Palæontology. — *The fossil human remains discovered in Java by* Dr. G. H. R. VON KOENIGSWALD *and attributed by him to* Pithecanthropus erectus, *in reality remains of* Homo sapiens soloensis [1]) *Continuation.* By Prof. EUG. DUBOIS.

(Communicated at the meeting of June 29, 1940.)

In order to give a still somewhat better idea of the dentition of Homo wadjakensis II, I reproduce in Plates III and IV, natural size, the telephotographic outlines of the fossil maxilla and mandibula, published $\frac{1}{2}$ natural size in 1920 (l.c.), before all the fossil pieces found were united, especially the right ramus with the corpus mandibulae, and 6 teeth, dropped on the spot, were inserted. Clearly these accurate outlines of the original fossils, including the occlusal views, (together with the two views of the casts of the completed upper and lower jaw, reproduced in Plate II) show the important fact that there did n o t exist any diastema, and that the upper canine did n o t penetrate between the lower canine and first premolar. In my eyes VON KOENIGSWALD's and WEIDENREICH's photographic reproductions of the upper jaw of "Pithecanthropus" skull IV, of Sangiran, January 1939 [2]), reproduced in natural size in the annexed Plate V, shows the same thing. The small seeming diastema of the authors can be put to account of the damaged and incomplete alveoli, the said penetration of the canine to account of its sagging.

It is interesting to compare with the dentition of VON KOENIGSWALD's finds, and the Solo-man skulls, a similar but elaborately described find of another fossil man related to the present Australian race: the skull of Talgai in Queensland, Australia, which, discovered in 1884, was elaborately described in 1918 [3]). This skull of a "male youth" (for m^3 was still

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[1]) Corresponding to this alteration of the title, the following corrections in the text of my paper of March 30, 1940 (Proc. Kon. Ned. Akad. v. Wetensch., Amsterdam **43**, 494—496 (1940)) may be inserted here:

P. 494, line 13 from below, instead of **is identical** read **belongs to the same group**
„ 495, „ 10 „ above, cancel **Homo wadjakensis II and**
„ 495, „ 25 „ „ read **an exact Solo-man skull.**
„ 495, „ 3 „ below, instead of **not** read **beit much**
„ 495, „ 2 „ „ place a note [1]) behind **II**: Concerning Sinanthropus pekinensis, see FRANS WEIDENREICH, The mandibles of Sinanthropus pekinensis: a comparative study. Palæontologia Sinica. Ser. D, Vol. VII, Fasc. 3, p. 33.

[2]) G. H. R. VON KOENIGSWALD und FRANZ WEIDENREICH, The relationship between Pithecanthropus and Sinanthropus. "Nature", vol. 144, pp. 926—929. Dec. 2, 1939.

[3]) STEWART ARTHUR SMITH, The fossil human Skull found at Talgai. Queensland. Philosophical Transactions of the Royal Society of London. Series B, Vol. 208, pp. 351—387. [Plates 12—18]. 1918. — See also EUG. DUBOIS, The proto-australian fossil man of Wadjak, Java. Proc. Kon. Akad. v. Wetensch., Amsterdam **23**, 1013—1051 (1920), p. 1028.

PLATE III. Homo wadjakensis II.

Nat. size.

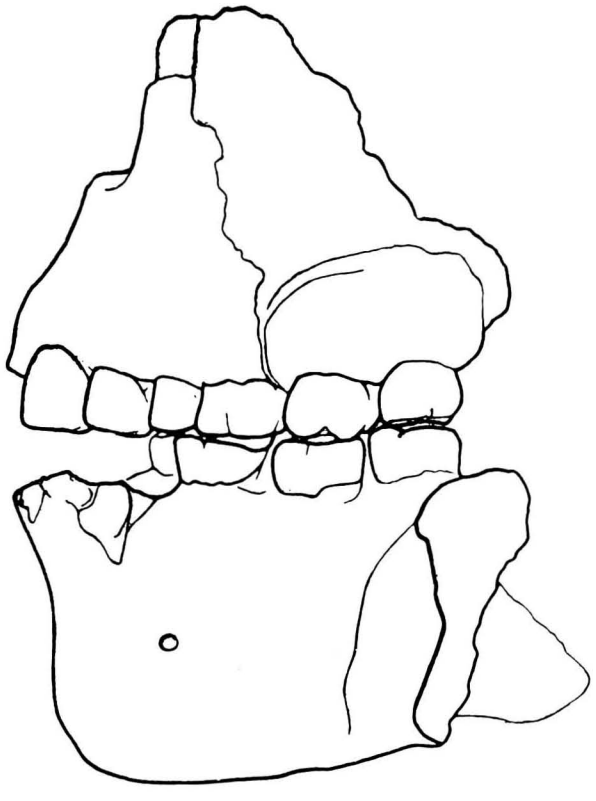

Fig. 1.
Left-side view of Upper and Lower Jaw.

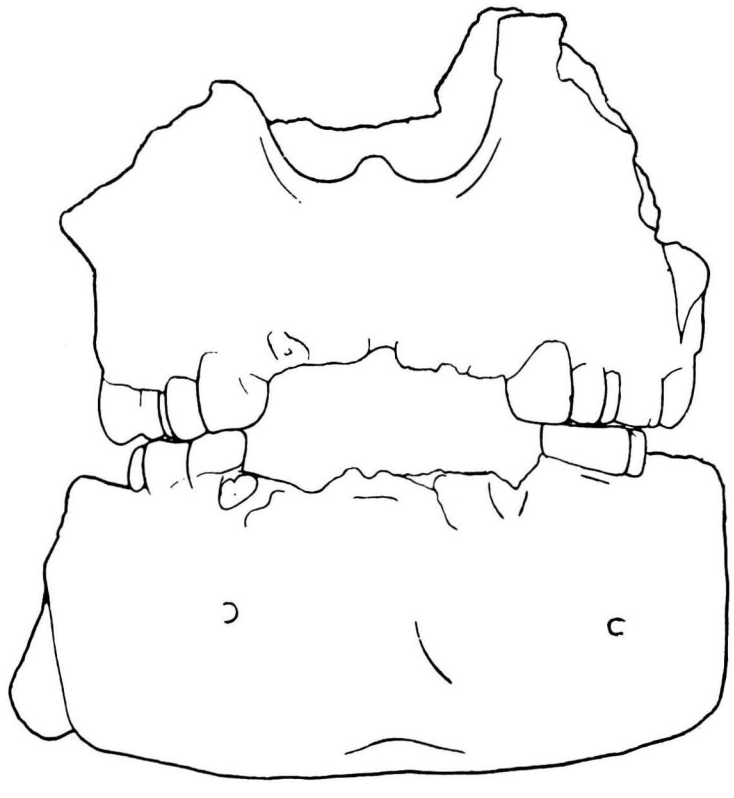

Fig. 2.
Front view of Upper and Lower Jaw.

PLATE IV. Homo wadjakensis II.

Nat. size.

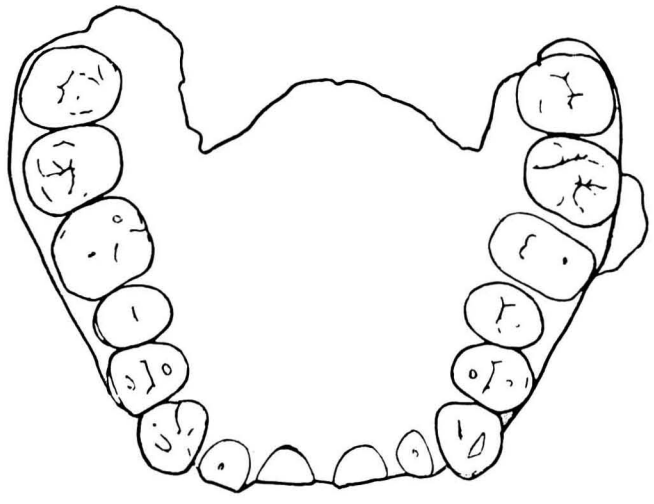

Fig. 3.
Palatal view of Upper Jaw.

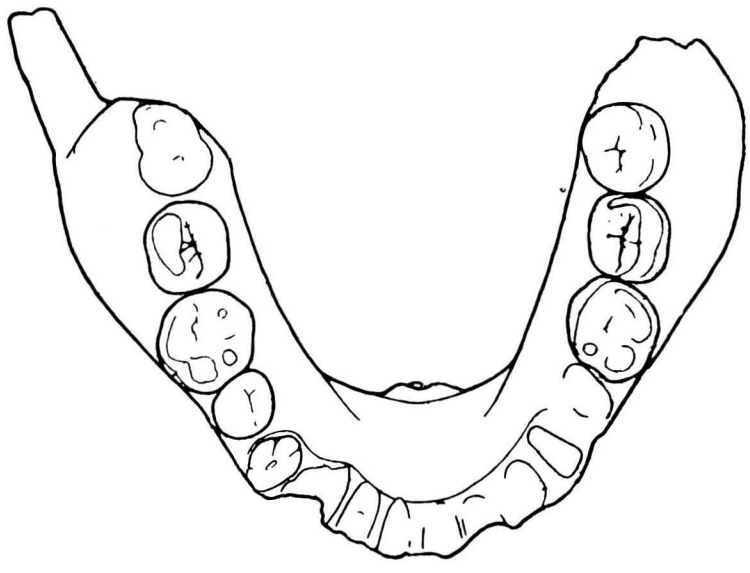

Fig. 4.
Lower Jaw, seen from above.

unerupted), though cracked *in situ* into numerous fragments, more or less considerably dislocated, but held in position by thin layers of calcareous earthy matrix cementing them together, the condition resembling a coarse mosaic, can yet be clearly recognized as not deviating in its general features from the present aboriginal Australian skull. The cranium as a whole, and the palatum, however, hardly admit of any reliable measurements. These can still be made at the tooth-crowns, each in itself, but most of them have more or less receded from each other; the apparent palatal area thus considerably exceeds the real, which, in my opinion, was no larger than that of the Australian native of present times. SMITH supposes that the upper canine, in an analogous way as in the dentition of the Apes, though without a true diastema in the maxilla, penetrated, almost ape-like, with its apex between the lower canine and the lower first premolar.

In my opinion there is reason to doubt this, on the ground of a comparison with the teeth of Wadjak II, especially on account of identified contact facets on the Talgai and the Wadjak upper canine. In his reconstruction, SMITH lowers the upper canine till the upper border of its crown comes very nearly on a level with the upper border of the crown of the premolar. Erroneously, for the crown-border of such a large upper canine as the Talgai one is always considerably above the level of the crown-border of the first upper premolar; in the maxilla of Wadjak the distance is 3 mm. This upper canine, therefore, cannot, in life, have projected so far downward. The canine of Wadjak II, which strikingly resembles that of Talgai, is also of equal breadth as the latter, and if its wear were as little advanced as that of the canine of the boy of Talgai, it would no doubt be as pointed and little shorter than the latter. For these reasons I cannot agree with SMITH in ascribing to the fossil skull of Queensland, which he too considers as typically Australian, "a human dentition in which these anthropoid characters are manifested in a manner quite unknown in man, except for the single example of *Eoanthropus*".

Now, twenty-two years after STEWART ARTHUR SMITH's publication, we observe, in a strikingly similar case, VON KOENIGSWALD and WEIDENREICH led astray to the same mistake, by the same belief in evolution from Ape to Man through gradual transformation of parts of the body. This belief, in matters of evolution, results from almost exclusive morphological consideration of the organisms. Hence the apparent inconsiderate supposition of those investigators, that the large, bestial, canines of the Apes are mainly organs of defence, and became gradually smaller and less apelike in the course of Man's phylogenetic development. Apparently, however, according to studies of the animals in nature, the large canines of the Apes are not principally organs of defence, in contrast to the canines of Man, but are specially adapted to the kind of food of those animals. Indeed, many years ago, EMIL SELENKA expressed this opinion with regard to the Orang Utan, studied in Borneo. If that is

true of the Anthropoids in general, as probably also of the Monkeys, and even, after all, of the Carnivores, such a gradual transformation from Ape to Man is hardly conceivable.

In the same communication on the relationship between *Pithecanthropus* and *Sinanthropus* ("Nature", l.c., pp. 928—929), VON KOENIGSWALD and WEIDENREICH give clear expression to their implicit belief in human evolution by gradual transformation, in the lines I may quote here:

"Considered from the general point of view of human evolution, Pithecanthropus and Sinanthropus, the two representatives of the Prehominid stage, are related to each other in the same way as two different races of present mankind, which may also display certain variations in the degree of their advancement.

"The Prehominids are separated from the Neanderthal group by a considerable gap. On the other hand, an apparently close relationship exists between Pithecanthropus and *Homo soloensis,* the skulls of the latter appearing like an enlarged form of the former. Certain peculiarities of Pithecanthropus reappear in exactly the same form in *Homo soloensis.* Those traits which suggest an already more advanced type, like the greater cranial capacity, and several other structural features, can be derived directly from Pithecanthropus, and correspond to the condition in the Neanderthal stage already attained by *Homo soloensis.* The two available fragments of the tibia of *Homo soloensis* show no special particularities, with the exception of a pronounced platymeria, exhibiting only recent human characters in their general form and in details.

"The finds reported herein show that Java has become the most important centre for the study of Prehominid forms. Not only Prehominids, but also the following evolutionary stage, *Homo soloensis,* are represented there. Furthermore, we know that the Wadjak man of Java represents another early form of recent man, whose upper jaw (Wadjak II) displays in some respects a most surprising resemblance to the Pithecanthropus upper jaw."

In reading this, we may not lose sight of the insufficiency, in geological as well as in morphological respect, of what we learned from the descriptions about the true nature of the fossils, as they were found by the collectors of VON KOENIGSWALD, or himself. This insufficiency, indeed, concerns the exact geological localization of the finds, as well as the original condition of the fossils before the restoration. Apparently, VON KOENIGSWALD, in his opinion about the true nature of his finds, does rely more on (insufficient) stratigraphical data than on unprejudiced examination of the fossil remains themselves. No wonder that his implicit belief in human evolution from Ape to Man, by g r a d u a l t r a n s f o r m a t i o n of p a r t s of t h e b o d y, according to the Darwinian point of view, would lead him astray about the true nature of his finds, and wrongly guide the hand which made the restorations.

Indeed, on closer examination, the fossil human remains attributed by VON KOENIGSWALD to Pithecanthropus, appear all of them to be, owing to

their morphological character, without any doubt remains of *Homo soloensis*.

This result of morphological examination does not fit in with VON KOENIGSWALD's opinion that his fossils belong to the Trinil layers, or even (the Modjokerto child skull) an older layer than these.

But circumstances of regional geology, as well as facts concerning the character and state of fossilization and the external appearance of the fossils, properties which they have in common with the Talgai skull, evidence that the skulls and jaws of VON KOENIGSWALD's "Pithecanthropus" belong to a relatively much later geological age than do the layers in which (in the years 1890, 1891, 1892, 1897 and 1899) I found real *Pithecanthropus erectus* fossils. In the regions where the remains of *Homo soloensis* were found, at Ngandong, and of VON KOENIGSWALD's "Pithecanthropus", at Sangiran, limestones of older formations come to the surface, to absolute higher levels than the Trinil layers. These limestones actually contributed to the "matrix" (composed for the greater part of d e t r i t u s from Trinil rock) of those human fossils, and determined character and state of the fossilization, which, as observed on the fossils of Sangiran and Talgai, were unable to resist the influences of wear in such an effective manner as did Trinil fossils.

Thus, also in geological respect VON KOENIGSWALD's finds are different from the real Pithecanthropus fossils. They are, doubtless, remains of *Homo soloensis*.

Concerning *Homo wadjakensis* and *Sinanthropus pekinensis*, we may remark that, although the character of fossilization is not different from that of *Homo soloensis*, the conditions of preservation at Wadjak and Choukoutien were better.

Naturally, I perfectly agree with VON KOENIGSWALD and WEIDENREICH in regarding *Homo wadjakensis* and *Homo soloensis* both as early forms of recent man (*Homo sapiens*). These forms, however, differ in some important morphological characters. Indeed, the Wadjak skulls lack the platycephaly, the torus supraorbitalis, the strongly expressed occipital slant, those conspicuous features of every Solo man, as also of "Pithecanthropus" Skull IV. On the other hand, Wadjak man Skull II exhibits a very pronounced chin, whereas, apparently, *Homo soloensis* possessed only a rudimental one, comparable with the t r i g o n u m m e n t a l e, which WEIDENREICH (l.c.) found in lower jaws of *Sinanthropus pekinensis*. The upper jaw, however, was probably of similar form in Solo man and Wadjak man; therefore that part of the skull of Wadjak man II displays "a most surprising resemblance" to the upper jaw of "Pithecanthropus" Skull IV, which really is a *Homo soloensis* skull.

Nevertheless, we may regard the two early forms of *Homo sapiens*, proto-australians of Java, as nearly related (they may even, as it seems, geologically belong to quite the same age), because those distinctive morpholo-

gical characters, as THOMAS HENRY HUXLEY [1]) said in the case of the Neanderthal cranium, "did not extend deep into the organization" — thereby, undoubtedly, meaning that they did not directly concern the a n i m a l o r g a n i z a t i o n.

Therefore, the morphological characters, especially of the supraorbital region and the occiput of the Wadjak II Skull, in contrast to the Wadjak I Skull, approach somewhat Ngandong skulls (*Homo soloensis* I and V), though the first Wadjak skull had come to light near the spot where in the next year the second skull was dug out, so that they are certainly geologically contemporaneous.

In this second Wadjak skull, the very prominent and low-lying arcus superciliares meet with a likewise swollen glabella, forming with it a much broader protuberance than the proper glabellar one, and melt together with the medial part of the orbital arch, as far as about the incisura supraorbitalis. The shape of the orbit is thereby made rectangular. Accordingly, there is above that broad protuberance, in the same breadth of ample 60 mm, a real s u l c u s supraglabellaris, the beginning of a sulcus supratoralis. There is, however, no f o s s a supraglabellaris, which is so characteristic a feature of the Neanderthalian supraorbital region.

The same form of the supraorbital region of Wadjak Skull II, now, is of frequent occurrence in Australian-aborigine skulls. Some of them approach in this respect the Neanderthal type still more, as far as to develop a real torus supraorbitalis reaching to the processus zygomaticus.

Of the Ngandong skulls (*Homo soloensis*) I and V certainly do this. Ngandong Skull VI, on the contrary, exhibits a transversally d e p r e s s e d glabella, thus entirely lacking the proper glabellar protuberance of Wadjak Skull II, and also of Wadjak Skull I. Nevertheless, Ngandong Skull VI possesses a moderately pronounced but real torus supraorbitalis, although this is interrupted in the middle. In many present-Australian skulls, also, the glabella is somewhat depressed transversally.

Apparently the different conditions of the supraorbital region in skulls of Australian aboriginals [2]) are represented, more or less separately

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[1]) Evidence as to Man's Place in Nature. London 1863. P. 157: "So large a mass of brain as this, would alone suggest that the pithecoid tendencies, indicated by this skull, did not extend deep into the organization."

[2]) HERMANN KLAATSCH, The Skull of the Australian Aboriginal. Reports from the Pathological Laboratory of the Lunacy Department. New South Wales Government. Vol. I. Part. III. Sydney 1908.

With this paper KLAATSCH, initiating investigations "based on principles of evolution", intended dealing with the skulls of Australian aboriginals, with special reference to specimens obtained by Dr. W. E. ROTH from different parts of Queensland. These skulls, comprising those of about ninety individuals, and deposited in the Australian Museum, Sydney, are of very great value in that their full-blood origin is assured. With a view to giving a general outline of the variations met with throughout a large number of the series, KLAATSCH has found it necessary to restrict special descriptions and

(selectively), in the Wadjak and Ngandong skulls, most strongly in the latter. The same we observe concerning the development of (1) the slanting nuchal plane; (2) the deviation of the dental arch from the horse-shoe form and resemblance to the form of the upper dental arch of Homo wadjakensis II (Plate V, Fig. 3), this being only relatively much broader — length-index **74** (identical with that of Rhodesian man), in contra-distinction to **90** of KLAATSCH's Australian R. 69 —; (3) the very pronounced chin. The existence of a trigonal mental prominence is the rule in the mandibles of Australian aboriginals [1]); (4) the platycephaly.

Abundant evidence about this varied skull morphology of Australian aboriginals is available in the collections of the Australian Museum, Sydney, of which KLAATSCH has made an elaborate study [2]).

The development of these features — in the opinion of the majority of anatomists — is a consequence of their physiological significance. According to the excellent investigations of TOLDT [3]), this development is directly correlated with that of the jaws in general, and the different parts of the apparatus concerned in mastication in particular. Accordingly they develop only at the same time with those parts, during the ontogeny. The pressure which, in the act of masticating, is exercised by the teeth on the upper jaw bone, is transferred to the frontal bone by three pillars: a nasal one and two jugal pillars. If the inferior frontal region is situated approximately in the direction of this pressure, it remains unchanged; with receding forehead and flattened skull (platycephaly), however, reinforcements in that frontal cross-beam come into being, especially in the case of a strong dentition.

Concerning the p l a t y c e p h a l y, we observe that, amongst recent races of man, the Australian aboriginal possesses the minimum of calvaria-

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illustrations to certain specimens which showed differences sufficiently great to warrant them being considered typical. —

Compare also the studies of D. J. CUNNINGHAM, The Evolution of the Eyebrow Region of the Forehead, with special reference to the excessive supraorbital development in the Neanderthal race. Transactions Roy. Society of Edinburgh. Vol. 46, Part II, No. 12, 1908. — Furthermore, the earlier studies of G. SCHWALBE: Studien über Pithecanthropus erectus. Zeitschrift für Morphologie und Anthropologie, Band I, 1899; also: Der Neanderthalschädel. Bonner Jahrbücher, Heft 106, 1901, and diverse other papers.

[1]) Concerning the Trigonum mentale, see: HANS VIRCHOW, Die menschlichen Skeletreste aus dem Kämpfe'schen Bruch im Travertin von Ehringsdorf bei Weimar, Jena 1920, pp. 51—64: Kinngegend. — Concerning the Australian aboriginal's dentition I may quote: T. D. CAMPBELL, Dentition and Palate of the Australian Aboriginal. Thesis, University of Adelaide, 1925. See particularly illustrations of **squarish front portion** of the dental arch, and of **parallel arch form**; the first feature, with a deviation from the horse-shoe form, is met with in the upper dental arch of Wadjak II; the parallel arch form is the extreme development of that deviation.

[2]) See note 2 of foregoing page.

[3]) C. TOLDT, Brauenwülste, Tori supraorbitales, und Brauenbögen, Arcus supraciliares, und ihre mechanische Bedeutung. Wien 1914. Mitteilungen der Anthropologischen Gesellschaft in Wien. Band 44.

height-index in relation to the glabella-inion line, (SCHWALBE's Kalottenhöhe-Index), 45, according to the reports of BERRY, ROBERTSON and STUART CROSS [1]), for 100 Australians, which minimum thus is below the index, 52, of Wadjak Skull I, whereas, according to the same reports, the medium in the Australian aboriginal race is 53 and the maximum 62. Wadjak Skull II, judging from the skull fragments, was possibly somewhat more flattened than Wadjak Skull I. Ngandong Skull VI, the only one of Homo soloensis which is so well preserved as to allow accurate measurements, in this respect, has an index 42; the index of the less well preserved Ngandong skulls I and V could not, apparently, differ much from this. Thus, it appears that the flattening of the skull in *Homo sapiens soloensis* was equal to that in *Homo neanderthalensis* — with calvaria-height-indices from 40 to 44.

Similar observations obtain with regard to a feature in the occipital region of the human skull, of frequent occurrence but different development: the torus occipitalis — being a swelling of the field between the lineae nuchae superiores (lineae nuchales terminales) and the lineae nuchae supremae (lineae nuchales supraterminales) — in recent races, especially again, in the Australian aboriginal, and the fossil races in consideration, comparatively the fossil species *Homo neanderthalensis*. It is, moreover, noteworthy that in Australian aboriginal skulls, alike in Ngandong Skull VI, only the medial part of each torus occipitalis half is developed.

Obviously, all those differences of features and conditions of homologic parts of the skull, in the Australian aboriginal, in Wadjak man and Ngandong man, comparatively in *Homo neanderthalensis*, have only mechanical (direct physiological) significance; they do not correspond to different stages of human evolution.

As Peking man (*Sinanthropus pekinensis*) has so many peculiarities in common with Ngandong man (*Homo* or *Javanthropus soloensis*) [2]) that both must be considered unquestionable members of the same proto-australian group, differences of features and conditions of those homologic parts of the skull neither correspond here to a different stage of human evolution. These morphological differences refer principally to a still more pronounced development of the torus supraorbitalis than in *Homo neanderthalensis*, and a correspondingly excessive flattening of the skull cap — the calvaria-height-index, in relation to the glabella-inion line, being so

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[1]) See quotations in: EUG. DUBOIS, The proto-australian fossil man of Wadjak, Java. Proc. Kon. Akad. v. Wetensch., Amsterdam **23**, 1018 (1920).

[2]) To the arguments given in my papers, quoted on p. 496 of the first part of this communication, may be added the demonstration of the similarity of the endocranial casts by C. U. ARIËNS KAPPERS in "The endocranial casts of the Ehringsdorf and *Homo soloensis* skulls". Journal of Anatomy. Vol. **71**, Part I, October 1936. Cambridge University Press. pp. 67—75.

low as 36 to 41, according to my measurements on the published representations of the skulls.

Another proof of Peking man belonging to one and the same group of proto-australians with Ngandong man and Wadjak man, is given again by the upper and the lower jaw. Up to the present there is only one upper jaw of Sinanthropus pekinensis available, but this, though slightly damaged, shows the features in question with sufficient distinctness. It is described and figured in WEIDENREICH's elaborate treatise on the dentition of Sinanthropus pekinensis (1937) [1], Text, p. 136; Atlas, Fig. 345. Here, unmistakably again, appears a striking resemblance to the upper jaw of Wadjak man II. For comparison of the dentition in the lower jaw, there is hardly anything more available of Sinanthropus than the alveolar arch of one specimen of sufficient lower jaw. But this shows at least probable similarity in the very large breadth-index of the dentition. [2] It is unnecessary to repeat the occurrence of the trigonum mentale in Sinanthropus, characterizing *Homo sapiens*.

Concerning the bearing on human evolution of the supposed similarity of the skulls of *Pithecanthropus* of Trinil and the (first) *Sinanthropus* of Choukoutien, implying near relationship, nay generic identity, it may now be observed that the real morphologic evidence is completely inconsistent with this supposition, which, indeed, is only based on the overlooking of this evidence.

Whereas, from the first, the gibbon-like features of the *Pithecanthropus* skull has always drawn the attention of those unbiassed by the preconceived opinion of human evolution by gradual transformation of parts of the body, others — and they were not a few — would not see those features, even their suspicion of prejudice fell on them who could not deny the existence of the features in question.

In reality the morphologic similarity of the large skull cap, excavated from a volcanic tuff, at Trinil, in 1891, and described in 1894 as *Pithecanthropus erectus*, to the homologous part of the skull of a small *Hylobates* species is most striking. Not only the median contour, but also the special form of the torus supraorbitalis and of the lower tabular part of the occipital bone, such as it was before it was naturally damaged in the fossil state, is quite gibbon-like. An absolutely distinctive gibbon-like feature, however, is preserved, just in that damaged region of the planum nuchale. One feature in this region the high situation of the linea nuchae inferior (linea plani nuchalis), in the Gibbons and the other Anthropomorpha, is very different from that in Man. Another feature, on the contrary, distinguishes the gibbons — *Hylobates* and *Symphalangus* — from the large anthropomorpha; this is the development, in the gibbons, of a deep

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[1] FRANZ WEIDENREICH, The dentition of *Sinanthropus pekinensis*. Palæontologia Sinica. New Series. D, No. 1. Peiping 1937. Text and Atlas.

[2] FRANZ WEIDENREICH, The mandibles of Sinanthropus pekinensis. Ibid. Series D, Vol. 7, Fasc. 3. Peiping 1936. See especially p. 100, Table XV.

depression below about the inner third of the linea nuchae inferior (linea plani nuchalis), that part of the linea, and the depression below it, serving for the insertion of the musculus rectus capitis dorsalis minor. In this respect Chimpanzee and Orang-utan are different, even more than Man. In *Hylobates* and *Symphalangus* the linea plani nuchalis is very much nearer the linea nuchalis terminalis than in Man; however, in *Symphalangus* it deviates relatively more at the crista occipitalis externa than laterally. This medial deviation is more considerable in Chimpanzee; but this feature there is variable, the deviation may be over a longer extent, as it is regularly in the Orang-utan, here with varying distance from the linea terminalis.

Now, the skull cap of *Pithecanthropus erectus* having lost in this region much of the superficial bone substance, with the crista occipitalis externa and all those lines, it has, nevertheless, preserved a large and deep united depression, corresponding to the place of insertion of the musculi recti capitis dorsales minores. The entire region has, undoubtedly, once been quite gibbon-like, but all the features had dimensions, the double of those of a present Siamang.

Needless to insist on the gibbon-like appearance of *Pithecanthropus erectus*, and on the unfoundedness of the conception of human evolution by gradual transformation of Chimpanzee-like ancestors.

The most important conclusion of a close examination of the Trinil skull cap is that the so-called *Sinanthropus pekinensis*, an indubitable *Homo*, is no near relation of *Pithecanthropus*, to say nothing of identity. The resemblance in the median sagittal contours of the two crania, which have about equal capacity, cannot surprise us, taking into consideration the mechanical significance of platycephaly. There are significant differences, as, above all, concerning the parietal vertex of the brain, a human distinctive which *Pithecanthropus* lacks, as do the Anthropomorpha and Monkeys.

As to the now known limb bones of *Sinanthropus*, they are, also in the eyes of WEIDENREICH, quite human; particularly the femur is in every respect of the *Homo sapiens* type, and the dimensions are such as correspond to the small cranial capacities. The six thigh-bones which we now have of *Pithecanthropus erectus*, all of them showing in the preserved parts the same morphologic deviations from the human femur, are, on the contrary, large in proportion to the cranial capacity. This does not fit in with the opinion that they might be human thigh-bones.

Concerning the teeth attributed to *Pithecanthropus erectus* one may refer, for the first lower premolar, to the resemblance to the homologous tooth of the gibbon-like *Propliopithecus* from the Oligocene of Egypt. As to the upper molars, it may be remarked that the shape of their crown not only resembles that of the homologous molars in the Orang-utan, but also, in some cases, in the Chimpanzee, and even in the Siamang, whereas the pattern on the crowns, as it appears to me, does not really resemble that of any orang-utan molar. On the other hand, I confess not to feel at liberty to attribute, with VON KOENIGSWALD and others, some

PLATE V.

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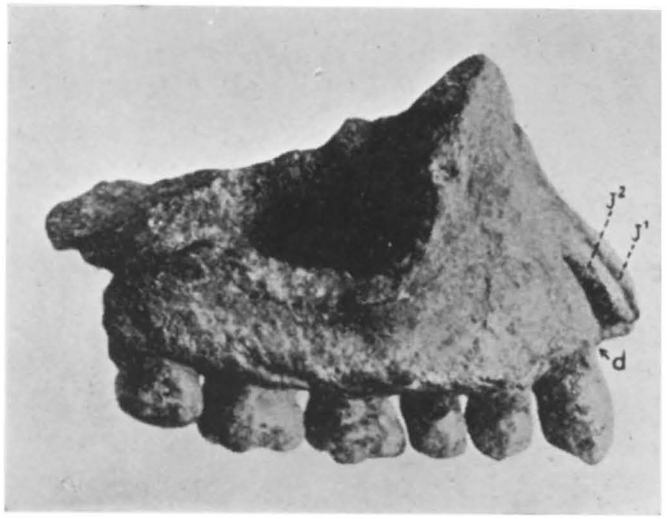

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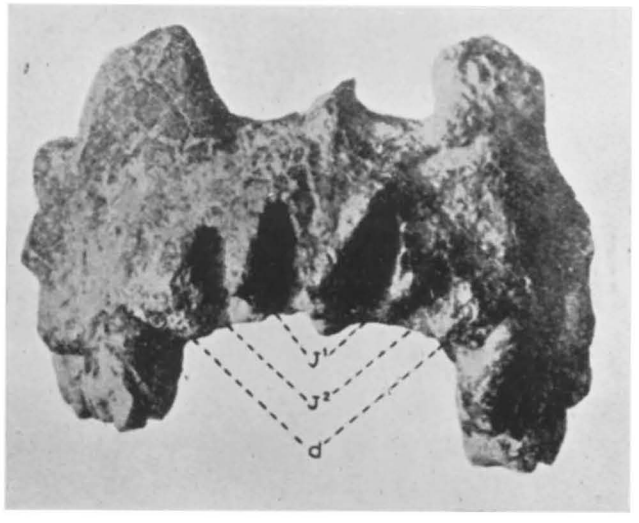
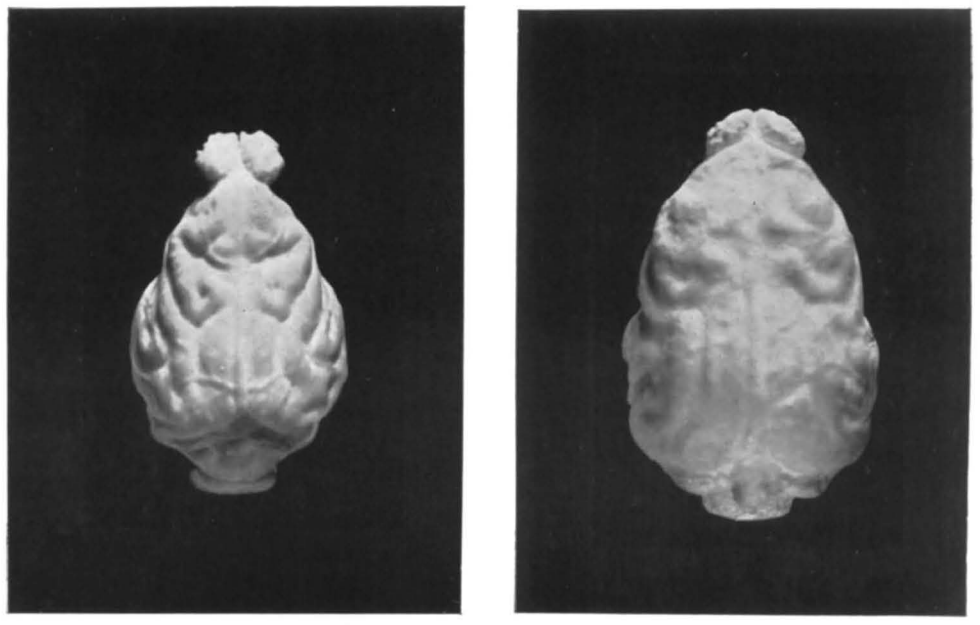


(*a*) Upper jaw of a male Pithecanthropus (Sangiran, January 1939), viewed from the right side. *d*, diastema; J^1, alveolus of J^1; J^2, alveolus of J^2. nat. size. (*c*) The same as (*a*) but viewed from in front. nat. size.

From "Nature" Dec. 2, 1939, Vol. 144, p. 927.
The figures one and a half times enlarged.

EUG. DUBOIS: *The fossil human remains discovered in Java by Dr.* G. H. R. VON KOENIGSWALD *and attributed by him to* Pithecanthropus erectus, *in reality remains of* Homo sapiens soloensis. *Continuation.*

PLATE VI.



Brains, natural size, viewed from above, of a Polecat (*Putorius putorius*) (left figure) and a Stone Marten (*Martes foina*) (right figure), both animals full-grown; the species are of equal medium size of body and reckoned belonging to the same family.

Proc. Ned. Akad. v. Wetensch., Amsterdam, Vol. XLIII, 1940.

fossil molars they found in Java and China, to fossil orang-utan; the pattern on the crowns showing more resemblance to the proto-australians of Java and China.

The insufficiency of the endeavours of WEIDENREICH, VON KOENIGSWALD, and other able investigators, to prove in China and Java the reality of human evolution in Darwinian way, by gradual, slow and steady transformation of parts of the body, is a consequence of their neglecting the holismic or *Ganzheits* conception of the organisms, firmly established by the researches in experimental embryology, on which conception, although having their origin early and spontaneously in another starting-point, are also based my own and LOUIS LAPICQUE's researches on phylogenetic progress of the brain, especially the cerebrum, in the Vertebrates.

Concerning the principal result of these researches I may here refer to the annex Plate VI, and, further, to my paper "Die phylogenetische Grosshirnzunahme autonome Vervollkommnung der animalen Funktionen" [1].

Obviously then, Man did not come into being in the Darwinian way, by gradual transformations required by the outer world power, but by inner world, autonomous, power. Nevertheless, Man is nearly allied to organisms even two autonomous degrees lower.

T h i s — near relationship to the Anthropomorpha, living and extinct — is admirably proved by comparative anatomy and palæontology; however, those sciences were not able to teach us more concerning a n t h r o p o g e n y than their own insufficiency. I refer particularly to the important and excellent researches in South Africa. Much other meritorious endeavour, in the same way, has had no other results.

In finishing, I may call attention to the fact that the proto-australians we now know: Wadjak and Ngandong man, Peking man, also Rhodesian man, all of them, have the same absolute and relative low cranial capacity in common with the Australian aboriginal. The race has apparently neither progressed nor altered i n t h i s r e s p e c t.

Furthermore, be it observed that, in accordance with the higher degree of autonomous brain progression, *Pithecanthropus erectus* possesses a calvaria-height-index equal to that of the s m a l l *Hylobates* species, not of the l a r g e *Symphalangus*, indeed the index of a *Hylobates agilis* being 35.5 and that of a *Symphalangus syndactylus* (both animals from the wild and full-grown) 24.5. The index of *Pithecanthropus erectus* was about 33.5.

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[1]) Biologia Generalis, Band **6**, pp. 247—292. Wien und Leipzig 1930.

(*To be continued.*)