

Web: www.l2a.in Email: l2adelhi@gmail.com

Anthropology Test Series – October 2021

Anthropology (Test code: AN4+TS02-21)

Mobile no:

Email id:

Name of the Candidate

Narayan Amit Malempati

CSE Roll no:

1006210

Place

Hyderabad

Time

4 pm

Test No.

2

Class room

—

Distance Learning



Date

/11/21

INDEX TABLE

Q. No.	Maximum Marks	Marks Obtained
1	50	22 1/2
2	50	28
3	50	
4	50	28 1/2
5	50	24
6	50	
7	50	29
8	50	
9		
10		
11		
12		
13		
14		
15		
16		
17		
Total Marks Obtained		132

INSTRUCTIONS

- Do furnish the appropriate details in the answer sheet (viz., Name, Admit card no and Test Code).
- There are EIGHT questions printed both in English and Hindi.
- Candidates has to attempt FIVE questions in all.
- Question No. 1 and 5 are compulsory and out of the remaining, THREE are to be attempted choosing at least ONE from each section.
- The number of marks carried by a question/part is indicated against it.
- Answers must be written in the medium authorized in the Admission Certificate, which must be stated clearly on the cover of this Question-cum-Answer Booklet in the space provided. No marks will be given for answers written in medium other than the authorized one.
- Word limit in questions, wherever specified, should be adhered to.
- Answers of questions shall be counted in chronological order.
- Any page or portion left blank in the Question-cum-Answer Booklet must be clearly struck off.

Signature of Examiner

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Feedback/Comments

Dear Aloraym Amit

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"you have attempted well"

Anthropology Test Series - I

AN4+TS02- 21

Time allowed: Three Hours

Maximum Marks: 125

All Questions are compulsory

Word limit in questions, wherever specified, should be adhered to.

This is Question-cum-Answer booklet, questions to be attempted in the provided space

SECTION - A

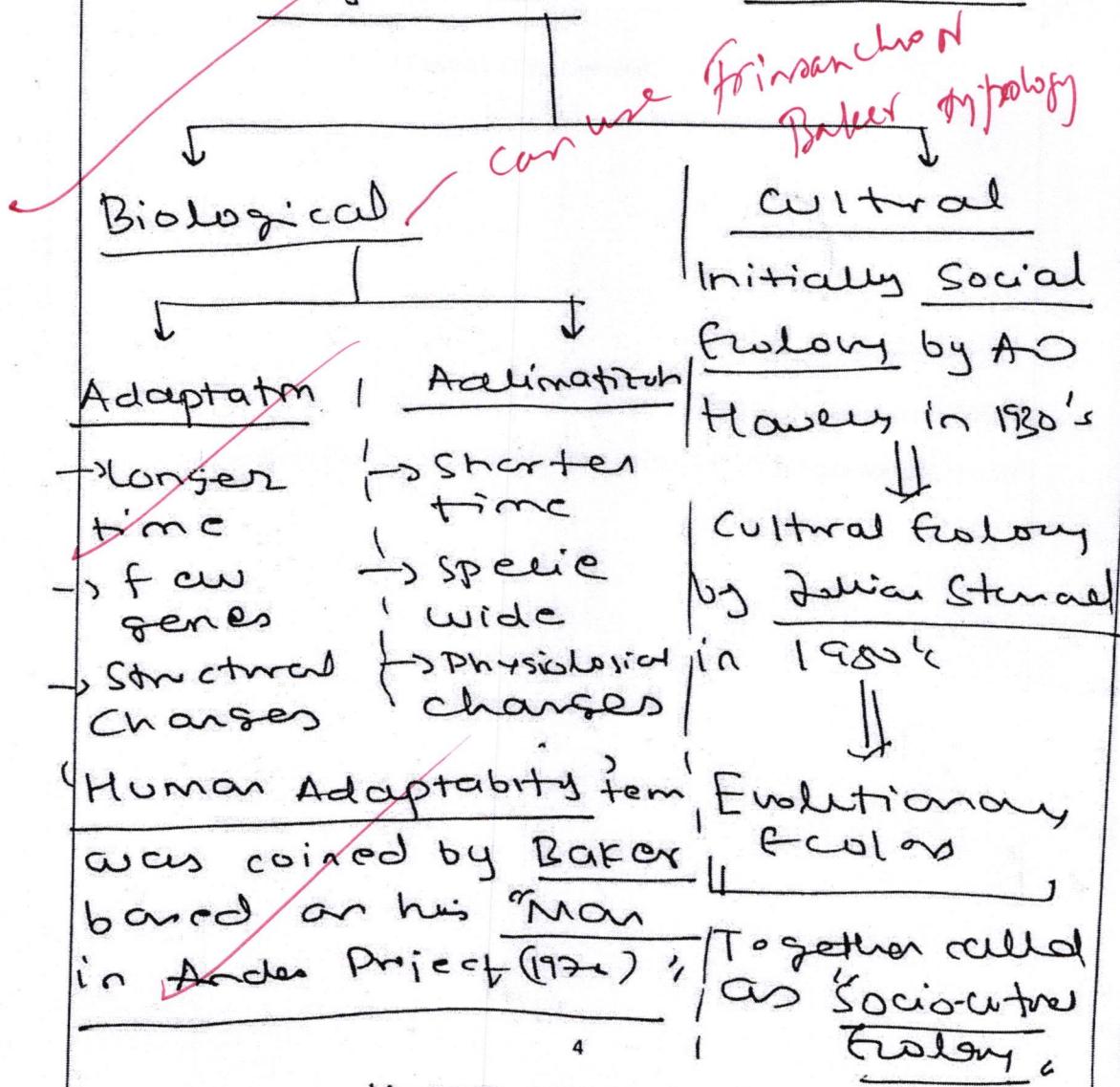
Q1. Write notes on the following in about 150 words each

(a) Modes of adaptations in humans

$10 \times 5 = 50$

10

In Human Ecology; we study various 'modes' of adaptations and Adjustments to stresses.



Hence these are primary modes of adaptability/adaptation to stresses

Stress

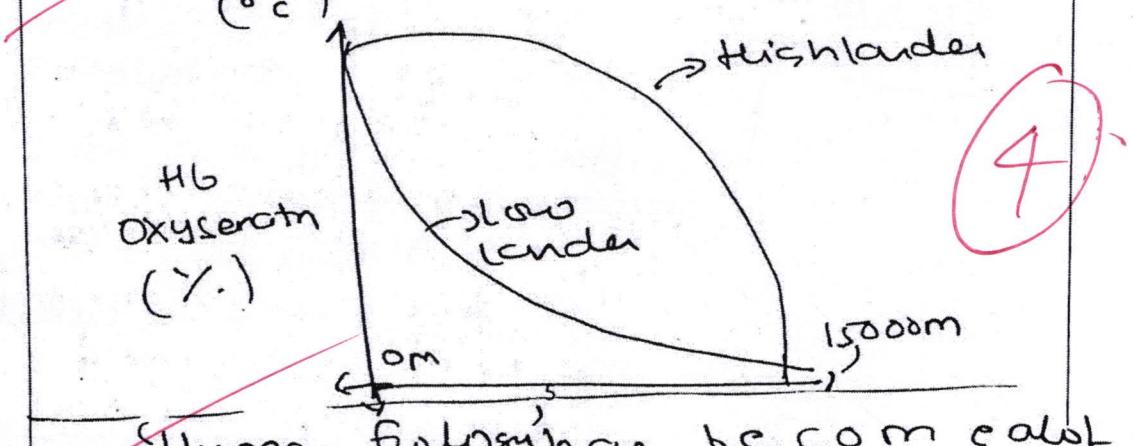
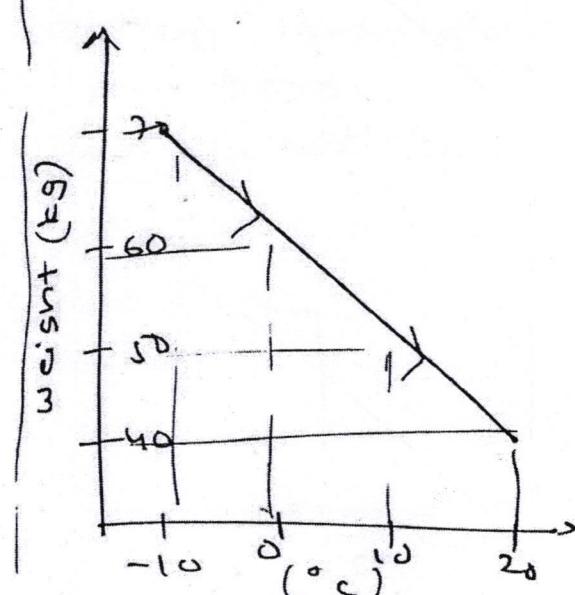
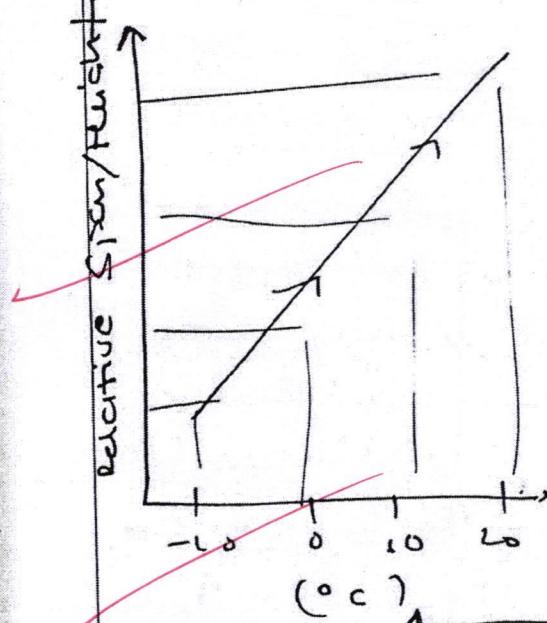
Any change in the homeostasis condition i.e
natural equilibrium.

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~~A little do~~ cold heat wind Disease

Alles Rule

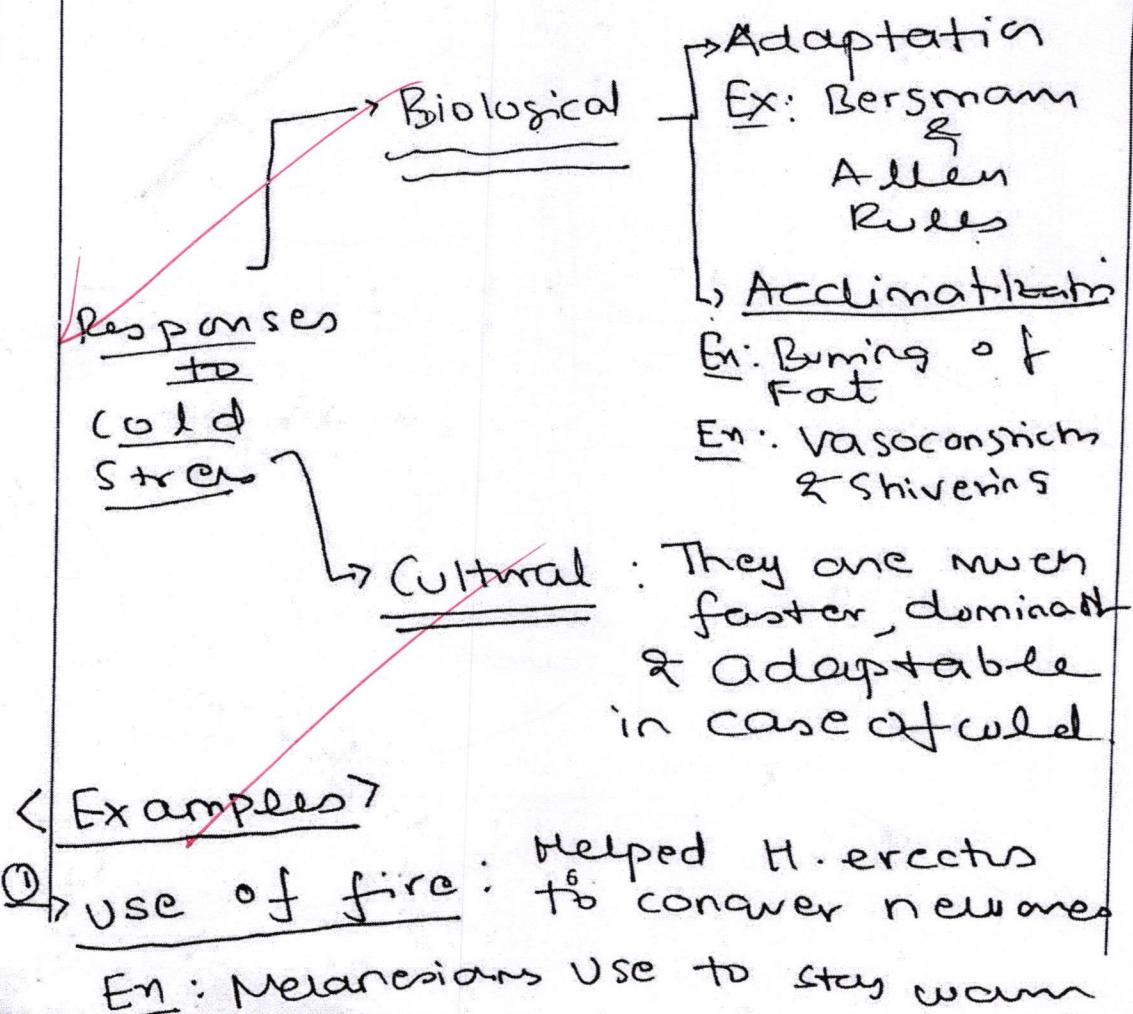
Bergman Rule



Human fitness has become more relevant due to climate change & also lockdowns during Covid-19 Pandemic.

(b) Behavioral cold adaptations

Anything that disturbs the Homeostasis
 i.e. Natural equilibrium of the body
 is called as stress. Acc. to
Laws of Thermodynamics Heat flows
 from High Temp \rightarrow Low Temp, so
 whenever outside $T < 28^{\circ}\text{C}$ it is
 considered as a cold - stress
 due to our savannah origins.



but suffer smoke diseases

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Ex: Australian Aborigines Sleep
in between fires \Rightarrow Burns

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- ② ~~The Siberians sleep in boxes to stay warm but suffer Hypoxia.~~
- ③ ~~Running, Diet rich in Fat, cold~~ become part of life
- ④ ~~Houses made with slopes to get maximum sunlight and also clear falling snow. In addition built few feet above ground so that layer of air acts as an insulation.~~
- ⑤ ~~Clothing is thick with fur.~~
- ⑥ ~~Drinking alcoholic beverages to stay warm. Ex: Vodka in Russia.~~
- ⑦ ~~Inuits build special houses called as 'igloo' that keep them warm during night.~~
- ⑧ ~~Fisherman in cold waters of Atlantic have developed experience to keep themselves warm.~~
- ⑨ ~~Thick gloves to prevent frostbite.~~

6/L

Contemporary Relevance: immense scope for studies for the training of athletes as well as Army. Ex: Siachen Glacier

(c) Infectious diseases

Infectious Diseases are abnormal deviance from health that are caused by Pathogens.

All communicable infectious Diseases are communicable either directly or by vectors; but all infectious diseases need not be communicable.

Ex: Tetanus.

Case Studies

⇒ Ebola by WHO & Nat Geo : Paul Richards & Amy Maxmen (2015)

The burial practices \Rightarrow spread; but tribes not cooperative. Hence a coercive approach was helpful.

⇒ Kuru Disease in Papua New Guinea

Initially thought it was due to cannibalism but later found that it was slow-viral caught during handling of carcases.

How to show this in 1 or 2 lines
Evolutionary dimensions

Allard has said that Infectious E2A™ diseases have tremendously influenced Natural Selection. He coined term 'Minimax' to those cultural practices that limit spread of pathogens and ensure welfare of group.
Ex: 'Namaste' helps spread diseases

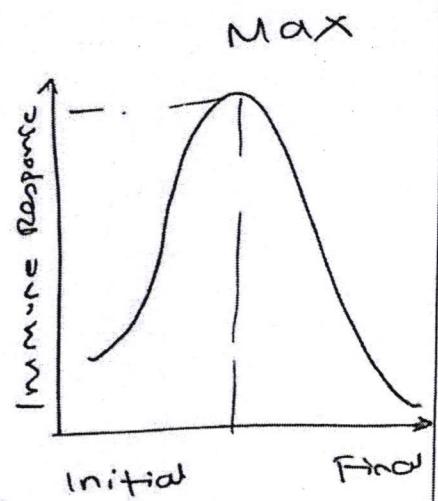
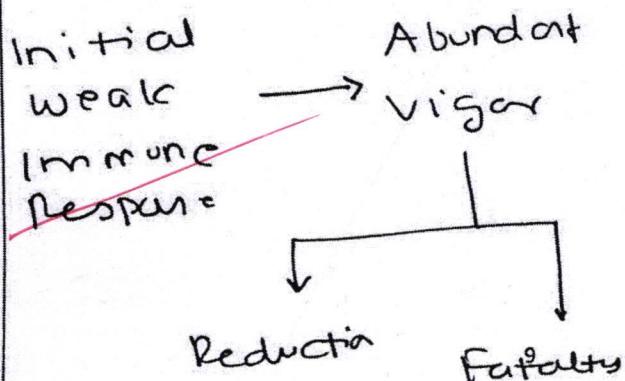
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Types

- 1. Acute (COVID-19) & Chronic (HIV)
- 2. Benign (cold) & Malign (MEN's syndrome)
- 3. Congenital & Acquired

5

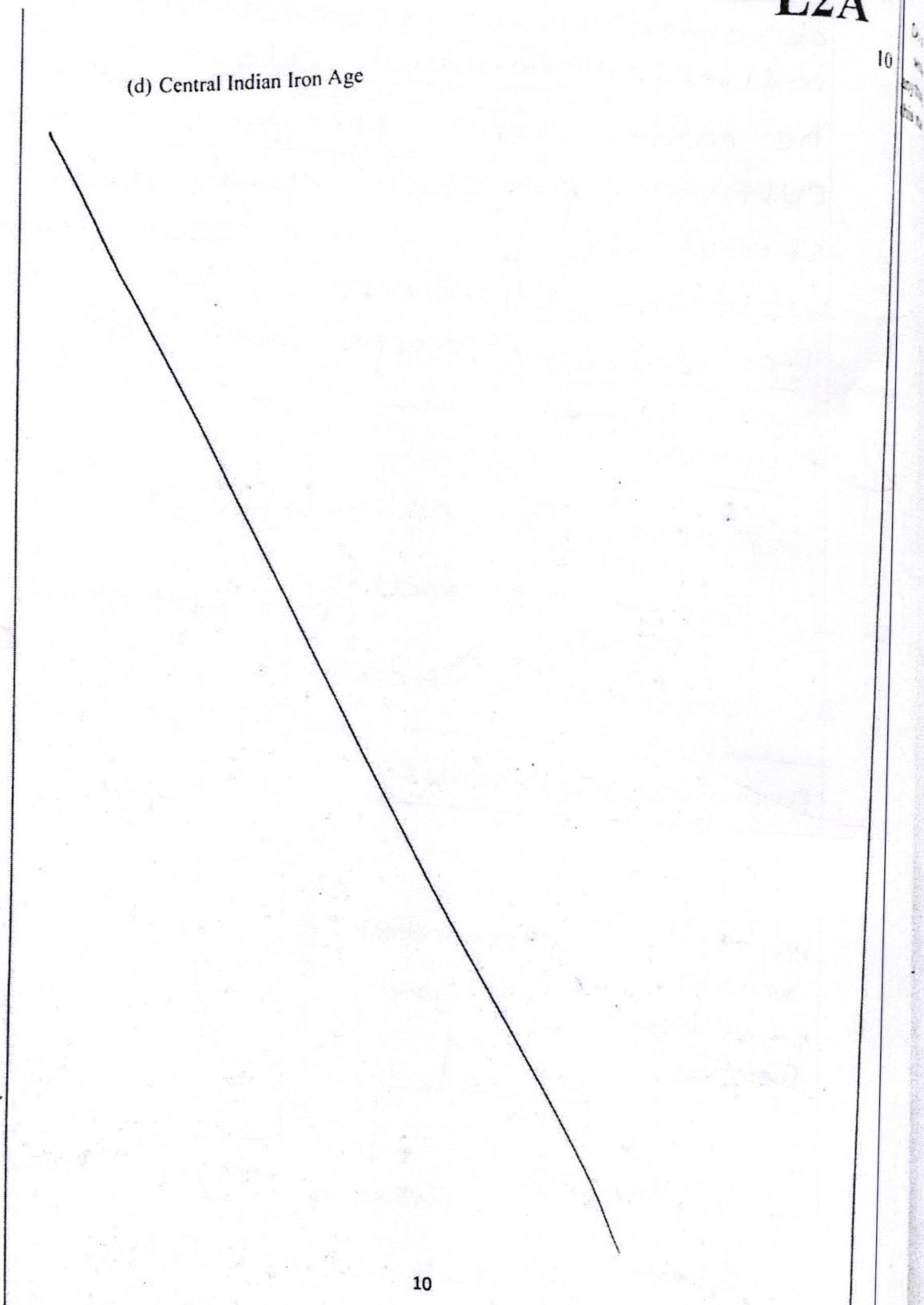
Evolution of Disease



Study of infection diseases more relevant due to zoonote & species jump.

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(d) Central Indian Iron Age



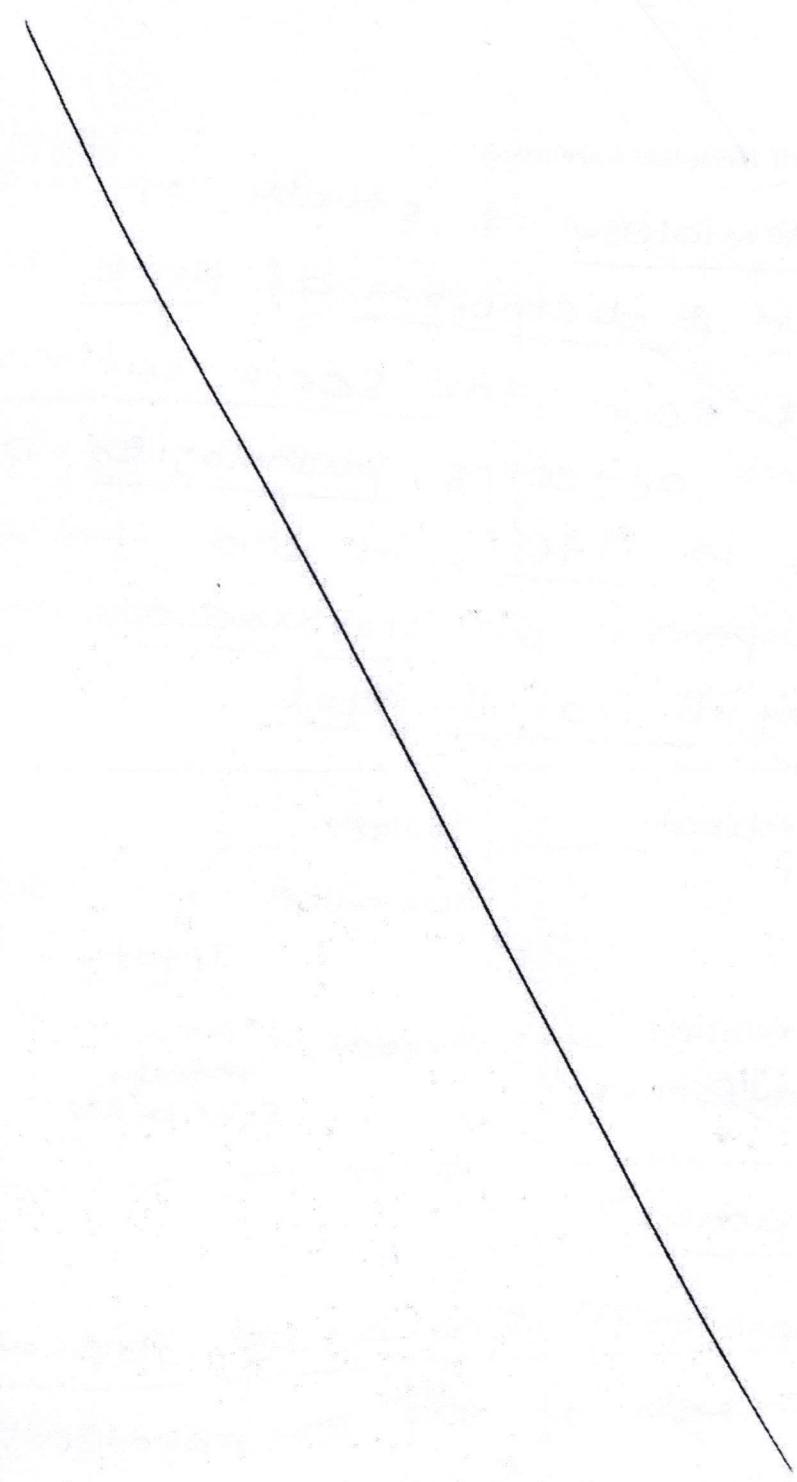
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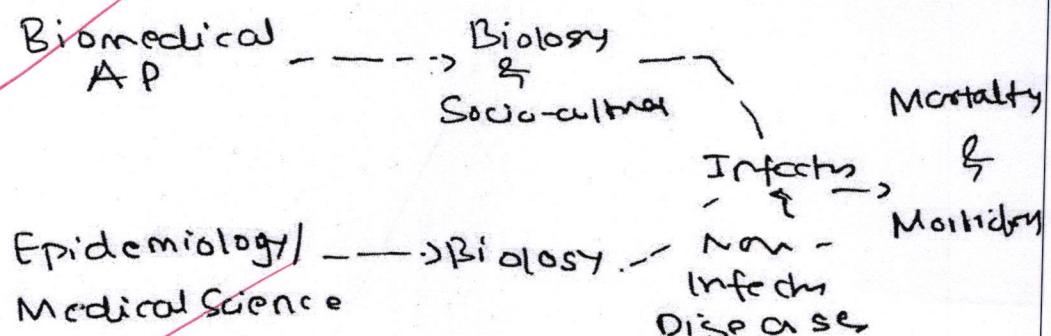
Bio & Med Anthro
Medical Anthro

L2ATM

10

(f) Biomedical Anthropology

Epidemiology is study of incidence,
pattern & distribution of health & disease.
But soon the socio-cultural factors affecting pathologies gained
fore. In 1940's, it led to the development of Bio-medical Anthropology led by B. David Pault.



Approaches

1) Environmental / Ecological Approach

Studies role of the environment.

Ex: Rapid Urbanisation & Slum formation in New World.

Ex: China Hookworm¹² Disease Spread

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2) Interpretative Approach

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How locals perceive & react to illness/disease by action/symbols.

Ex: Shaman sings songs during a women labor-

Ex: Role as Placebo Effect.

Ex: Courade practice also.

3) Critical-Medical Approach

How Big-Corporations are affecting our perception of medicine. As simply 'prescribing a pill' is not a solution to all medical problems.

(6)

<Case Studies>

Indians make 80% of Antivenom in India but don't use for themself, American entry by Spanish led to wild outbreaks of small pox

Now: Epidemiological Anthropology (1960's)

has evolved which is much wider than Bio-Medical AP whose focus was somewhat more on the medical aspects.

Q2. (a) Discuss how socioeconomic status can influence exposure to environmental stressors that can influence the human growth and development. 20

Growth: Acc. to Malina is the ^{defn} quantitative change in size of body or its parts.

Development: It is qualitative changes that leads to mature & specialised individuals.

- Positive / Negative v/s Permanent irreversible
- Occurs later v/s Earlier
- Differences
 - Dependent on v/s Predictable factors
 - Longer period v/s Shorter period
- Similarities
 - Dynamic aspects of life
 - Similar stages
 - Similar factors affect.

- Factors affecting Growth & Development
- Genetic ①
 - Environmental ②
 - Nutritional ③
 - Hormones ④
 - Socio-economic & Cultural ⑤

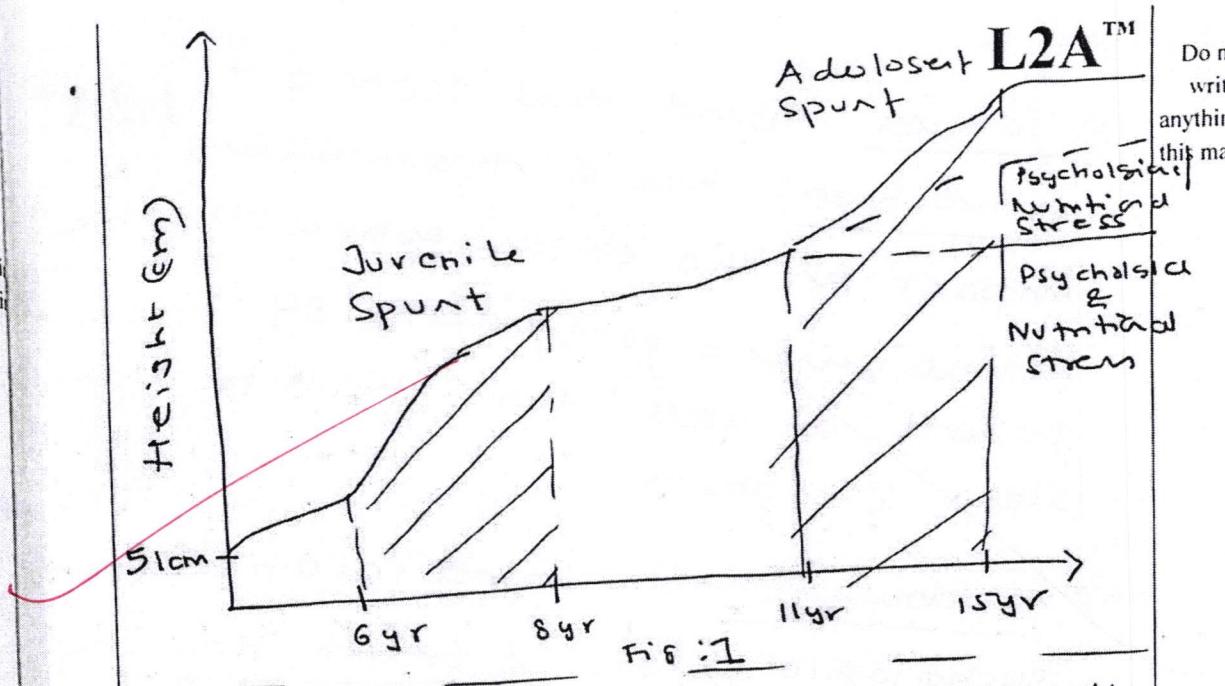


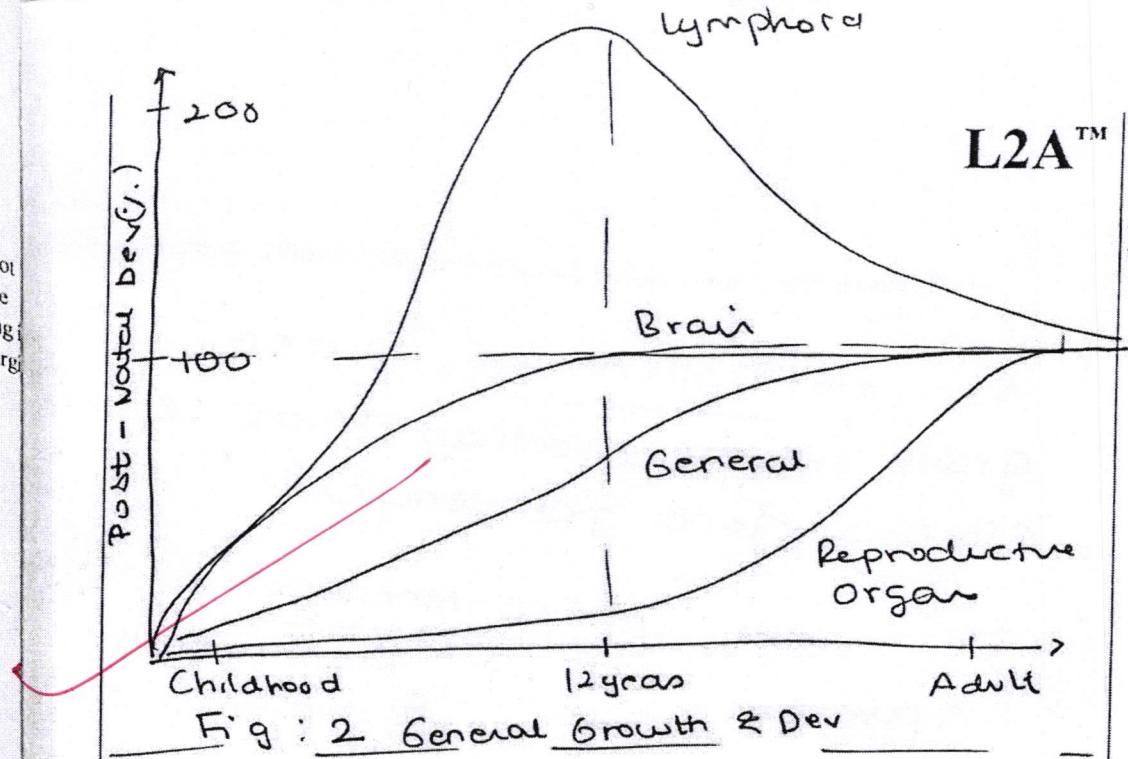
Fig:1

Thus while Spurts are genetically controlled; their expression depends on the environment which to a large degree depends on socio-economic status.

<Examples>

- 1) Troenich (1970) : Found that Japanese living in Hawaii were 3-4cm taller than those on Mainland Japan due to better nutrition in Hawaii.
- 2) Studies in Kenya as well as among Sanaya tribe of Roraiathon (PVTB) have found that menarche occurs later & menopause occurs earlier thus reducing => Reproductive span and thereby affecting the fertility (actual reproductive performance).

- L2A™
- 3) Tanner: Found that home environment has a tremendous impact on the child; especially the intelligence & personality of the parent, as well their habits of sleep & exercise.
- 4) Widdowson (1948): Found relation between Psychological stress & growth Hormone release. In Crete, he found that behaviour of sister-in-charge had impact on growth of child.
- 5) AM Tripathi (1987) & Shukla et al (1992)
Found that Rural sports girls menarche occurs on average 2-3 year later than Urban sports girls.
- 6) If Mother smokes during pregnancy than → Child IQ (↓) & lcm (↓). It cannot be recovered in future.
- 7) Tribal IMR (38) ^{not much} ~~better~~ than National IMR (35); but Tribal CMR (55) is ^{much} ~~worse~~ than National CMR (42) as Subsequent to birth access to health & immunisation services is less for Tribals.



\Rightarrow Reproductive Organ dev starts only after dev of brain is complete.

\Rightarrow If malnutrition occurs than the maturity (adult phase) occurs earlier.

Thus the socio-economic status of the family has tremendous influence to environmental extremes that affect the Growth & Development of the individual.

Ex: If mother keeps child in A/C always then his sweat pores if not activated in childhood would never be activated.

(b) What is 'race'? Enumerate and discuss the factors responsible for the formation of Races 15.

Acc. to Dobzhansky: "Race is a group of populations that share similar gene frequencies."

2 Approaches

→ Pre-Mendelian: Based on Morphology.
Ex: Nasal Index

→ Modern: Characterized by particular gene frequency
Ex: ABO Blood groups

Thus Franz Boas says that the 'Race' is a biological concept only and must be distinguished from Racism which is a cultural concept based on hierarchy of high and low.

So 'in theory': a race is said to be reproductively isolated which maintains its distinction

<Race Formation>

For Race to form a change in Gene-frequencies is required which in human only occurs by micro-evolution.

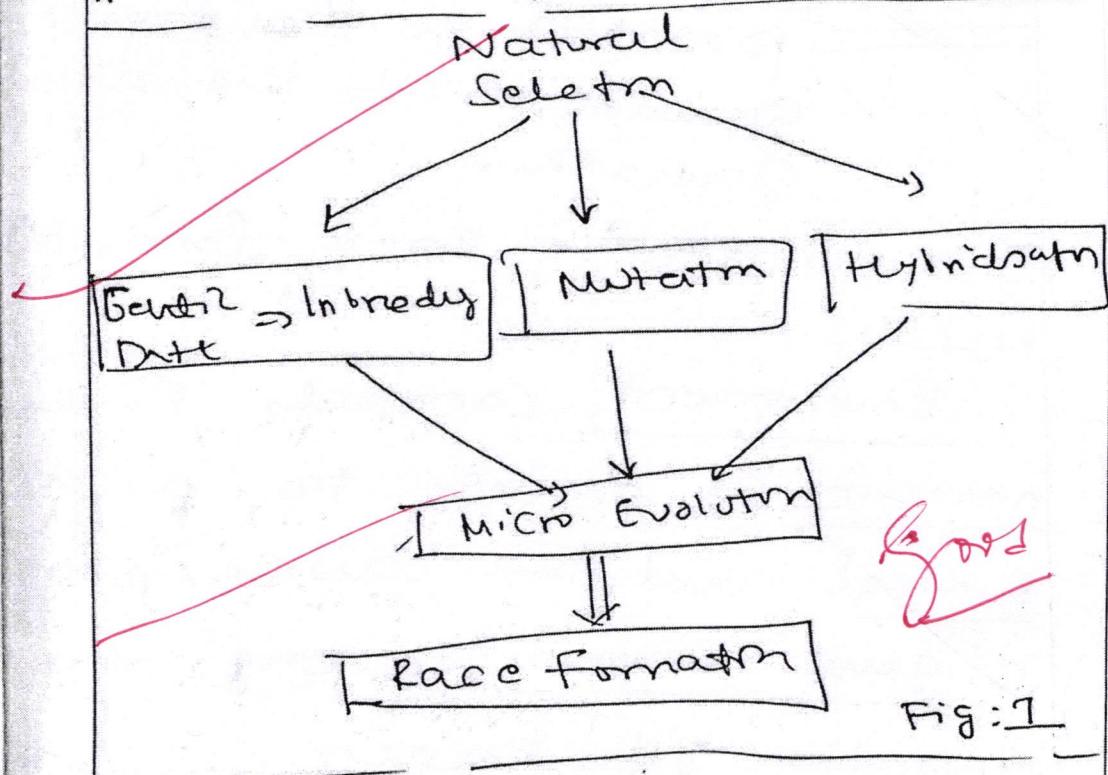


Fig: 1

→ Mutation: In man, meaningful mutations are radiation only from the environment.

→ Natural Selection: Based on environment, the phenotype decided

19

→ Genetic drift, Man's cultural in Inbreeding / humans; but culture Hybridization is man-made part of environment.

Hence all factors which affect race formation are environmental in nature. L2ATM

~~Heredity: only transfer what was present in the previous generation to the next generation.~~

Thus no role in race formation

~~Environment compels the heredity to change to aid survival and this causes change in gene-frequencies leading to formation of races.~~

(8)

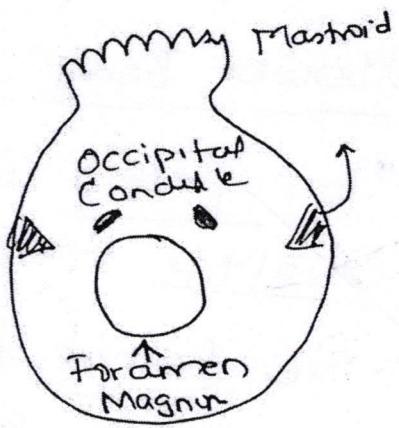
(c) Discuss the anatomical changes that occurred in Man due to erect posture

Erect Posture was one of the most significant steps in the process of hominidization:

① Head & Skull

- Foramen Magnum moved downward and forward so spinal cord enters skull at bottom.
- Occipital Condyles were moved towards the jaws.
- Development of Mastoid process that helped balance head on spine.

Fig 1



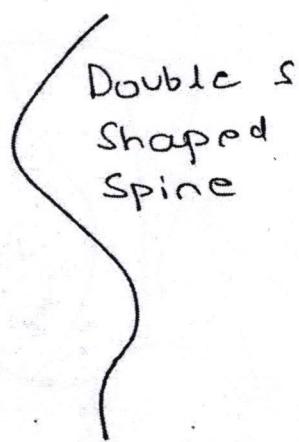
Inferior view of skull

② Middle Body

- 4 curves in the spine which are dorsal, lumbar, sacral & cervical.

21

- Size of the



vertebrate became longer.
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→ Relative constancy in spines
combing from
the ribs helped
evenly distribute
the weight.

→ The Sacrum &
Coccyx bones are
fused for strength.

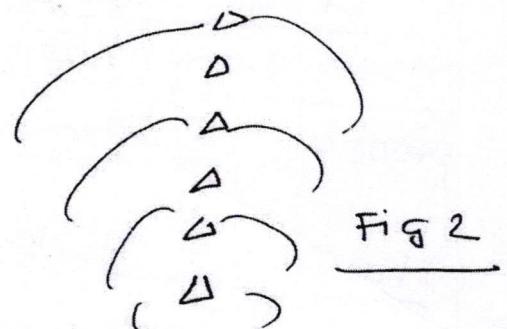


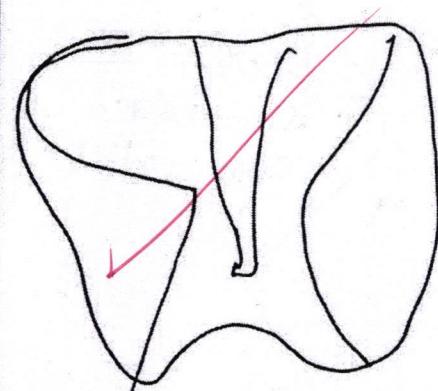
Fig 2

(3) Lower Body

→ The pelvis is basin shaped &
shorter than apes.

→ The femur is strongest bone in
the body & has ridge on
posterior side ⇒ Linea Aspera.

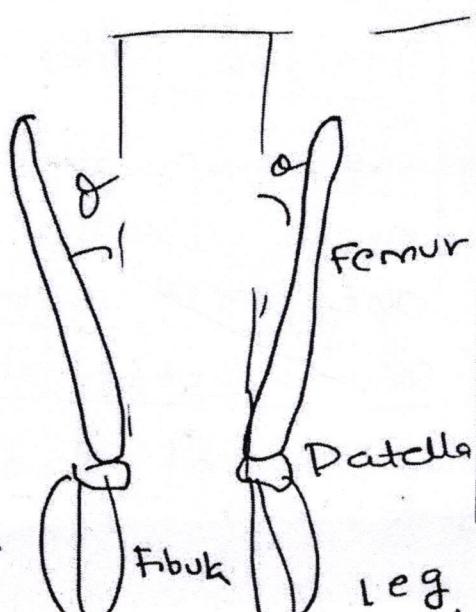
Fig 3



Pelvis

22

Tibia



leg.
Femur
Tibia
Fibula
Patella

- The femur is angled in **L2A™** towards the patella so that the body lies above the knee.
- The sacrum-pelvic joint is closer to the pelvic-femur joint for better transmission of weight.

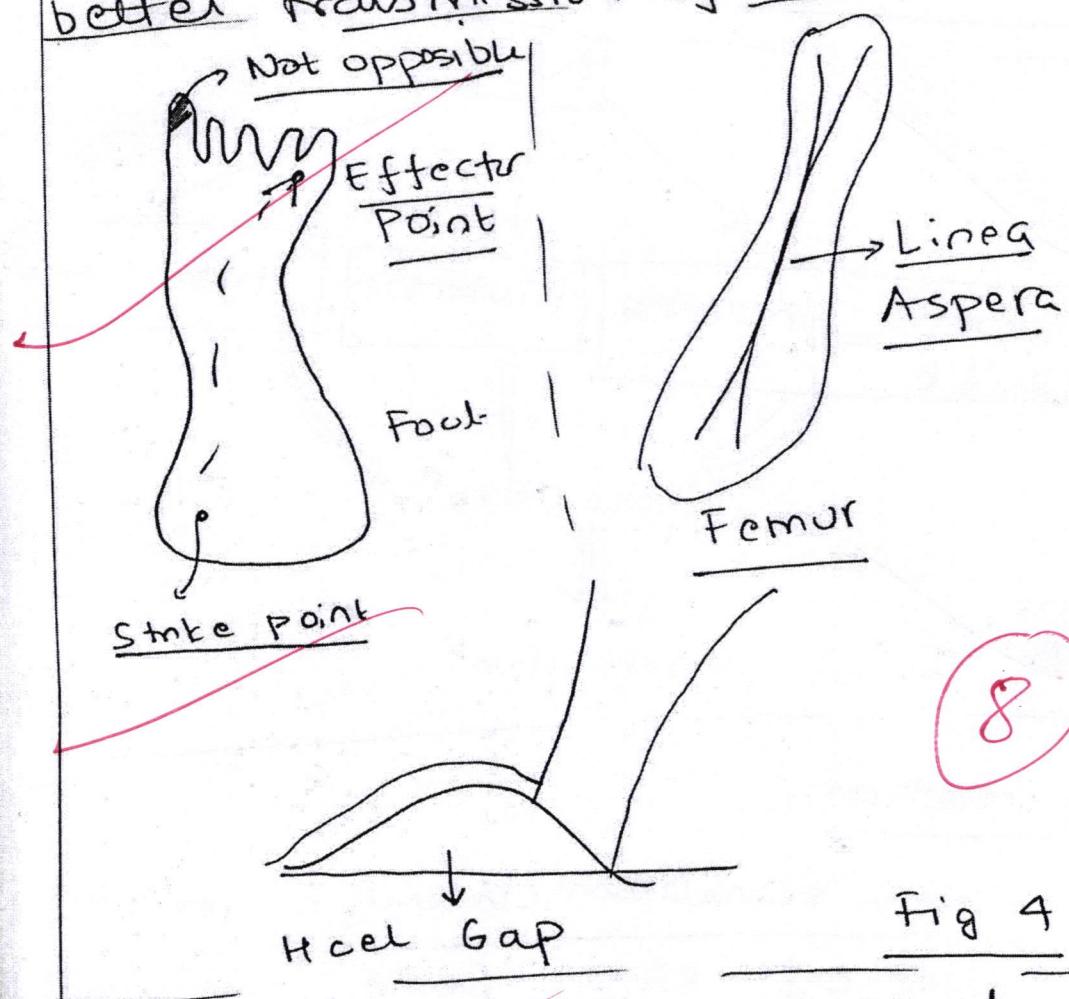
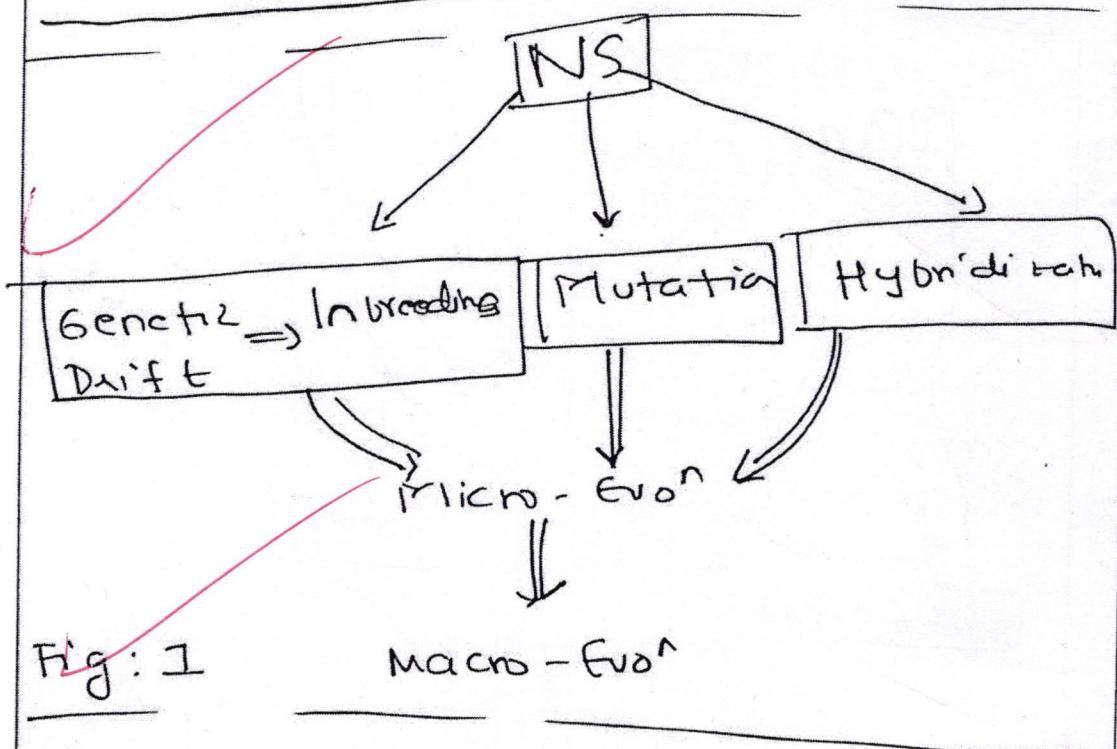


Fig 4

Thus all these analytical changes helped man roam the Savannahs and ³³ conquer new areas. So biocultural evolution of man occurred.

- Q4. (a) Briefly review the ways in which evolutionary mechanisms can alter or structure the genetic diversity within and between populations. 20

According to the Synthetic Theory,
"Evolution is change in gene frequencies."



① Mutation

Sudden random change in the nature of single Gene.

→ Rare; Sudden; Random; recurrents

→ Most Harmful; many neutral and few are helpful.

→ X-ray, γ-ray, ³⁴Chemicals and temp are causes → Mutagenic Agents.

It is source of new variation.

(2) Change in Chromosome Number L2A™

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Euploidy | An euploids
 $n, 2n, 4n, \text{etc}$ } $2n+1, \text{etc.}$

In Humans \Rightarrow Euploidy leads to Spontaneous abortion (15% of such cases)

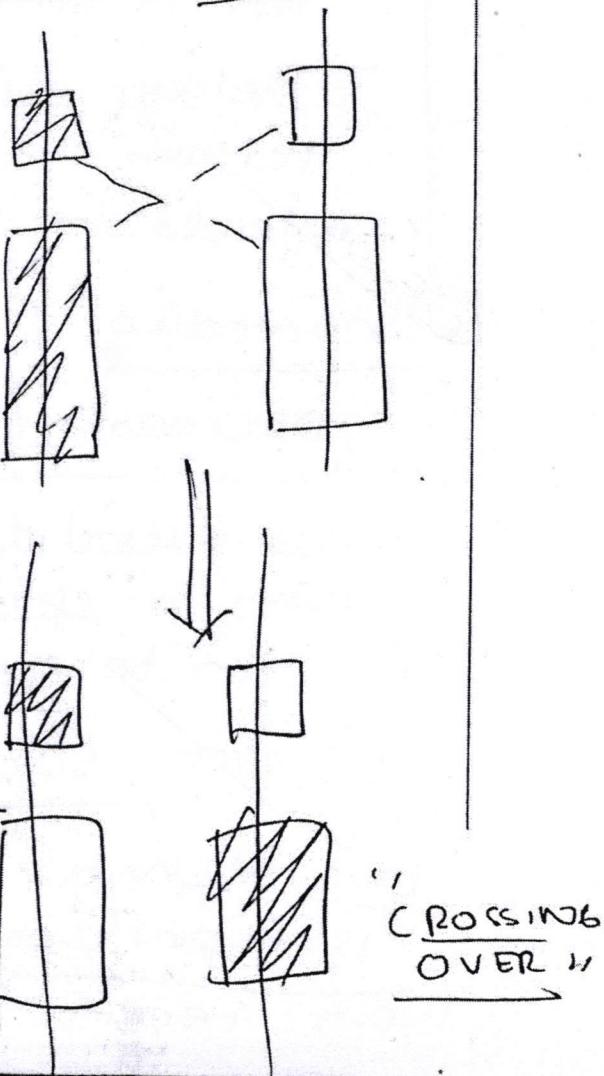
~~But aneuploidy depends on the specific chromosome and Addn/delns~~

(3) Genetic Recombination

Fig 2

~~The order of the genes changes.~~
~~In humans it is deadly and the effects are the same as change in chromosome number.~~

Infact; in humans it only leads to expression of the already present variation and not a source of new variation.



④ Migration: called gene flow; L2A™
and only valid if permanent migration
along with mating occurs. Still it
can be understood by hybridization.

⑤ Hybridization: Mating outside a
mendelian population -

→ Increases genotypic variability (GV)

→ Decreases homozygosity

→ Natural selection acts slowly
on it until recessive phenotype appears

→ Delays elimination of recessive
alleles as they spread

→ Leads to spread of variation

⑥ Inbreeding : opposite of hybridization.

→ Decreases (GV) & homozygosity (↑)

→ Considered dominant by Survival
Theory in speciation

Ex: can be geographical [Sentinel Island]

or even social [caste system]

Ex: Human Genome Project
1st Report (2003) said that Africa
has least genotypic variability

hence it is source of all humans.

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⑦ Natural Selection: It only acts on other factors and is not a source of new variation.

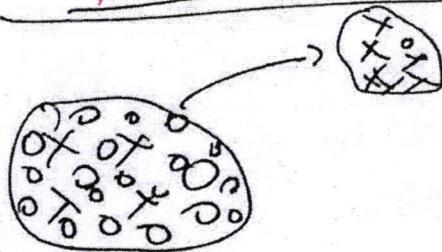
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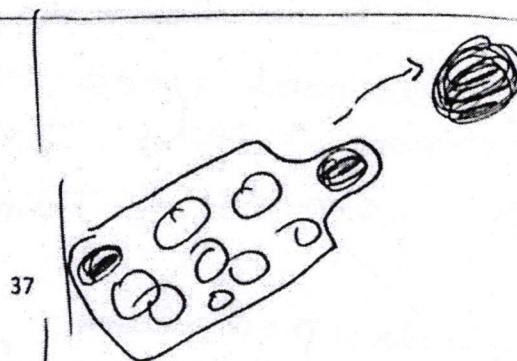
⑧ Genetic Drift

Chance & random factor. It is not due to any of the other factors. It is called here.

~~Founders Effect~~



~~Bottlenecks Effect~~



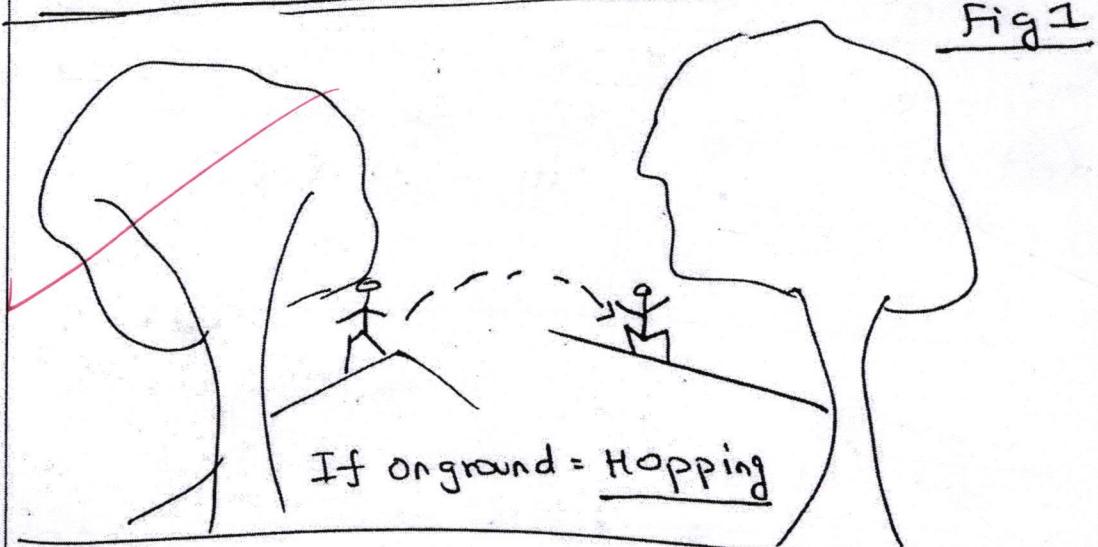
(12)

thus the mechanism have had a drastic impact in the history of human evolution.

(b) Discuss primate locomotion with special reference to adaptations to arboreal life 15

Locomotion refers to movement from one place to another by the propulsion from the organism itself.
Primates mainly have anatomical adaptations for locomotion for arboreal (tree) & terrestrial habitats.

① Vertical clinging & leaping



The animal uses its tarsals to propel itself. It is in flight.
Ex: Lemurs & Tarsiers.

② Quadrupedalism

Use of all limbs in propulsion & locomotion.

Do not
write
anything
in his marginArboreal Quadrupedalism

Ex: Lorises and
Tarsiers &
Monkey

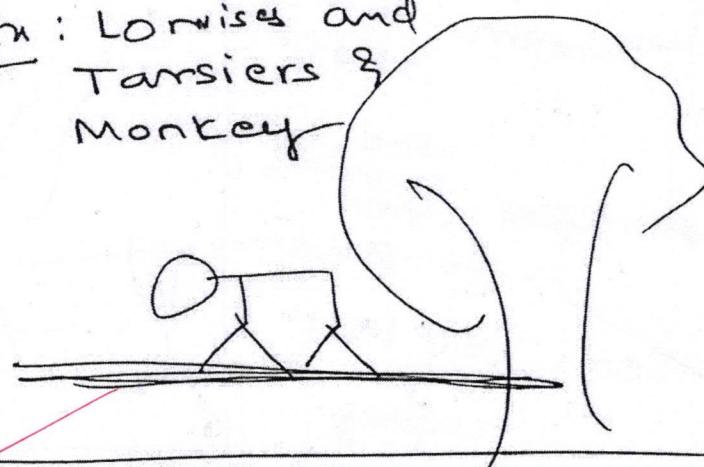
Types

Fig 2

Ex: Baboon & Macaques.

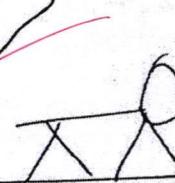
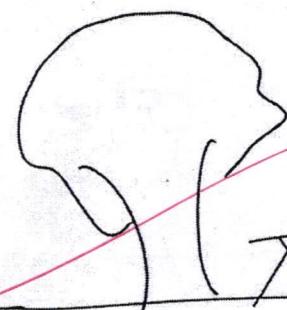
Terrestrial Quadrupedalism

Fig 3

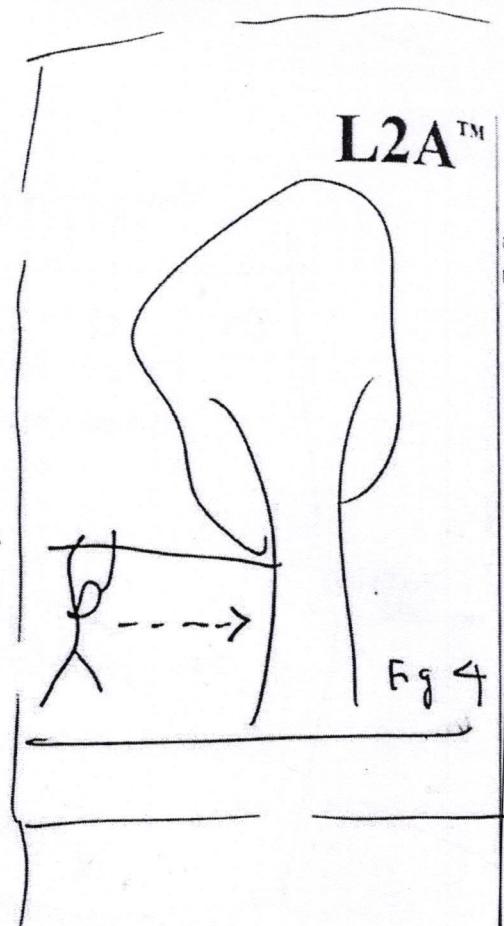
Its specialised form is said to
be Knuckle Walking.

Ex: Apes, Australopithecines etc.
Dyopithces too (earlier ones)

(3) Brachiation: It is use of forelimbs
³⁹ to propel by 180° turn of torso

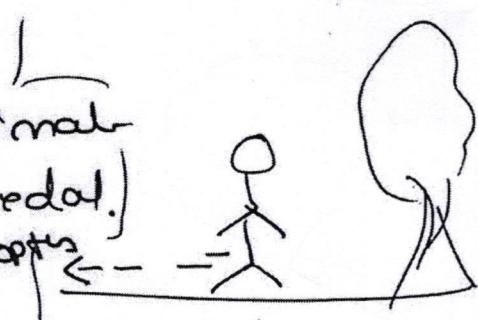
from branch to branch and also
along branch. Ex: Gibbons & Siamangs.

Types
 True: Flight between
 Primitive: turns 180° there
 Modified: used as secondary form
 Ex: Orangutan
 Semi: use tail & leaping involved
 Ex: New World monkeys



④ Bipedalism

Man is the only primate that is habitually bipedal.
 It accrued from Australopithecus about 2.2 m.y.



8

Acc to Napier VC & L → Quadrapedalism → Bipedalism

walked:

Not from specializations of trachiation / Walking knobs.

Gordon Hawes → Bipedalism to free hands led to tools

Washburn → Bipedalism more energy efficient

∴ Several adaptations in primates

(c) Discuss the concept of 'Mendelian population' and its application in study of anthropo-gentic variation in India

15

~~The concept of Mendelian Population was introduced by Sewall Wright in his "Evolution in Mendelian Populations (1931)". He defined it as:~~

~~"An interbreeding population that shares a common gene pool".~~

~~Others such as Muller, Gregg, Dobzhansky have said it is: "Spacio-Temporal group of Conspecific Interbreeding Individuals"~~

<Characteristics>

- ~~Genetically closed system & forms a 'breed isolate'~~
- ~~The members share in 'gene pool'~~
- ~~Matings within group are random & fertile & equally likely.~~
- ~~Cutoff from outsiders. It might b/c due to geography, social~~

Values, beliefs, practices, etc. - L2A™

- exists in a hierarchy; infact a Mendelian population can contain several mendelian populations (M.P) within it also.
- largest possible Mendelian Popn is the species itself

Ex : Caste system of India is
[caste [kin-Group] Model as
means of marriage alliances
Characterized by Endogamy
[Mating within defined social unit]]

Application

- We can study effect of Inbreeding and find out the genetic structure and evolution of population.
- When paired with Hardy weinberg law we find a deviation. So cause of deviation is the resulting in Evolution. Since

evolution is change in the gene frequencies and since **L2A™** M. P. is inbreeding it also is said to be evolving.

→ The spread of traits can also be found out. Also used in the Peoples of India Project, 1985 by

K S Singh of Anthropological Survey

of India also.

→ Helps understand population boom in India and tells us what steps to be taken by the Health Ministers to control it.

Thus M. P. have huge role in the field of Population Genetics especially when Hybridisation and Migration are increasing.

Day n live what [early late]

SECTION - B

Q5. Write notes on the following in about 150 words each

10x5=50

(a) Acheulian Technology

This technology is characterised by tools & typology found in site in france called as st. Acheul.

However, later more such forms found in Africa & India so it is 1.7 mya old there. But in Europe it is only 0.6 mya.

Tools

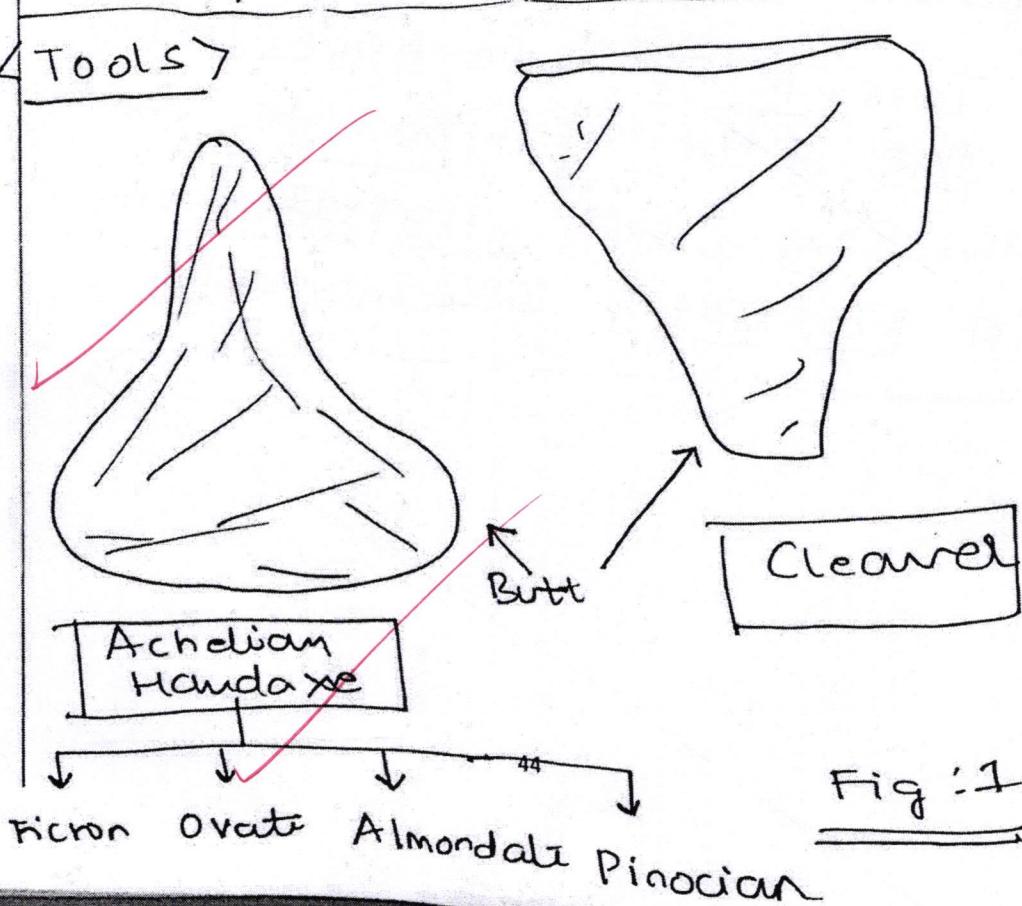


Fig : 1

Thus we say that cleaver is a characteristic tool. In Europe, there was evolution from Abbevillian to Chellean. But in India at Bhimberka we don't see such progression.

Also add

*H. moor's
line*

Even Flake tools are found such as Levalloisian & Clacton on Sea

(n350kya)

(400kya)

Pre-formed flake | Large flakes from core and only 2 multiple from 1 flake obtained. | the same core

→ usually considered as mostly associated with Lower Palaeolithic.

→ The chopper & chopping tools of Oldowan did continue.



(unifacial)
Chopper



chopping
Tool
(bifacial)

It was one of the resilient tool technologies that lasted from 1.5 mya - 200kya from H. erectus to H. sapiens. Even into the Middle Palaeolithic.

⑥

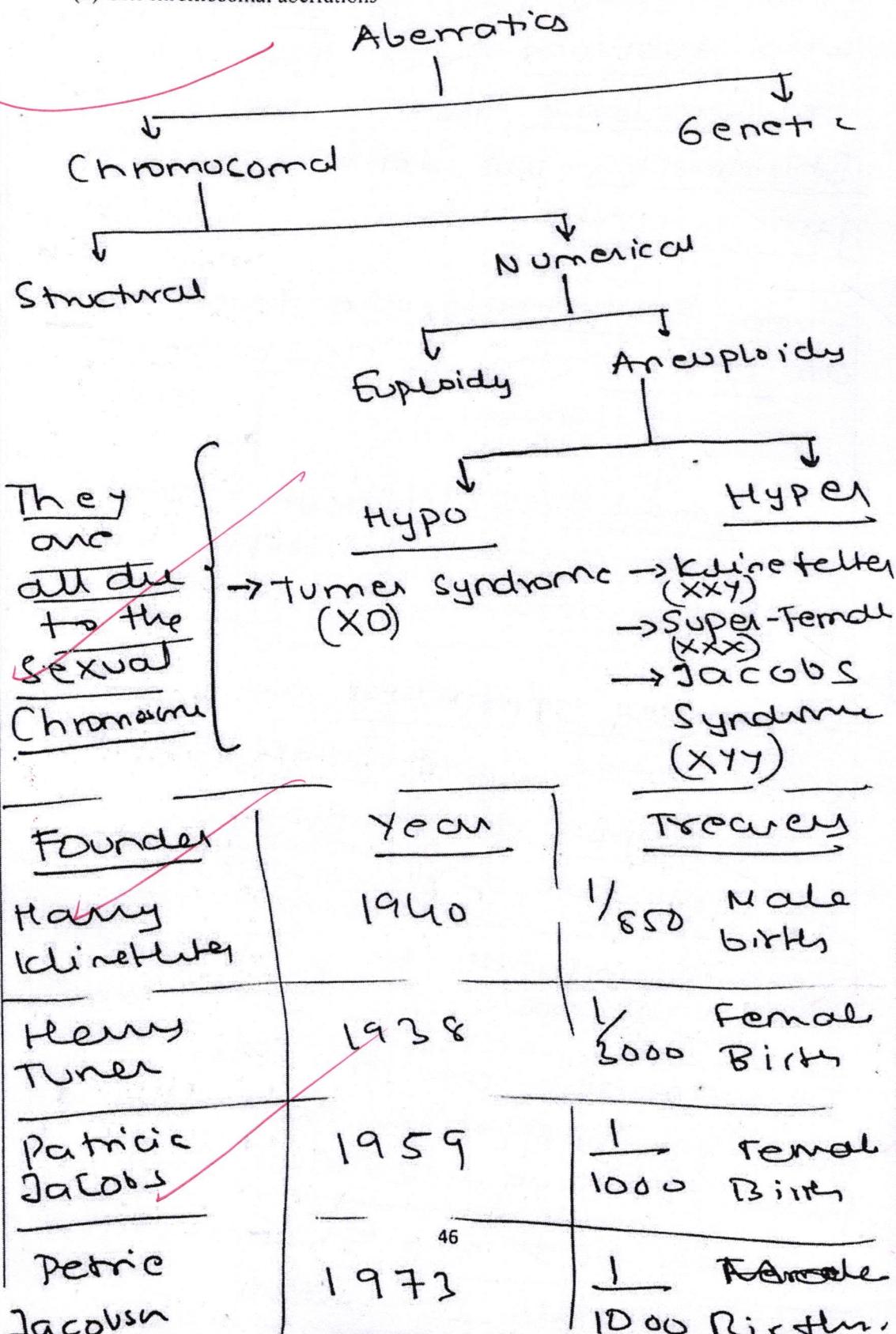
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(b) Sex chromosomal aberrations



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Klinefelter

- Testes retarded (infertile)
- Gynecomastia
- Tall & Fat near Pelvis
- L2A™
- Retarded Secondary Sexual Characters
- Pubic Hair and less hair on chest

Characteristics

Turner

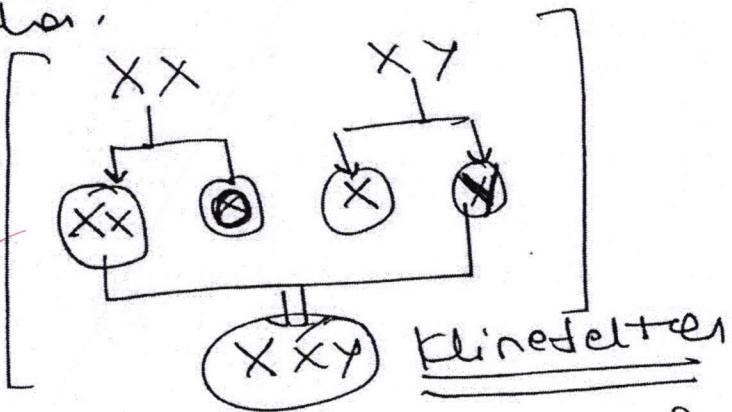
- Brown; Nevus spots
- No. Infertile ovaries
- Shorter
- Low Hairline
- Webbed Neck

Super female

Jacobs

- Normal Individual but not too terrible to children.

Diagram:



way-forward

- Karyotyping for diagnosis
- Hormonal Therapies
- Assistive Surgery

Need to remove societal stigma

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(c) Evolutionary Medicine

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(d) Nutritional Anthropology

Nutritional Anthropology is the study of socio-cultural effects on diet.

→ Improper nutrition can lead to stunted growth and development.

Impacts

height (cm)

Juvenile Spurt

Adolescent Spurt

6 8 11 15

years

Maturity

CDR (its methods)

H. V. Index
W.H. Index
etc.

→ Can lead to various diseases

Ex: Excess Iron → Cirrhosis of Liver

Dehydration → Kidney Stones ($>5\%$)

Too much Calcium → B3 deficiency causing Pellagra

Lack of Iodised salt → Goitre.

Basal Metabolism Rate for Sunken

→ 32 kcal/hr : children

→ 72 kcal/hr : Adult

100 kcal/hr : Lactating Mother

But many of these surveys are as per European Standard; hence **L2A™**

ICMR(2020) has said that simply

2000 kcal → Urban Areas (+ 15 g protein)
2050 kcal → Rural Area [protein]

Case Studies >

① Leslie White (1975): People adapt unique strategies. Ex: Papua New Guinea tribe only ag protein.

② Priya et al (1991):

South American → Soak Maize in Cacao
Eskimos → Fatty Diet
Melanesia → coconut fat

③ Lee (1979): Studied !Kung of South Africa

⇒ $\frac{1}{2}$ rd (meat + milk) + 25% Mansarovar 40% veggie nuts

Rarely suffer nutritional stress.

④ Sinclair (1953): Eskimo diet is rare in fats.

Now anthropological reading
that lack of Nutrition is also a major cause of scars.

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(6)

(e) Modern Homo Sapiens culture

Culture is product of Artifact,
Mentefact & sociofact according
to Bidney.

~~Modern Homo Sapiens~~ \Rightarrow Jebel Irhoud, Morocco.
0.309 Mya at site

Cultural Phase \rightarrow Majority middle & Upper
Palaeolithic

① Europe

\rightarrow Middle Palaeolithic \rightarrow Moustierian Tradition
of Flake Tools.

(440 - 40 K BCE) Ex: Denticulate

\rightarrow Upper Palaeolithic \rightarrow Perigordian | Auri-Snaerian
(40 - 23 K BCE) \rightarrow Blunted blade \rightarrow Bone Tools
 \rightarrow Gravina Point \rightarrow Retouched
Blades
Hide Needles

(19 - 17 K BCE) Solutrean: Laurel Leaf Points
 $\xrightarrow{52}$ Batons

(18 - 10 K BCE) Magdalenian: $\xrightarrow{P} \text{Pocklette (arrow)} \\ \rightarrow \text{Stiletto} \\ \rightarrow \text{Javelin Point}$

② Asia

→ Middle Paleolithic → Shanidar, Iraq

→ Upper Paleolithic → Nevasa, Luni, kumoot,
Mahandi Valley, Bhimbetka

→ Denisova cave of Altai
Mountains of Siberia

→ Muchatla Chintamani Gom
857. bore
(+1004)

→ Belau Valley by GR Sharma

→ Bhimbetka ⇒ 15% paintings.

(3) Africa: Kenya Stillbay / Proto Stillbay

Sangoan Tradition

~~Capsicum culture~~ Solanaceae type
~~of Kenya~~ => leaf point
at yamase.

\Rightarrow ostrich egg shell.

Thus there is plethora of modern Homo Sapien culture spread

⁶³ across the world as the per cent out of Africa they.

Q7. (a) Discuss the Ageing and Senescence and describe the biological and social theories of Ageing 15

Ageing is defined as the process of getting old irrespective of when it occurs in the life span.

Senescence acc. to Strehler (1962) and Sir Peter Medawar is the decrease of survival capacity due to functional decline in the post reproductive phase.

Thus Senescence usually occurs after Ageing.
Not all Ageing is senescence.

| Ex: Childhood to
| Puberty is ageing
| but not senescence.

⇒ It is continuous, gradual and cumulative process.

⇒ Senescence is deleterious and ultimately results in death.
Not the same⁶⁴ for ageing.

Biological Theories

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"Lifespan:

- Why we Age & why we don't have to

- Prof. David Sinclair of Harvard University (2021)

→ Loss of epigenetic information

Since Methylation & Histones leads to ageing. Without them cell doesn't know which genes to read.

Ex: Hannath Clock to tell biological age.

Body stressed to erase the protective mechanism to safeguard the epigenome. Ex: Heat, Exercise, etc.

② Programmable Theory

→ Death Gene: Activated at particular stage.

Ex: Monozygotic Twins have a similar life

Ex: Hunter of Pale live long life.

2) Endocrine Theory

→ Immunosenescence: By Walicer & Burnet

(3) Wear & Tear Theory

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1) Telomere Shortenings

2) Cellular & Tissue : August Wocoman (1911)

3) Freed Radical Damage: Denham (1950) Bauman

→ But not all are bad; in fact many help in cellular comm^ & destroy bacteria

4) Cross-linked protein harmful acc. to Bjorkstein (1942)

< Social Theory >

*saying that they Stephen Hawking
pp. come up
with a theory*

① Cummins & Henry in Getting Old 1961 gave Disengagement Theory.

As we get old → loose connection.

Criticism: People not disengaging so not universal theory now.

② Continuity Theory : Robert Atchley
People try to maintain old life.

Eg: use spectacles to continue reading books

Criticism: Doesn't take into account the Chronic illnesses

③ Activity Theory (1960's) by Robert J. Hargrove
Opposite of first Theory.

Thus Biological theories are conflicting,
while Social theories not universal \Rightarrow Open question

(b) Discuss the geographical distribution and natural selection of the ABO Histo-blood group systems

20

ABO Blood Group is an example of Multiple Allele Genetic Polymorphism

Location: Chromosome 9

Appearance: 8th Month of Pregnancy

Discovery: By Karl Landsteiner in 1900.

Studies: → 1st Genetic Survey by Morand in 1930;
→ Mc Arthur & Penros (1951)

Inheritance Pattern: Co-Dominance pattern found by Bernstein (1924)

Alleles: I^A , I^B & I^0

Inheritance Pattern:

Each parent gives 1 allele to form the zygote:

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If

$I^A I^A$	} $\rightarrow A$	Hence 4 blood groups possible
$I^A I^O$		
$I^B I^B$	} $\rightarrow B$	
$I^B I^O$		
$I^O I^O$	$\rightarrow O$	
$I^A I^B$	$\rightarrow AB$	

Now if $I^A I^A \rightarrow$ 'A' Antigen on RBC
 $I^B I^B \rightarrow$ 'B' Antigen on RBC
 $I^O I^O \rightarrow$ NO Antigen on RBC

So Only that Blood can be transfused if the victim doesn't have Antibody of the donor.

A \rightarrow Accepts A, O
 [Has Anti-B]

B \rightarrow Accepts B, O
 [Has Anti-A]

A™

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AB
(has no Antibody)



B, A
AB only, O

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O
(Has A&B Antibody)



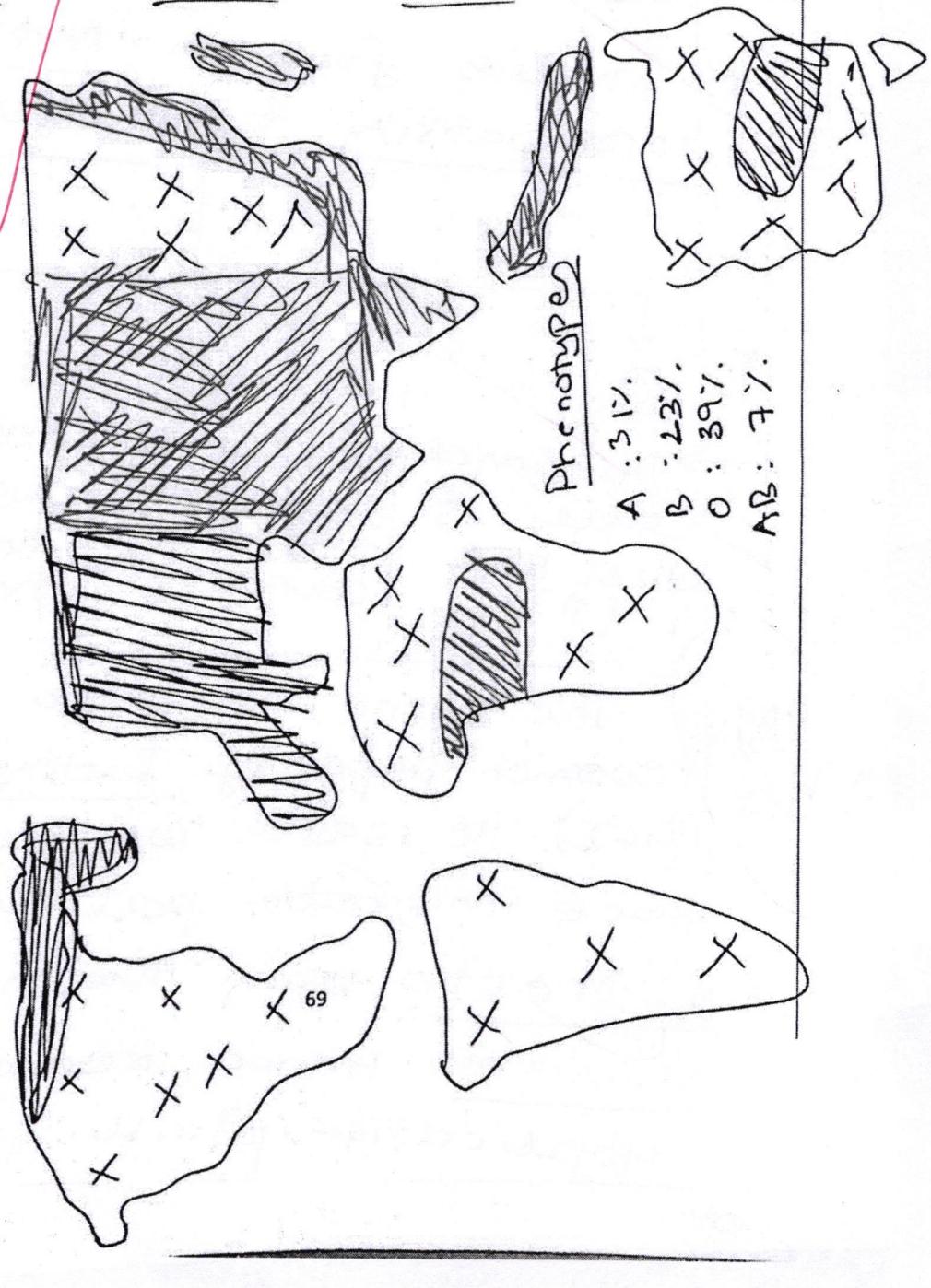
Only O

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∴ O is universal donor while
AB is universal recipient

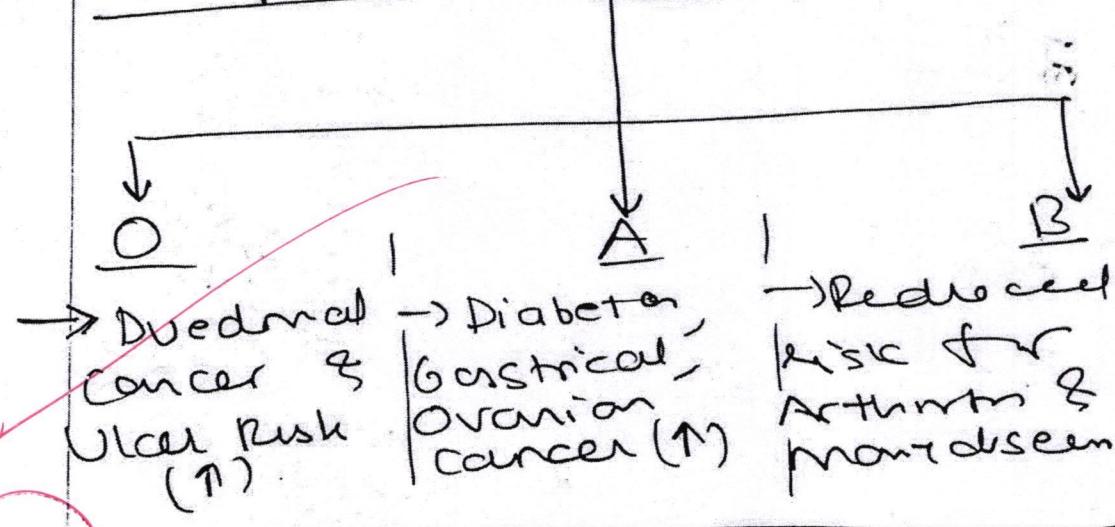
→ A : 0.62
→ B : 0.17
→ O : 0.17

Allotro
transfusions



Does Natural selection operate

1. Yes; as the frequencies L2A™ of A, B, O vary from population
2. Originated Bm79 and also found in Chimps, 6 milas, etc.
3. Studies focus on mother factors incompatibility & Pathogenicity.



The same was also found by research paper of Bettner Jaush (1962). He said we can also trace migration pattern of H. erectus using the population variation. Hence tremendous application possible.

(c) Differentiate between the anatomical characteristics of man and apes

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Man & Apes belong to the Superfamily of Homoidea.

Skull

- Location of foramen magnum.
- Man doesn't have a well dev Nuchal area to rotate neck.
- Apes have sagittal crest.
- Man has chin but not apes.
- Man has Zygomatic Arch well dev.

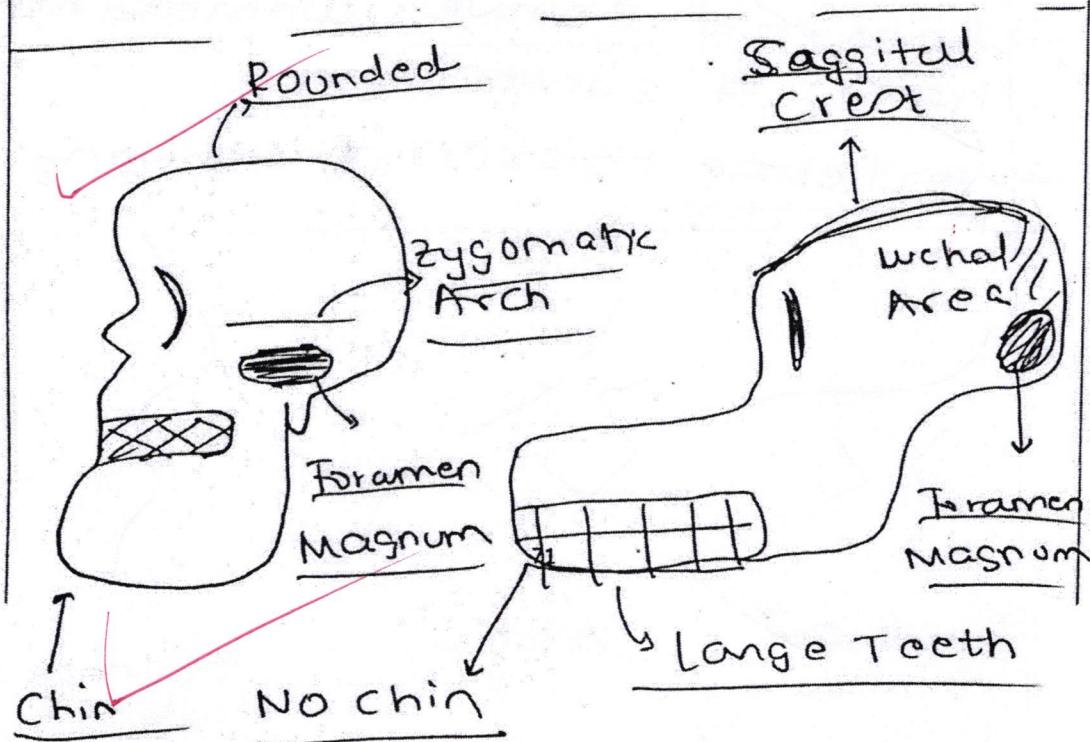


Fig 1

Teeth

- Diastema present in Apes; these canines are larger.
- Apes have U-shaped dental arcade but humans have parabolic

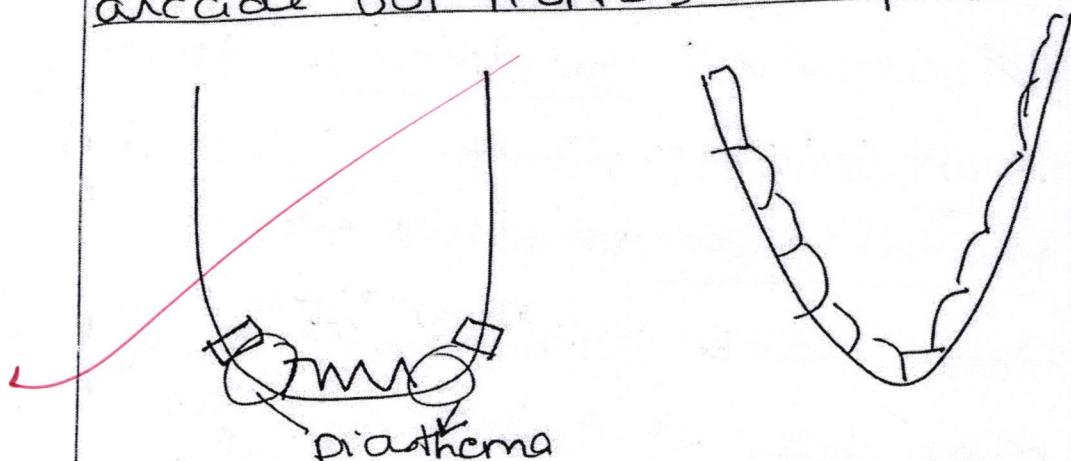


Fig: 2

Spinal cord

- Apes have 2 curves whereas humans have 4 curves
- vertebrae thicker in humans

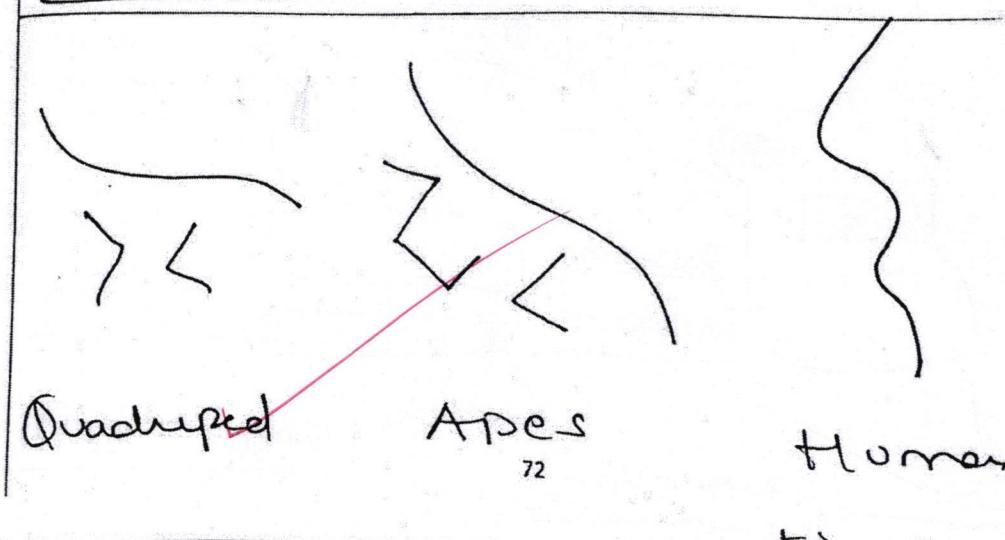


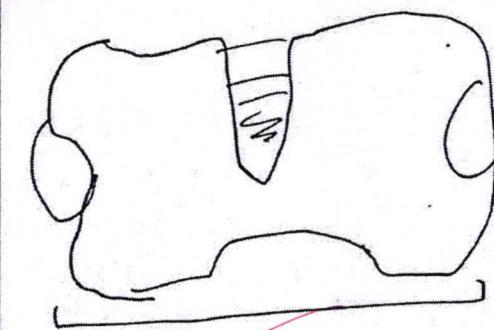
Fig 3

Lower Body

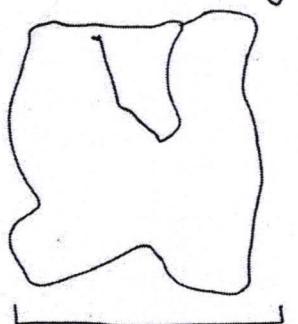
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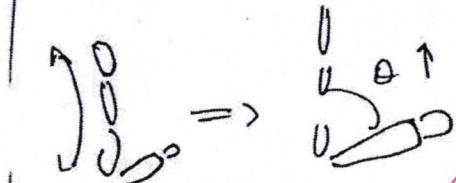
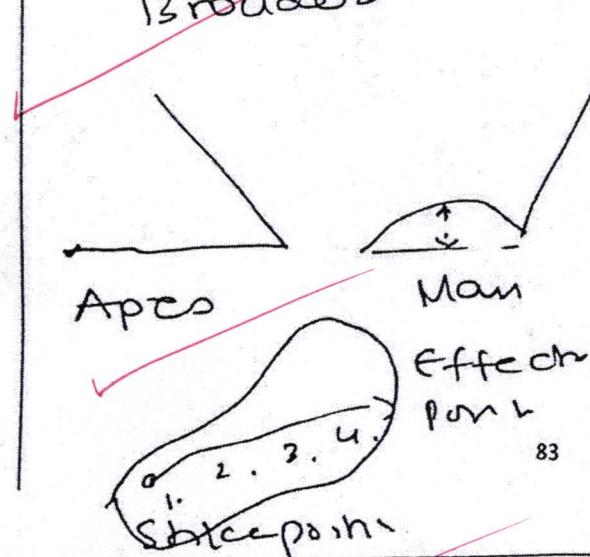
- Pelvis is more basin shaped in man than apes.
- Man has linea Aspera for bipedalism
- Toe not opposite in man.
- Man has Patella but not ape.
- Knee → Double knee action in man
→ No function in Ape.



Broader



Longer



Apes Man
↓
straight phalanges
and thicker thumb
which also longer

Thus most of the anatomical differences are due to Bipedalism.