The task was unquestionably difficult, since any of the man ancestors has managed to survive. And it is interesting to consider the condition of survival of this hominoides.

12 - Border effect and populations

It could seem that it is impossible now to ascertain events that happened long time ago, may be so much as 10 million years. But in fact, we have some data that will permit us to get an approximate idea of this events.

We have first to estimate the ecological and genetical circumstances in which hominization took place. To do this, we can ascertain the following:

a - Predopressure was potentially great in savannah.

b - Dynamos in a prehominidae population must had been very slow, since Man has between the lowest growing speed and the lesser fecundity in mammals, and probably, though in a lesser degree, can be estimated in prae-hominidae.

c - This two assumption, a/ and b/ seems to be contradictory. The only possibility is that predation being great, mortality was low. Prehominidae has to face this predopressure and has succeed in avoid it, without need of
Another interesting question to be considered is the social structure of the populations of hominidae. We can ascertain it by knowing that the social structures of living primates are the following:

Also, we know that in the more primitive hominidae, Sinanthropus and Pithecanthropus, there was great differences in size between males and females, much more accentuated that in actual man. Great males suggest a social structure in family parties of groups with more females that males. If it was so, thus, and since the sex-ratio at birth is 50% males and females, we must admit that competence between males, leading to selection, has existed, as in many animals. Male's competition, in mammals, lead usually to the evolving of:

1. weapons for fight between them, generally great canines. But as we will see after, development of canines is a way that do not leads in the hominidae way.
2. imposing aditaments and attitudes. This is the reason possibly for human beard and moustache.
3. in Man only, another factor that begin to has an importance in the Earth's history: intelligence.

The males excluded from groups or families, has probably to support the greatest predation and mortality, and were submit to a great selection. This only can explain the rapid evolution of the hominidae family, but I believe, based in ecological reasons that would be explain in other place, that usually, selection is much stronger in males that in females, and that this is a general law, in mammals.

From the exposed assumptions we can infer the genetical conditions of the populations of hominidae as follows.

1. - Linear dispersion under the border's effect —— genetical isolation.
2. - Great male's selection —— fast evolution.
3. - Long living dominant males —— great transmission of selected genes.

This implies, thought male's selection, an scarce importance of the "drift" effect of Sewall Wright. The local groups were probably exceedingly adapted to local, ecological conditions, and this supposed fact, combined with the genetic isolation, let us suppose that speciation was great, leading to a multiplication of subspecies ores.
especies. We know too few remains of primitive hominides to verify this assumption, but the poor representation of the Australopithecidae family that we know, so widely different, seems to confirm this suggestion.

It is known that living Pongidae, evolving under circumstances less extreme, has a high intraespecific variation of morphological characters. The variability of the number of lumbar vertebrae gets a 43% in Anthropoids, and the variation in length of the extremities is also great. In Man, the variability of the same vertebrae is only of a 10%.

But the actual uniformity of biotypes in living man is not a base to exclude the polyphyletic origin of hominides that the ecological bases exposed before let us suppose. In the last stages of his evolution, it seems probable - by only taken account of the historic events in Man - that the sellection of groups and the interbreeding has been very important.
We have seen that modifications of the face or splachnocranium are ecologically conditioned by food. An attractive theory explains also ecologically the evolution of the posterior part of the cranium.

Since 1922, Perez, it seems, called attention on the vestibular axe, and it was immediately followed by Girard, that in 1923 published the first study on the use of the vestibular plane for orientation of the head. Recently, Delattre and Fenart have demonstrated his important paper in the modifications of the skull. They have demonstrated that the line that unit the centers of the circles circumscribed by the horizontal semicircular canals of the internal ear (Vestibular axe) is the center of rotation of the occipital bones. It is contained in the

This theory suppose that the skull is organized by rapport to the vestibular plane, determined by the semicircular h
Delattre (Les processus de l'hominisation, C.N.R.S., 1958, p. 37-55) has shown the importance of the internal ear on the evolution of the posterior part of the skull. His thesis is that the axe defined by the line that unit the center of the cercles circonscrites by the horizontal semicirculars canals (vestibien axe) is the center of rotation of the occipital bones. The animal tends to keep his equilibrium with rapport to the ground level, determined in the skull by the horizontal semicircular canals, that determine a plane, the vestibular, in which the vestibien axe is contained.

During the evolution of the primates, the plane determined by intersection of the vertebral column in the head, that we can trace by the plane of the foremen magnum, is evolving from a nearly vertical primitive position (Insectivora) to an horizontal one (Man) passing through intermediate stages adopted by the simia (fig. .).

This evolution is followed by transformation in the posterior part of the skull. The temporal bone, containing the static system, remains in the same position, at the same time that the occipital bone descend and become horizontal. Thus the paleooccipital separates himself from the parietals, leaving an hiatus. This hiatus is thus fill by a new bone, the neo-occipital, of membranous origin, appears to fill the hiatus in the new open suture of the vault of the skull. At middel hight in the parieto-occipital suture, an small region keep his old conection. The parietal bones must extend forward and down to keep this conection,so well as to help in filling the hiatus of the vault.

At the materal, inferior region of the suture, appear also an hiatus, lesser in size that this of the vault.

"En résumé, au cours du développement évolutif du crâne qui l'emmène à la forme humaine, la rotation du paleo-occipital de l'ordre de 90° détermine une brèche virtuelle ou hiatus entre l'occipital (paleo-occipital) et les pariétaux.
Sur chaque hémicranée, cette brèche est divisée en deux hiatus secondaires par un pont osseux aux niveaux des angles asteriques de l'occipital et du parietaux correspondant.
L' hiatus supérieur est combiné à mesure de sa formation par l'occipital d'origine membranuse et par l'etallement des parietaux
L' hiatus inférieur est formé par l'exteriorization, la rotation et l'extension des lames mastoidiennes droite et gauche.
Un volume nouveau est ainsi créé; il dépend pour une part de la rotation occipitale, mesurée par la rotation de l'inion (angle iniaque), et pour une autre part de l'élargissement de l'écuille occipitale, mesure par l'écartement des deux asterions. Cet élargissement est en rapport avec le volume sacré des hémièdres. L'examen des cranes d'Anthrophides montre des images de transisition évolutive" (p. 44)
Debattre conduit à l'acquisition d'une expérience marquante par rapport auquel le cerveau s'organise, et ce s'organise par rapport à l'exemple.
The food in the past

We can approach to the food in early men or premen by 4 different ways, with wide different values:

- Direct knowledge of prehistoric men
- Origin of actual food.
- Prehistoric man.
- Incomplete evidence from Pithecanthropid and Australopithecines.
- By eliminating in actual food those objects not available for preintelligent men.

Other ways to approach the problem are: the study of tools, the study of teeth and this of the possibilities offered by the bioceneses where prehominides lived. But all this are left for posterior chapters.

<table>
<thead>
<tr>
<th>Basic food - cereals and vegetables (bibliography)</th>
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<tbody>
<tr>
<td>Actual</td>
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<tr>
<td>10,000 años Paleolítico-old civilizations</td>
</tr>
<tr>
<td>40,000 años Neolítico</td>
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<tr>
<td>600 años años. Australopithecines</td>
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<tr>
<td>Basic food - unknown. Only proofs of anthropologic and big game known (bibliography)</td>
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<tr>
<td></td>
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<tr>
<td>Basic food - unknown. Only a few remains of small vertebrate known or supposed (Canna Rodentia)</td>
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The tools

We are only interested in tools as an index of the first steps in the hominization way. Thus we have to consider only a few things.

a - Land living Baboons have been seen using a stone to kill and open scorpions.
   Coquir la fure complete - Coquir cómo utilizar los peñidos

b - First tool in man. - Pebble culture.

A gruious eater, tosses pebbles from a distance, knowing it unadid. He has used it to process nuts, to mash seeds etc., for so many years over years. By use, the stones become. It was at the same time that he first maul. We use the broken stones for dusting press, these become greater with the evolution of intelligence.

He arrived at the same time to the referral and to the big game.
To explain now the evolution of the teeth, it is necessary to accept first two reasonable conditions:

i - It seems logical that the size of a tooth is in direct report with its use, the more used, the more it becomes greater. Thus this enables us to estimate where the resistance point is situated in a molar series, by considering what is the greater molar.

ii - The size of the teeth can be estimated by his length. This is not always exact, because the molariform surface is a product of the length by the largest, but is more easy and practical to estimate only the length. Hurzeler has do so, in his well known paper on Oreopithecus, and we can do so profit from his figures.

This accepted, it is my purpose to see the variations of the resistance point in some dental series. As result from the formulae of the 3 orders, if the larger the resistance arm (thus the more postward the greater teeth), the more powerful the mandibular arch, and that let us suppose that the more granivorous is his possessor. As a result we can infer the seeds eaten nature of an Simia by knowing the position of the larger molariform teeth.

In this assumptions, we are in condition to examine, for example, the graphic of the relative size of 3x3 teeth, of Hurzeler (1958, Oreopithecus bambolii Gerv. D'Aroxi, Vol 69, p. 38-39) of the low mandible, in a new light.

As seen before, in the dental series we has to consider two different resistance points: The canines, connected with the temporal muscle, and the rapidity of the bit, and the molars, connected with the mastectic muscles and the power of trituration. But this does not mean that the evolving of canines suppose always as defensive evolution, (since canines are widely used by frugivorous animals to eat), nor that molarization forcibly implies a granivorous regime.

The examination let us to separate the two groups, apes and hominidae by the usually admitted character of the molarization of the P₂, that indicates a more granivorous regime, the molarization total surface becomes greater.

In Pongidae, we see that M₃ is greater than M₂ in the more terrestrial species. Hylobates and Pongo, arboricolal, has it small. In Gorilla. Dryopithecus and Theropithecus, is much greater. Since Pliopithecus, that we has add to the Hurzeler's graphic, has a greater M₃, it could seems that he was a more terrestrial ape that living Hylobates.

In the hominid group, there are two different trends. The more primitive, Oreopithecus and Paranthropus, has all the teeth increasing in size from J₂ to M₃. The resistance point is thus going postward during this evolutive period. They become more and more granivorous and terrestrial, thus, if this theory
is correct.

But the Australopithecidae become intelligent. They change regime as stated before; they use fire, and tools to soften the seeds, and start to eat meal, much more soft also. Thus the resistance point is coming forward, simultaneously at the same time that the molar series is contracted and reduced. The greater molar, $M_3$ in Paranthropus, become $M_2$ in Sinanthropus and $M_1$ in Homo.

At the same time, the relative size of incisives and canines increase. This could be a consequence of the evolving of language or not, and it is out of my purpose to study it.

In the fig, we has reasumed the evolution of the dental series in man. The drift of the resistance point as a result of cerebralization and change of regimen is notorious.

(place for the fig.)
Between the Cynocephaloids, the weight is also as a rule greater than the weight of the tree living Monkeys. Some Baboons, Gelada etc are gigantic animals. We can then suppose that there is a threshold in size for arboreal primates, and that this threshold, in attempt of precision can be estimated at about 6 kg.

The first land living hominidae, the Australopithecidae, weighed between 22 and 27 kg, and inhabited countries far away from the equatorial forest. I do not know yet if Oreopithecus was or not arboreal, but, being in Europe, he cannot have evolved brachiation, if our supposition is correct.

The ecological conditions of brachiation

We can conceive that brachiation has been evolved by apes, surpassing the arboricolal size and inhabiting in equatorial forest. The animal brachiating (fig. ) pass from a branch to another, or run along the lianes, hanging from the hand. This suppose several modifications in the hand that are of interest, as previously explained, since they determine the loss of the precision grip (see fig. ).

But the animal resting arborecolal sought brachiation escape his predators easily. He does not need evolve great canines for defense and this, we will se after, can be one of the more important evolutive factors, approaching his skull morphology to these of Man.

Nevertheless, brachiation is only a solution of circumstances, that enables medium weighed animal to remain arborecolal, but that has to has also a limit. The heaviest build Chimpanzees and Gorilles are largely terrestrial, and this is very noticeable in the old males. Heavy male Gorilles rarely climb to the trees, and it is well known that they stay at night at the very foot of the tree were the family spend the night. In the yet more heavy Mountain Gorille (G. g. beringei) arborecolalism is so rare that the foot has evolved in a Man-like manner, losing partly theprehensibility of the tumb. All this terrestrial old males evolve impressive canines, and will see ather that this made him separate of the cerebralized medium-type of Simioides. Thus the increasing in size of the phylum will end the actual brachiants again to the land, the threshold of brachiation being surpassed. This threshold can be up of 12 kg (Symphalangus). And.

When the Hominidae become terrestrial ? Many things in our organization seems indicate that we descendt from brachiant apes. But our precision grip states that we are ecologically nearer of the land living Monkeys from which we are well separate in the structure of the molars. The Simioides preceding Man has had to pass one or two size tresholds, and I am prone to think that Man separated from Anthropomorpes in the first.

The heroes are the origin of man.
Hylobates moloch
andrewsii (from photograph)
Incidential, of Gibbons from Photographs from American Primate Expedition.
By comparing first of all with those of Primates, it seems
result that the main difference is that for the purpose to eat growing
the ancestral adaptation necessary for this kind of food, a prehensile
grasp and a milling apparatus, were more developed in it that
any other Primates.

From this, it result that man, instead of a
slow-caterer of the slope prior to cerebrolization, the ecological
downstream of hominids unique human this diet is discussed
in concern with time of other Primates.

It is found that the change in diet from frugivorous diet
required the asceticism, to omnivorous and posteriorly later to
tropical omnivorous diet determine changes in the mouth, palate
and teeth can be observed in the known facts. Also, it
is possible that these changes could had an importance in the
evolution of human social and cerebrolization.

Acknowledgement

I thank Prof. B. Malendec and Rev. de Bounaues by
encouraging me to finish this project. Prof. M. Aquasie,
S.I., Prof. Bounaues, and has helped in the duration
of data, and in the written lectures of this manuscript. To
Conclusions

According to the exposed reasoning and data, it seems possible that some species of *Homo* Primates were obliged to become terrestrial, probably as a result of the increasing size of the philum, and that they found immediately a biotope, the savannah, where the leguminosas and gramineas abounded, providing the new terrestrial animals with a new concentrated food, the seeds. They changed their diet, improving parametrically.

To take it all, the prehominidae will then need to evolve a precision grip, that was the hand. This excluded the possibility of use it in locomotion, and so the prehominidae acquired verticality. So doing, the cervical column pull the occipital bone to gyre around the vestibian axe, and the volume of the cerebrum was increased, at the same time that the sphenoidal angle was close.

Seeds being hard, small piedes, the prehominidae has need to evolve a triturating apparatus by multiplying the number of cuspid of the molars. To mill the seeds, the jaw acquired a rotatory motion, which excluded the existence of canines and diastemas.

To increase the power of the mandibular lever, they would use by preference the last molars in the dental series, what then become the greatest. Simultaneously, the power of the lever was increased by modifications of the face, that acquired an human shape, with strong frontal torus. Possibly that result in molars becoming hysodont, and the palate excavate. The maxilar borders took a semicircular shape and entered under the skull. All that could has result in a motion of the face downwards and postwards, encrasing possibly the occlusion of the sphenoidal angle.

A terrestrial animal, without claws or canines, must had been completely unable to defend himself against predators. But prehominidae could has escape predation by spending but little time in land, since they get a food with a great amount of energy (calories) most of his time was then expended in the security of the trees or rocks, thus disposing of a great quantity of free time that implied the use of observation capacities. Also, they were obliged to live in the proximity of refuges, being thus unable to occupy the treeless plains. They must then has lived in the borders of biotopes, in small, isolated populations, and in this conditions of transition of genes, could had lead to a rapid evolution, possibly originating very different populations or/and species.

It seems to be verified that when prehominidae arrived to the Australapithecidae stage, they start to use tools, probably for smashing grains. Intelligence was evolved by this time, and permit them to take small animals, thus changing his diet for a more soft food.
The change of diet seems to be at the origin of the losing of the characteristic of a granivorous diet, manifested in the reduction of the number of cuspids in the molar teeth and in morphological changes in the mandibular lever, that enters also in regression. It seems possible that this reduction postwards of the splanchocranium further encrease the occlusion of the sphencoidal angle.

When evolving weapons, Men were able to defend themselves against the great cats, Thus all they do not need to be restricted to the borders of the biotopes, and they could spread all over the world.

Summary

By comparing the food in Man and others Primates, it seems to result that the basic difference is that Man has evolved as a granivorous animal. The morphological adaptations that would impli this diet, are thus studied. It result that all this adaptations are found in hominides, having bibliographic base of all, or can

This modifications affect to the hand, teeth and face.

Acknowledgements

I thank Prof. B. Melendez and R.P. Aguirre, S.J., by the help they has give me in the consult of litterature and discussion of ideas, and to...

for the critical lecture of the manuscript and complementary data.

Instituto de Aclimatacion de Almería.
Consajo Superior de Investigaciones Científicas.

Almeria y Madrid, Mars 1962.
José A. Valverde.
a. Land descending.

As the filum increased his size, a generalized type of arboreal and frugivorous primates were obliged to become terrestrial. Consequently, a new biotope, the savannah, where fruits were rare, but seeds of *Leguminosae* and *Cucurbitaceae* abounded. It changed the diet, becoming granivorous.

To do this, he must evolve a precision grip. Thas was the hand. This excluded the possibility of use the hand in locomotion, and so, the prehominid acquired verticality.

So doing, the cervical column become vertical, and he dragged the temporal bone to an horizontal position. The temporal bone, remained static, since it contained the horizontal channels of the internal ear, and the occipital gyred around the vestibial, separating himself of the vault of the skull, and producing a grasp that was filled by a new bone and a prolongation postward of the parietals. This give a new volume to the head (Delattre's theory), and partly flexed the basis of the skull. (fig. a)

The new food exiged a change in in teeth. To smash seeds, he must get an united and enlarged *molar* triturating surface. Then, the number of cusps in the molars increased. PM2 become also molarized. A new rotatory motion of the jaw was also necessary, and this was impossible if the canines, entering each one in the diastema of the other, blocked this rotatory motion. Thus canines become incisive like, not surpassing the height of the other teeth, and diastema disappeared, giving an united surface to the dental series. (fig. a)

Seeds being a hard object, the prehominidae need to increase the Fosse of his mandibular arch, that functionates as a lever of 3 order. Thus the face was modified such to as increase the force of the maseteric and *mmmmmmmmmmmm* anterior part of the temporal muscles. The insertions of the maseteric become more separated, and so the cigomatic become higher and the angular apophysis of the jaw lower. Also the temporal muscle become longer vertically, by descending of the coronoides and possibly expansion of the forehead. (fig.)

At the same time, the force arm was elongated forwards. Thus, the coronoides separate from the condyle, *mmmmmmmmmmmm* drifting forwards, ans dragging the cigomatic arch, in which window was contained. Also the maseteric muscle become forwards, pulling
the zygomatic and the angular apophisi of the jaw.

By using the last molars, mechanically more potent, they en-
cresced his size. The Resistance point become postwards, and so do the Resistance plane. The dental arch is become semicir-
cular, what leads postwards more teeth ans is mechanically better. During this procedus, the position of the dental plane by re-
port to the vestibular piane nan probably not change, keeping
the same angle between them, posibly by some ecological reason
depending of the catch of food and/or terrestrial habits. Thus,
the general encrease of size on the mandibular arch, combined
with the general postwards motion of the Resistance plane, made
the face gyre negatively (fig. 1).

This gyre has some important results: First, to get the same
dental plane, now down, the posterior molars must descend. The
palate thus become excavated, and the molars, possibly, more
hispodons.

b - The angle formed by the dental and resistance plane is
closed. The faring is pushed against the basilar surface of the
occipital, and excavate the base of the skull. This motion, combined with the negative gyre of the face, oclu
the sphenoidal angle and flex more yet the basis of the skull.

c - The strong jaw, with protuberant angular apophisis, stro-
ke against the neck during this retrogression.

Lips are evolved as a needlet to separate the seed of extrange
objects taken by the precision grip. They made a similar effect to
the valvulae of the rodents. The same tongue, become carinone
to operate easily the seeds, small and hards. Thus, the palate
excavated, lips and tongue prepare mouth for language. (ver len-
gus en loros)

All along this procedus, as the dental plane become down,
the orbits become greater.

All the force of the maseteric muscle and the condyle is
applied against the zygomatic arch. This is fortressed by being
ticker and the support of the supercilior torus, that
become so powerfull. As the canines are small, it does not need
of this support, as Gorilla needs. (Zinjanthropus)

In this stage an Australopithecidae skull is get. In some
cases, the anterior part of the temporal muscle need
also an osceus suplementary insertion, ans a sagital crest, appear
in the forehead. (Paranthropus crassidens).  

The encephale develops in the new volume of the skull. The
regions of the cortex correspondig to the lips and hands get a
great importance, while the corresponding to foot remain small.

During this time, prehominides has to support a great predo-
pressure, but they can not evolve canines for defence. They has
arrived to spend but little time on ground, where they are exo-
sed to the attacks of great cats, by getting a food that having
a great energetic contents, permit it to expend many ours in the security of the trees or rocks. During this free time, the observation capacities is evolved. The increased energy of the new food is probably then directed towards the growing of the encephale, with exigis a great expend in energy, and in the new volume of the head, it increase his volume, may be by mutations leading to mitosis of the nervous cellules (theroy of)

This prahominidae are obliged to live near the refuges, profiting of the effect know as "border's", and can not spread over the trees or rockels plains, owing to predation. They geographical distribution must had been then lineal, dividing the whole espieces in numerous populations, rather independing or with scarce genetical relations.

In this small populations, it is probably that the genes can had transmised rather independently of his biological posibilities, since predation is avoided and food get. This can originate a drifting evolution, under the Sewell Rieght Effect, and numerous espieces evolved. Next, probably, key height collection of nucle.

By imitation, some of this populations can start to use tools, want was, in the early stage, mostly used to smash seeds, being simple pebbles taken in the grevells of the rivers. This fact, simultaneous with the growing of the encephale, leads to a first culture.
It seems to be verified that when prorominides arrived to the stage Anthropopitheciae, they start to use very simple tools, probably useful only to smash grains, giving origin to the "pebble-culture". Intelligence was evolved by this time, and permit them to take small animals first, juveniles of great animals either, and big game later. This represented a change of diet for a more soft food.

This change of diet seems to be at the very basis of the reduction of all the mandibular arch. The same way, but in contrary sensus, that the granivorous stage has realized, was follow by this hominidae. The reduction of teeth, of number of cuspids, and the advance forwards of the resistance point, at the same time that the family encreased his size, were the result of this change of diet. The appearance of more and chew in chew is warm with this reduction.

It could then seems difficult to explain why, during this late face of evolution, the occlusion of the sphenoidal angle encreased, since the resistance plane was coming forward. The possible answer is that this plane does not change his angle with the vestibular plane, the reduction of all the mandibular arch being so in nature as to made advance the resistance plane relatively, but not absolutely. (fig. 1), passing from the 3rd to the 1st molar.
COMPARAR CON CONCLUSIONES.

28. FINAL CONSIDERATIONS.

May be the best word that we can give to a theme is the conjunction of the problems that it must help to elucidate.

So thinking, I have transcribed the last chapter of Ptolemaic (Trata de Zoológicos, Thl. III, 1457) and the paper where the problem of humanization in our current prehistoric study where the humanization is summarized in the most important respects, and made a list of problems and answers that the theory these explains can explain.

1. Intrinsic original —,. Missing.
2. Intrinsic type —,. Not answer, but it originated from Pongade, in an early stage of their line.
3. Belonging to the Miocene —. Evolved potentially to carry influence type, as a result of new diet.
4. In the order of the result — one of the best clarifications of humanization, as a result of grain-eating.
5. Members were specialized — Neander, that is now specialized in the grass crop, and first in a response to the environment type to terminal life.
6. Response of the teeth — result due to the change in the causes of having diet, and for all from the change to short feet after the humanization.
7. Humanization — result of the increase size of the brain.
8. Liberation of the hand — and need for the precision grip.
9. Evolution of the tooth — (Pleistocene) for the precision grip.
10. Functional changes of the teeth.
11. Theory of adaptation, primitive lack of defense.
13. Creation of the men for house precision grip and free-time—
15. Reflection —.
11. - Height at the base of the scull. - Rotation of the occipital was
probably the单价 of a face without angular
jutting and aptite lines.
12. - Tons - Needs of the quanunious, not unwell in quanunious
soft areas.
13. - Occipital Tons - Drayed by rediability of the heat over the
vertebral column.
14. - Pharyngopharynx - Finally, the ret conditron result of the
weakness pure of Central complex, but was
no need longer muscles. Spherical form of the
head to keep equilibrium. (Woodward)
15. - Weakness of the frem - A put humdrr result of the
no need of developed defense against predator
related by central defense. Firstly sexual
selection.
16. - Mouton - A result of teeth regression under the change
of diet.
17. - Complication of central base - ?
18. - Teeth evolution - From before.
19. - Physiological structure of human teeth - Numerous small
and with differentiated species prior to humanization,
under the body's effort, a few diversifying slightly,
off they, and may be only one continuously evolving. So,
fast, the more intelligent species a human being to point.
20. - Place of Man in Nature - A prey evolved under
very special circumstances to become a predator, though
evidence of intelligence.

This end with this paper, that I believe it is

(End of notes on the other side to continue.)
The faunistic aspect of the countries where the gallery forest meets the savannah is well known. Out of the main forest, small groups of trees offer refuge here and there, and many of this are Leguminoses. Bush and tall grass cover the ground.

Where two main biotopes meet, life is very rich, and the abundance of species and individuals is greater than in one of the two biotopes considered separately. This is ecologically known as "border effect", and has considerable importance, since many species, unable to occupy one of the biotopes, can only live in this zone. It offers a variety of food, and provides good protection against predators.

In Africa and Asia, this is the biotope inhabited by the great cats, the worst enemies of the Simioidea. Nevertheless, the semiterrestrial Monkeys live here, as for example the Macaca, Papio cataractae, Papio cynocephalus, P. ursinus, P. papio, Cercopithecus hamadryas, and Theropithecus gelada. Many of them prefer to the arborous savannah the rocky slopes of mountains that afford also a refuge against predators.

The abundance of edible plants for a granivorous animal must be great, since in a short reiew of literature, [not very clear, but it seems to be a list of plant species] are interesting to man.

All the plants of tropical Africa, though I do not know his exact biotopes. It seems to me that there is a possibility of determinate, by the study of the edible plants eaten by the terrestrial monkeys and the primitive peoples, what was the biotope more alike for the first hominidae to appear, since it seems that the African Rand—There has not greatly changed since the Miocene.

What seems out of any doubt is that a Simia obliged to become terrestrial in tropical Africa or Asia, meet immediately a biotope where the fruits and leaves disappear and are replaced by seeds and roots. This last food has, incidentally, a much more higher calorific power, and would permit an animal keep the same basal metabolism, activity and fecundity under much more cold climates. Thus, an animal eating concentrate food of this type, can spread out of the equatorial zone, and so do both Cynopithecoids and men. We know that they have in common the precision grip and the molarization.

VALOR-CELLO