applied from 500—600 to the region from Sincfal to the Weser; and after the middle of the 9th century, even to the Konge Aa in Jutland. In a considerable part of it the people called themselves Frisians, even up to the time when the Frisian language was no longer spoken. Besides this, the word "Fries" was supposed by popular etymology to mean "the Free", and the alliteration in "Free Frisians" will have sounded very attractive in Teutonic ears with their love of alliteration, and also have flattered their national pride[1]). The East-Frisians, who have undoubtedly spoken a largely Saxon language since 1400, except in a small district about Embden, still exclaim at their feasts: "Eala fria Fresena!" = Hail free Frisians! (Lüpkes). These words of greeting also occur in the national hymn of East Frisia.

The Frisian name has been repeatedly used to arouse the warlike feelings of the masses. Still in the time of the Spanish War — so at a time when the Groningers had ceased to speak Frisian — as

[1]) The explanation of the name as being connected with their long fair locks (friser) has become far less popular, because it did not appeal so strongly to their emotions.

Prof. Huizinga also admits, the half-forgotten Frisian name was revived by the Gueux to incite the country folk against the royalist townspeople in the capital.

So we see that the name "Frisian" bound many people of other race to Friesland. Even long after the Frisian power had waned, the name alone, whether rightly or wrongly, recalled affinity, perhaps a feeling of common origin. When the cultural importance of Friesland was a thing of the past for the surrounding country, the old Frisian laws were still in force, and perhaps rewritten in the new language. For ethnological science teaches that there is a strong tendency to retain old forms and half-understood terms in the practice of the law (S t e i n m e t z). There can be no doubt that after the Frisian tongue had ceased to be spoken colloquially by the better classes, the language, and later many terms and expressions, were still used on solemn occasions and in official documents. The written local names in Groningen and East Frisia also apparently changed with the development of the Frisian language, just as the North Frisian place-names afterwards followed the evolution of the Danish language (Lindholm, Ockholm, Horstedt, which are situated in Frisian-speaking districts) in the same way as the topographical names in Groningen and Guelderland are gradually adopting Dutch forms. Yet, though the written form may often appear to be pure modern Dutch, in the dialect of the people the names have remained as they were centuries ago. Consequently, even if the written form may alter with the language, in reality the name follows the phonetic development of the spoken dialect.

In our opinion, the fact that the people of a district considered themselves Frisians, obeyed Frian laws and lived in places with Frisian names, does not necessarily prove that the Frisian language was spoken there, but only that it was used by the better classes. At a later time it was ousted by Middle Low Germanic and subsequently by modern Dutch. There can be little doubt that Prof. Huizinga has lost sight of the difference between the written and the spoken language.

Not being trained philologists, we should not have ventured to raise these objections against the opinion of so eminent a historian and philologist, were we not assured that the Groningen dialectician K. t e r L a a n M. P., the author of the Nieuw Groningsch

Woordenboek, a lexicon of importance for historical and ethnological culture and folklore, differs strongly from Prof. Huizinga's conclusions, and agrees with our objections. Ter Laan believes that the concordance of the Groningers with the East Frisians is greater than with their Western neighbours.

Therefore we cannot but come to the considered conclusion that Prof. Huizinga's opinion that the people of Groningen and East-Frisia spoke Frisian before the late mediaeval period, does not rest on a firm foundation. Consequently there must be serious doubts, even on linguistic grounds, about the unity of the Frisians.

Metamorphosis of Frisians into Groningers?

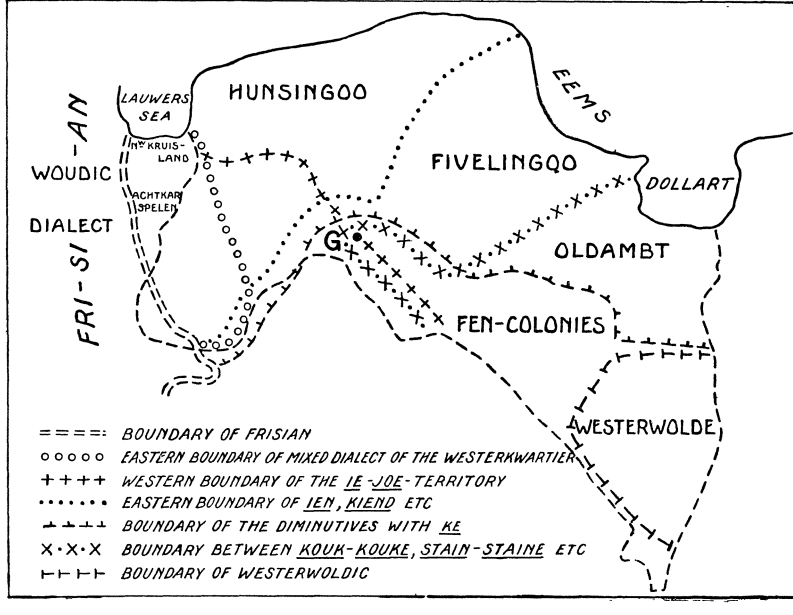
The Frisians of Groningen are said to have lost their original language under the influence of the town of Groningen. But Prof. Huizinga also says that East-Frisia has lost its Frisian character, though it does not contain a great Saxon town. So we may partly eliminate this factor from the process of development. Although the capital town has doubtless had great cultural, and possibly also racial influence on the province, yet we may see by the dialectic boundary-lines radiating in a West-South Eastern direction round the town, as they are indicated on the maps of Prof. te Winkel and K. ter Laan that the influence of the capital has not been strong in this respect. The fact that the North-Drenthian dialect spoken in the town of Groningen has not extended farther North, also shows that the influence has been small.

Prof. Huizinga supposes the course of events to have been as follows: "A Frisian people are overwhelmed by an invading stream of Saxons, socially declassed, altered by marriage, and finally so reduced in numbers that the elements who are properly of Frisian stock, lose their national speech and character" (p. 28). We can only say that the author offers very little proof of such a total conquest of the Frisians by the Saxons. At the outside, it may be supposed that the Frisian patriciate was supplanted by one bearing Groningen names and that these allowed Saxon speaking elements to settle in the province to supply the demand for labour. We could only speak of the people being driven out or overwhelmed, if great masses of allochthons invaded the land, as the result of important cultural changes. But Prof. H. gives no proof of any such cultural revolution, which moreover is not at all probable in these old

agricultural districts. Everything points to a peaceful penetration, which is often accompanied by assimilation with the original inhabitants. Social declassification of the Frisians is unconceivable in Holland, where any odium philologicum does not exist, and is opposed to the national character of the Groningers, who usually treat strangers with great consideration.

It seems most unlikely that the character of the Groningen people should have been Frisian originally, and gradually been altered through the influence of the town. With equal justice it

DIALECTS OF GRONINGEN (ACCORDING TO K. TER LAAN)



might be asserted that Groningen, the only Dutch town of importance outside the Western Holocene, is in a great measure the product of the Groningen ethnical character with the addition of a few favorable factors. No Frisian town could have exploited the surrounding country so mercilessly as Groningen tried to do, which in itself explains the hatred of the surrounding peasantry for the "Sassche Grins". "They would rather be strangled and killed than serve the "Trippentreders", or be governed by them." (Huizinga p. 69).

Had the people been Frisians, the town would also have become partly Frisian at an early period. The investigator has himself laid

too much stress on the exceptional character of the town. In fact the theory is physically impossible, and most improbable from a psychic and physic point of view. Yet we do not deny that there has been a continuous settlement of Saxon elements in the town. So it is possible that there was some difference in character between townspeople and peasantry, though it was certainly not so great as between Groningers and Frisians. To show this difference we give a short description of the character of each group.

The Groninger is a matter-of-fact and practical materialist, who looks more to the present than to the future. For him, a bird in the hand is worth several in the bush. He applies himself to the improvement of his property, tills the soil, builds factories, adopts mechanical improvements and division of labour. Though he is close-fisted he is not afraid to risk his money in a profitable interprise. Groningen men are at the head of many industrial and financial concerns in Holland, and they take a leading part in the socialdemocratic movement of this country. Generally speaking they resemble in some respect the Saxons in England, with their want of imagination.

The South-Groningers, especially, are sociable and companionable, and public life is more advanced in Groningen than in Friesland. Though the peasants of the Northern part are more reserved, the Groningers soon feel themselves at home among strangers, and make them welcome among themselves. The Groningen dialect enables them to make themselves understood all along the coast of the North Sea, and even along the Baltic as far as Riga, an advantage that the Frisians do not possess. This partly explains the lively trade relations of even inland towns with the Baltic region in the Middle Ages. The great number of Groningers among shipcommanders and also in the Indies and America, speaks for their love of travel and adventure, though the "beklemrecht" a kind of majorate that keeps the farms in one hand, also compels many younger sons to go abroad. The first Dutch airman that flew to the East-Indies was of Groningen extraction.

The Frisians, on the other hand, are more inclined to be idealists. If the present does not satisfy them, they look hopefully to the future, and they like to dwell on their famous past. They are interested in intellectual movements, and, in spite of their reserved, staid appearance, have an ardent love of poetry and natural beauty. Dr. Wumke's "Bodders in de Frijske Striid" is an instance

of this. The close ties that bind the Frisian to his country, induce thousands to go forth in Spring when the plovers lay their eggs, to spend weeks in the boundless green fields, enjoying the sparkling lights on the lakes, and listening to the sea dashing against the dykes, or the soft rustling of the reeds in the silver waters of the peaceful canals. The sciences are not neglected either, the Frisians being great lovers of mathematical studies. Though they are sincere, good-natured, munificent often [1]) they are also inflexible and stiffnecked. The emotional side of life is strongly developed; religious, social and political matters are widely discussed, and innumerable are the churches and meeting-houses in Friesland. Whereas the Frisians bore the brunt of the modern labour movement, the practical Groningers profited by the courageous sacrifices of these pioneers. The Frisians are at all times ready to serve the common weal, even if this demands personal suffering. Generally speaking, their character bears a closer resemblance to the Scandinavians than to the Mecklenburgers or Prussians. As the Groningers approximate more to the dwellers on the South side of the Baltic sea, and probably closer to their Eastern than to their Western neighbours, the Frisians bear more resemblance to the people on the North side of the Baltic.

If it is true that a love of wide distances is the essential characteristic of the Nordic mind, as Clausz (1925) says, the Frisian is a genuine Nordicus, whereas the Groninger would perhaps be more like the Alpine with his love of enclosed spaces, his supposed dislike of distance. Certainly, Frisians are more reserved and individual, and do not easily associate with strangers. This exclusivism may partly be explained by economic and historical circumstances and the narrow confines of the Frisian language sphere. It is also the result of racial difference. In this love of distance, the Frisians resemble the Hollanders more than their Eastern neighbours.

Though we have consulted the opinion of eminent students of our Nothern provinces, we feel convinced that such generalizations about national character are too subjective to be of much scientific value. Yet all this clearly proves that the psychic character of the two groups differs so widely that it is impossible to assume that

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[1]) As an instance of the difference in money matters between the two peoples, the leading Groningen book-seller told us: "the Groninger will walk an hour to a public reading-room to look into a new book; the Frisian will buy the book."

their characters originally were the same, but that in a short period of time, the Groningers were psychically changed by immigration.

Describing the modern Groningers, Prof. Huizinga writes: "The new Saxon inhabitants have adopted and kept up but little of the old Frisian tradition or of the fundamental popular culture, neither have they replaced them by others. These districts have acquired a dull and prozaic spirit, which, much more than in Friesland proper, seems to justify the old saying: "Frisia non cantat, Frisia ratiocinatur" (p. 77).

We are as little inclined as Prof. Huizinga himself, to believe that the Frisians are characterized by their lack of song and resemble "the people without music" on the other side of the North Sea, to whom they are so fond of comparing themselves. The Lyrical nature of many Frisians disproves it already by a long line of poets from the time of the Anglo-Saxon poet Starter, to the modern Waling Dijkstra, Halbertsma, Sipke Huismans, Pieter Jelles Troelstra and Meint Bottema.

As for the Groningers, Ter Laan collected so many songs, that the saying cannot justly apply to these people either [1]). One need only consult his New Groningen Dictionary to find so much tradition, legend and folklore, as will convince every one that they are anything but dull and prosaic, and without a fundamental national culture. This again goes to disprove the theory of later immigration.

In the 18th century numbers of German, and other labourers flocked in to work on the rich deposits of peat, so that a hundred years ago sermons were preached in German at the fen-colonies of Sappemeer and Veendam. This wave of immigration was certainly not less important than those which Prof. Huizinga has indicated in the late Middle Ages. All these people have been assimilated by the Groningers; giving up their speech, their nationality and customs, without entirely changing the character of the Groningers, though there is some difference between the Northern and Southern inhabitants of the Province. How could such local linguistic differences as we have mentioned have held their ground so long in the province, whilst in Friesland an insignificant group like the Hollanders in Het Bildt have never been assimilated, if it is so

[1]) De Riekdom van de Grunneger Toal, Groningen 1924, o.a.

easy to change the language of such a big population? Though it is very difficult to suppose an entire change of language, folklore and other manifestations of mentality, it is nearly impossible to believe in such a fundamental change of psyche as must be presumed from the great difference in the characters of the Frisians and the Groningers.

This latter change is of much more weight for anthropological science, whereas it is of secondary importance whether the Groningers in the early Middle Ages spoke Frisian or not. For, like clothing and other objects of culture, language is in a great measure adopted from others. Linguistics can only prove an intellectual relation between groups, but not that they are genetically related. In fact, a change in the language, the name and the customs of a people need not indicate a change of race. In all somatical matters the decision rests with Anthropology.

Prof. Huizinga, basing his opinion on a few vague historical data and presumptions resting on a shaky foundation, came to the following supposition: "Also, as far as one may define anthropological characteristics by the historic-linguistic name of Frisian, Groningen and East-Frisia stand in the same line as the Dutch Province of Friesland. Therefore we may consider them to have been a pure Frisian land in the Middle-Ages" (p. 6).

To our regret we cannot agree with this conclusion, which rests on little evidence and is insufficiently supported later.

Prof. Huizinga adduces no anthropological evidence in support of his opinion that the East Frisians and Groningers were somatically equal to the Middle-Frisians up to the late Middle Ages.

Saxon Immigration

Prof. Huizinga attempted to solve anthropological problems simply by linguistic-cultural-historical means, an attempt that had been made more than once before the present century. However, he practised Anthropology in a more original manner than commonly passed. He noted the supplanting of Frisian names by Saxon ones, and asked: "If at a given period we see the names becoming preponderatingly Saxon, does this prove that the Frisians have been supplanted by racially pure Saxons?" (p. 37).

So it seems that Prof. Huizinga thought the change of a name could also mean a physical change. It is almost unnecessary to say that this need not be so. The name is a mere label often telling

us nothing about the person who bears it. In Northern Friesland the Frisians have for many centuries borne Danish names, as Peter Henningsen, Jens Mommensen, Asmus Gottburgsen, Hans Magnussen, Broder Nissen. Further South the names are German. But the people all speak Frisian and have partly remained somatic Frisians. The names are probably not the result of Danish or German immigration, but of cultural intercourse with Denmark or Germany.

The author acknowledges that names are not always reliable proof of physical characteristics. He shows that the increase of Frisian names in the 17th century means very little, as they are often the name of the farm; "they frequently pass on intentionally in the female line, or are simply copied from others, so that they are no guide as to the descent, or the original place of residence of the people" (p. 63).

About the middle of the 15th century Low German supplanted Frisian as the written language, in consequence of which the Groningers, in the towns, and afterwards in the open country, first came into contact with the large flourishing district of the Hansa towns, and later also with the other parts of the Netherlands. At the same time, the introduction of the art of printing widened their mental horizon. So it is easy to understand that names derived from those parts were adopted instead of, or by the side of Frisian [1]) names. With the rise of religious discussion in the early part of the 16th century, and humanistic influence, the number of Biblical and Classical names rapidly increased. Many such names were widely distributed, and not specially Saxon. We readily assume that the tendency to change their names arose when wealthy townspeople of Drenthian and Westphalian origin acquired landed property and imported labour from other districts. But we must not exaggerate the effect of this stimulating influence, as Prof. Huizinga does, and speak of social retrogression and the loss of national character, reminding one of the catastrophic theory of Cuvier. The Jews are a living proof that the change of language, names, and nationality does not cause an entire change in the national character, and far less in fundamental psychic or physical conditions.

[1]) K. ter Laan considers it doubtful whether they were not old German names, not specially Frisian, thus native both to Groningen and Friesland.

We have already made it probably by anthropological means that the Groterpians, who already differed much from the Friterpians, have altered considerably since the Middle Ages. The change also took place in the Western parts of the country, farther away from any Saxon town. Prof. Huizinga's conclusion, therefore, is a confirmation of our own presumption that the immigrants came from the Pleistocene, whilst other factors point in an Easterly direction, where also, in our opinion, the origin of the Groningers must be sought.

We believe however that the strong immigration resulting in the establishment of the peat-diggings, i.e. since the end of the eighteenth century has probably had a greater physical influence, perhaps also in the other parts of the province, than the late Mediaeval immigration mentioned by Prof. Huizinga, and for which he has not yet shown convincing economic factors. In fact, we cannot possible conceive how such a sudden, great, somatical and mental change can have been brought about by an infiltration from Drenthe, Germany or elsewhere, in spite of Prof. Huizinga's criticism on Prof. Bolk's statements in "Het Boerenhuis", which becomes the more convincing by comparison with Prof. Huizinga's own work. In fact we receive the impression that it was Prof. Bolk's study that inspired Prof. Huizinga to make an attempt to confirm Bolk's theories by linguistic and cultural-historical means. As such, his work is deserving of praise, though it has not been quite successful in every respect. May our present efforts contribute towards a more successful repetition of the attempts to clear up the racial composition of this interesting part of the Netherlanders.

Prof. Huizinga's conclusion that since the Middle Ages a steady stream of immigrants entered in Groningen, accords with the results we have obtained, on anthropographic grounds, concerning important racial changes since that time.

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