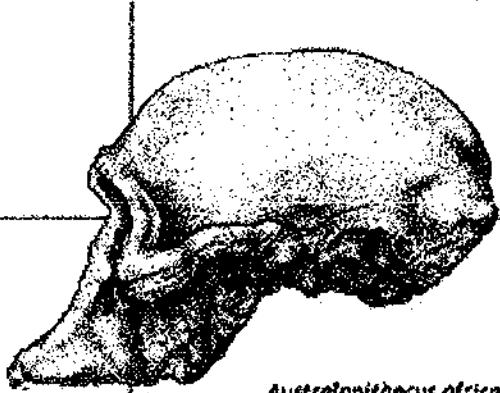
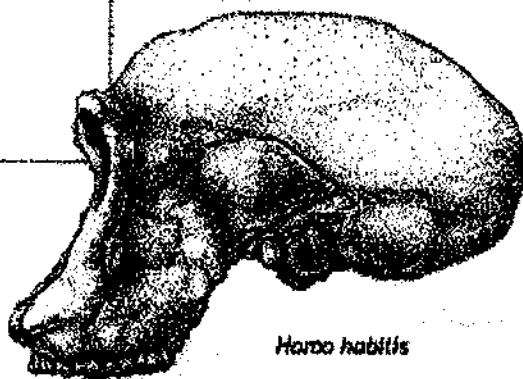


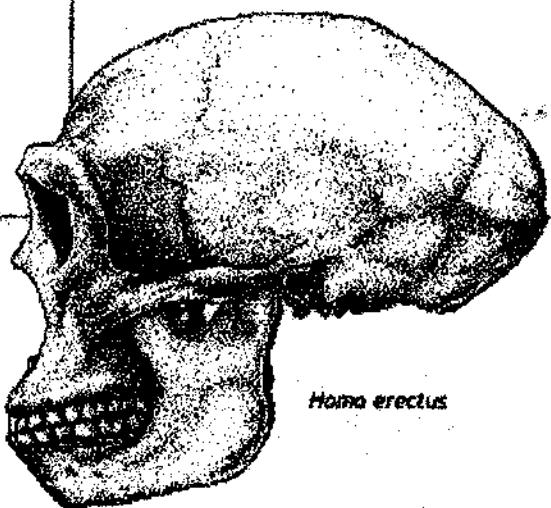
Pan troglodytes



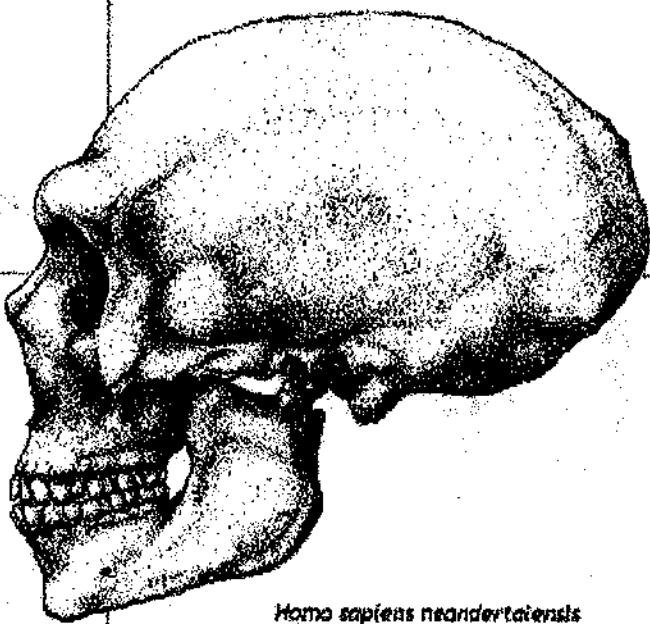
Australopithecus africanus



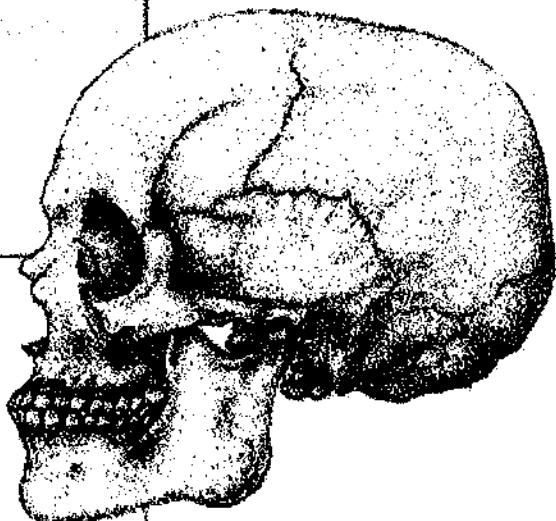
Homo habilis



Homo erectus



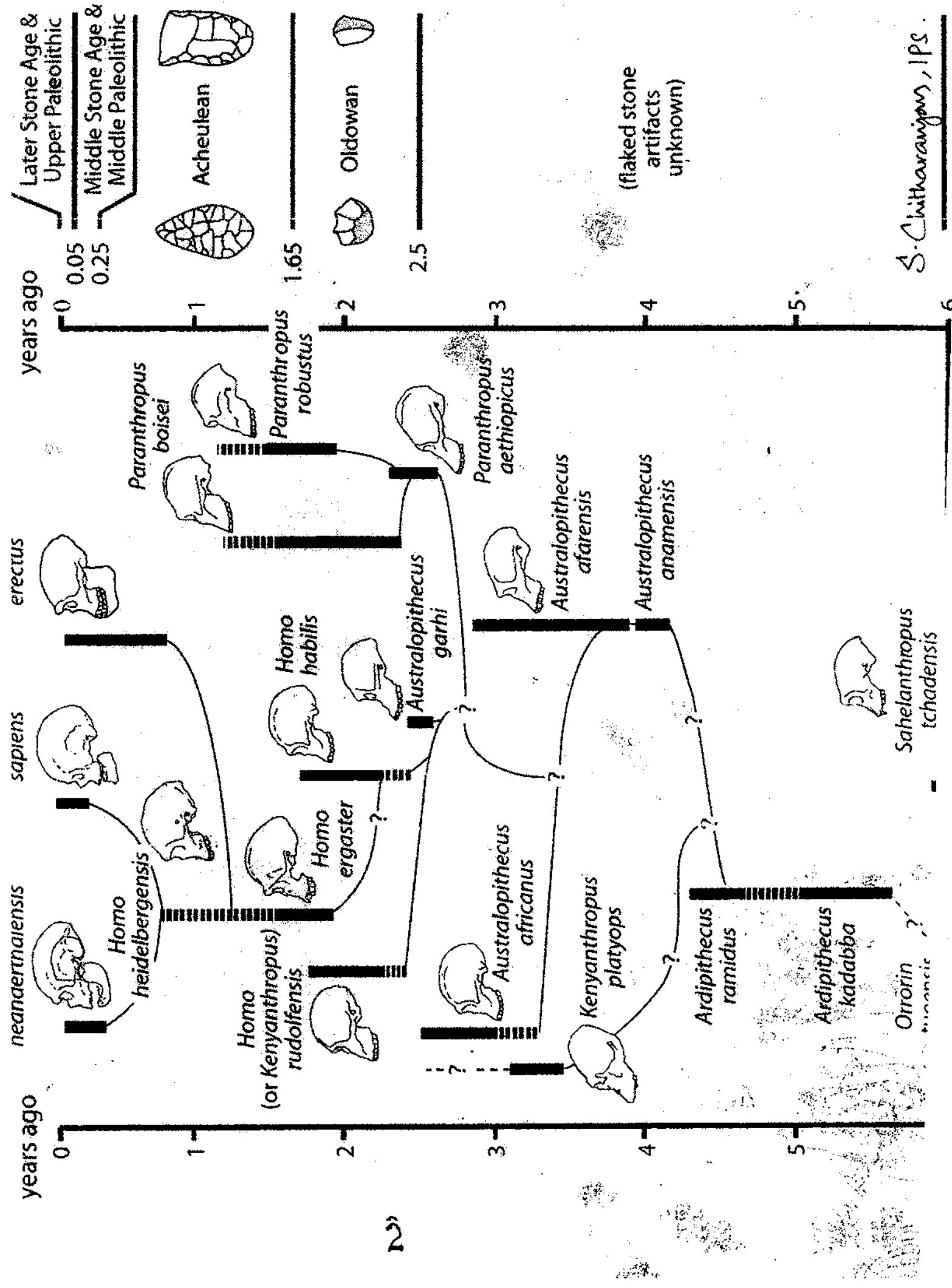
Homo sapiens neanderthalensis



Homo sapiens sapiens

S. Chitharanjan, 1

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Orrorin tugenensis

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AIR#574

WHAT IS ANTHROPOLOGY

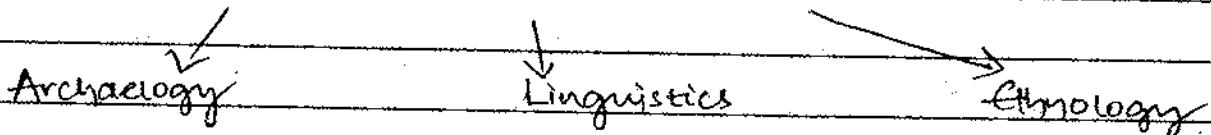
Holistic, multi-faceted approach, by studying both variants of people & their aspects of experience.

FIELDS OF ANTHROPOLOGY

(i) basis of physical & cultural characteristics,
two types:

- 1) Physical Anthropology (Biological)
- 2) Cultural Anthropology

Cultural Anthro Subdivided into:



→ Physical Anthro, focus on 1) emergence & evolution of humans - Paleoanthropology.

& 2) human variations among various races.

- To understand better biological variations among humans, Anthro's use - Human genetics
- Population biology
- Epidemiology

→ Cultural Anthro - concerned with variation in culture in past & present.

- Culture is customary ways of thinking & behaving of a particular population or society.

- Three main branches:

- 1) Archaeology - Reconstruct daily life & customs & also trace cultural changes, offering explanations

Anthropological Linguistics: Emergence & divergence of language, Study of how languages changes over time how contemporary languages differ.

Structural Linguistics: General focus

Socio Linguistics: Use of language in social context

Ethnology (Cultural Anthro) usually now, concerned with patterns of thought & behaviour, marriage, kinship study dynamics of culture

- Ethnographer: Fieldwork, lives & study people.
- Ethnohistorian - Studies how the ways of life of a particular group of people have changed over time. Usually concerned with people who didn't leave written records.
- Cross-cultural Researcher - interested in discovering general patterns about cultural traits.

Anthropology

Study of language
Context of culture & society.

Physical

1) Paleontology

- Study of past living
- fossils

2) Neontology

- living primates

3) Ethnology

- study of primate behaviour

Socio-Cultural

1. Human nature

2. Cultural relations

3. Social aspects

Linguistic

Historical

- Spots
- evolution
- Origin of language
- process

Social

- Study of variants in language
- language as social phenomenon

Structural

Language is - words, phonetics, si combination of

Ethno-semantic

usage of language |
Ex: Mother tongue to culture.
(language, culture)

Psycholinguistics

- Process of acquisition language, mechanism involved in learning a language
- all neurological phenomena

Archaeological

- Prehistoric

- material remains of people who lived in the past & therefore involves excavation of artefacts & ecofacts.

- Text aided

- Text free

- Salvage

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SCOPE OF ANTHROPOLOGY

Anthro not only describes and analyses but also synthesises the biological, cultural and social aspects of humankind in all places at all times.

→ Scope of Anthro is Universal. It covers humans in Pre-historic, proto-historic, historic, present & future times.

→ Scope of Anthro examines:

- i) How humans are basically organisms.
- ii) How humans adapted themselves to their environment by creating culture & organising group life.
- iii) How - language as effective means of communication.
- iv) Amazing variety of cultures & group lives.
- v) How human in their fascinating variety of cultures & group living display solutions to problems which are rooted in their invisible unity in all places at all times.

BIOLOGICAL ANTHROPOLOGY interprets the origins, evolution, diversification and variation of humankind - also called Organic or Physical Anthropology.

SOCIO-CULTURAL - It examines the origins, evolution, diversification, structure, organisation, function and dynamics of culture and society in space and time.

While dealing with all these aspects of humankind all over the world in the past, present & future, Anthro arrives at the most complete understanding of humankind. Therefore it is a whole science. Other disciplines study only one or two aspects of humankind, so called PART SCIENCES.

RESEARCH STRATEGY

To deal such vast scope, Anthropologists adopted various approaches for research strategy.

FIELDWORK APPROACH - Process of collecting info about biology, culture and society of peoples extinct or present, whenever they lived or live. It highlights collection of raw materials.

HOLOSTIC APPROACH - tries to understand every aspect of humankind in relation to the whole and the whole in relation to every aspect.

COMPARATIVE APPROACH - Compares the biology, culture & society of different peoples in order to learn how people came to be what they are and also learn how the culture pattern is related to biological pattern of another people & society of one to another. Vice versa. Where there are differences, this approach tries to find out the causes. This enables to have clear-cut understanding of universal, general & particular features of human biology, culture & society.

SYSTEMS & PROCESSES APPROACH - Tries to find out morphological, anatomical, genetical, etc., systems in human biology. Marriage, family, kinship, economic, religious, systems in cultural status, etc., structural, organisational & functional systems in society. The focus of attention is on study of nature & working of every system in relation to others.

EMIC & ETIC APPROACH - Deals with people's view (emic) & view (etic) about bio, culture & society. Translates emic view to etic view provides completeness to description, analysis & interpretation of subject matter of Anthropology.

CASE STUDY APPROACH - Examines in-depth bio, culture & social aspects of an individual, family, association, community or an episode.

Everything underway is quiet to the mix of Anthropology.

RELATIONSHIPS WITH OTHER DISCIPLINES

Anthro & fellow disciplines maintained interaction bcoz they dealt with same biological, cultural & social reality but with different orientations & perspectives. Anthro started with the basic premise that humans are bio-socio-cultural animals and no one aspect of human life can be detached from its other parts. Whereas other sciences devoted themselves each to study one aspect of human life. The perspective of Anthro is unique & holistic, which is a synthesis of all other perspectives.

ANTHRO & SOCIO

Father of Social Anthropology - Lewis Henry Morgan.
Westhus says Cultural Anthro & Socio are a single creature under different names.

Both show similarities & differences with respect to their scope, subject matter, methodologies & applications. Both are synoptic sciences. Both show interest in race, ethnicity, social class, gender & mass culture & use indistinguishable theoretical approaches to understand unity & diversity of life. But they differ in scope, subject matter & research methodology.

ANTHROLOGY

Scope: Universal - whole of humankind. Limited - contemp - rural & societies It is whole science

Subject matter: Origins traced to biology, social philosophy, prehistoric cultures, limited study with primitive societies. Every aspect of culture, biology studied & has numerous branches.

SOCIOLOGY

^{urban}
Scope: Only society & culture. Traced to philosophy of history, political science & social survey, with urban societies. Limited aspects of culture & limited branches.

Studies	Studied human in relation to bio, socio & culture.	Studies evolution in relation to social, economical, political & ecological
METHODOLOGY	Treats humans as endowed with consciousness, not as objects.	- Human as objects, subject to many forces.
	Focus on intensive study.	- Extensive study.
	Things human behaviour is expand means of measurement.	Human behaviour can be measured & is reliable.
	Tends to treat data qualitatively.	Tends to treat data quantitatively.
	Study communities.	- Take samples & surveys of large populations.
	Interested in inter-connectedness of all aspects of social life.	Interested in causal relationships b/w limited no. of variables.
	More towards social problems in primitive & peasant societies.	In urban societies.
	long time investment for single - gen answer.	Can't afford.

ANTHRO & Psychology

Psychology: Studies human mental process such as emotion, memory, perception, intelligence & formation of personality. More dependent on clinical & laboratory experiments.

Psycho & Anthro converge when they study culture and personality & cognitive aspects of people in different cultures and societies.

Culture - personality theory is a product of both areas.

MILARITIES: Both concern human behaviour regarding how humans learn, acquire personalities.

Related in study of aggression, sexuality, sex roles, intelligence. Both recognize importance of human institutions.

DIFFERENCES

ANTHRO

- Universal
- Intrinsic science

PSYCHO

- Limited - Studies only advanced societies.
- Part science.

SUBJECT MATTER

Studies primitive, peasant & advanced societies.

Society more important than individual.

Studies social behaviour.

Studies Social facts mostly in relation to social facts & cultural facts which originate in collective living & not transmitted through biogenetic substances.

Studies only advanced Societies.

Considers individual & society as equally important.

Studies feelings, motivations, consciousness.

- More in relation to biological facts. It constantly interacts with some biological bases.

METHODOLOGY:

Studies Social facts which are external to individual, & they can be studied objectively.

Expln of social facts must be in relations to social facts.

Studies quality of interactions & quantification is less.

No experiments.

- Developing trends ignore psychic factor from purview of explanation.

Studies mental facts. A psychologist has to improve objective methods to study subjective dimension of human beh.

Expln of psychic facts in relation to psychic & social facts.

Individual traits studies, so more on quantification.

Great experiments for results.

ANTHRO & ECONOMICS

- Economics deals with rational allocation of scarce means to alternative ends, which is economising.
- Economics studies economic man, but Anthro man in toto. Economic Anthropology, a specialisation of Anthro deals with economic activities of man & is basic to human to sustain life & thus they are inseparable.

SIMILARITIES: Anthro borrowed products, distribution, consumption, market, trade from Economics. When economist stuck with inflation, unemployment, they go through problems in light of socio-cultural conditions of people existing in that time.

DIFFERENCES

ANTHRO

Universal & whole science

Studies evolution of subsistence strategies, types of economy relation
- Caring

Shows how techniques of products are simple, Shows how they are complex
how forms of exchange are complex as they are rooted in social values relatively simple regulated by laws
Consumption patterns compete for social values in primitive societies

Shows how money absent in primitive societies.

Shows how integration of economy & society achieved through inter-personal relationships & society through bureaucratic organisations.

Deals with empirical economy

ECONOMICS

Limited & part science

Studies history of modern economics

Shows forms of distribution are eco
- Has people through consumption patterns compete for maxim of profits in modern societies.

Shows how all purpose money exists in advanced societies

Shows how integration of economy & society through bureaucratic organisations.

Deals with formal economy

METHODOLOGY: Deals with specific cases - Inductive method
Does field work & comparative analysis.

Deals with general

- Deductive method.
- Theory towards it.

Motivations effecting Cultures

2. Various cultures

Traits Economics as an institution Economics as economizing process.

Single motivatn - Maxim of Profit

guiding decisions of all culture

Economics as economizing

Substantive approach:

Substantive rationality refers to standards of efficient procedure adjusted to cultural values.

formal approach

formal rationality refers to abstract standards of rational procedure based on profit motive.

ANTHROPOLOGY & POLITICAL SCIENCE

P.S. is more specialised science than Anthro.

'African Political Systems' - a book on Political Anthro. showed Political Systems every exist in stateless societies.

MILARITIES: Pol. Anthro borrowed many aspects like power, legitimacy, authority from P.S. Anthro. depended on P.S. for its conclusions.

DIFFERENCES: They both differ in types of societies they study.

ANTHRO

- Universal Whole science

Explains how & why man became a political being.

Examines evolution of pol. systems

relate to Social & Cultural System independent of other systems.

Examines social & cultural bases of distribution of power in any societies.

POL. SCIENCE

Part science, Limited scope

Focuses man as political being.

Studies modern political systems

Examine in detail the

distribution of power in terms of degree of formality & informality.

<p>Studies the maintenance of order on basis of mechanisms of social control & systems of laws & moral norms.</p>	<p>Studies maintenance of order on basis of laws, Courts & councils, military.</p>
<p>Proves war as part of politics is not universal & shows many primitive societies which are exceptions to war.</p>	<p>Proves war as part of politics concerned to modern societies.</p>
<p>Studies politics & dept with socio-cultural implications.</p>	<p>Studies politics & dept in terms of politics of modern societies.</p>
<p>Studies politics of ethnicity in different societies.</p>	<p>Studies politics of ethnicity only to a lesser degree.</p>
<p>Studies unconscious activities also to analyze political life of humans.</p>	<p>Studies conscious activities</p>
<p>Examines levels of socio-political integration in different types of societies in terms of conflict models.</p>	<p>Studies integration of lineage, giving a typology of political systems.</p>
<p>Gives an expanded comparative understanding of political systems by showing how law & crime & crime are cultural universals & not cultural universals.</p>	<p>Gives a limited comparative understanding of political systems by showing how law & crime & crime are cultural universals & not cultural universals.</p>
<p>Examines expression & resolution of conflict in societies without govt.</p>	<p>Examines expression & resolution of conflict in complex societies with govt.</p>
<p><u>METHODOLOGY</u> Field work oriented. Studies structural, conflict, processual, and systems approach to study pol. life of diff. societies.</p>	<p>To great extent text-oriented, uses structural, functional, Marxist approaches to study modern societies.</p>

ANTHRO & LIFE SCIENCES

- Anthro without Taxonomy, can't understand the position of humans in organic world.

- After 1930s the interaction b/w biology & biological Anthro. was intensified bcoz the science of Genetics helped the latter to know much about evolution, variation & diversification.

SIMILARITIES: Both treat human species as unique in ^{Animal} kingdom.

- Both use same criteria of taxonomy.
Both use evolutionary, structural, systems & ecological approaches to deal with biology of humans in relation to environment.

DIFFERENCES

ANTHRO

Deals w/ learned behaviour of humans, whole science, Never subject
Never can be closed if I.C hadn't reached a certain maturity.

Uses taxonomy developed by zoologists

Heavily depends on Genetics.

Uses data of botany & zoology, life sciences uses Anthro data to determine extent of use of resources to environment for environment by people & reconstruct understanding plant & animal prehistoric populations.

METHODOLOGY:

Anthro uses actual natural setting of a community or society as its laboratory.

Spends long period of time to establish good contact with people.

Relies upon participant observation & other techniques for data.

Has to wait for years for any event. Only few life cycles are amenable.

LIFE SCIENCES

Distinct behaviour of organism
Part science; older subject.

Uses their own taxonomy.

Uses their own.

Life sciences uses Anthro data relating to environment for understanding plant & animal ecology besides human ecology.

Life sciences bring specimens to their laboratory.

No such problem.

Wait for a season.
All life cycles.

Anthro & History

History is a study of the record of events pertaining to those societies which have written info about their past life. Anthro through Archaeological, Socio-cultural Anthropology maintains direct relations with history.

Similarities: Both treat human life as a continuous stream. Both are dependent on each other for historical interpretation & social interpretation of historical & social facts respectively.

Differences - Anthro

Cope: Universal, whole science

scale from beginning - origin of human

b: It is abstract science of ^{human} experience concerned with individual & event

studies conscious & unconscious phenomena

primary interest to find general laws of culture & society - nomothetic & generalising chronological order - ideographic

Depends upon history for its material

Much in history is not of significance

Method: field data is primary

aimed creating data

working unit is group, religion, nation, etc

regularity in working hours

descriptive & explanatory

learns particular first, assembles

but together - makes abstract

nd general framework

move from particular to general particular

inductive deductive approach

History

Limited, Part science

Deals with past 5000 yrs.

Concrete study of human experience

More concerned with individual events

Studies conscious phenomena from

To narrate historical events in their

chronological order - ideographic

Particularising

Depends upon history for its material

history supplies facts which are

concerning to socio-cultural changes interpreted & coordinated by logic

Much in history is not of significance

Method: library data is primary

Concerned finding data

Working unit is a document

regularity in working hours

More explanatory

from general to particular

as he knows what he is

looking & emphasises later on

- Deductive - Inductive approach

-ANTHROPOLOGY & MEDICINE

Medicine has had primarily biological orientation, but its social & cultural concerns - maintenance of health, etiology of disease.

SIMILARITIES Both study medical systems of human populations.

Both utilize the research results of "Science & Human genetics".

Differences

Ay

Universal, holistic science

UB Examines Indigenous medical systems.

Examines medical & non-medical aspects in relation to each other.

Studies disease causation in terms of personalistic & naturalistic or emotionalistic & naturalistic causes like head cold.

How disease labelled, treated in various societies.

Therapists, Priests, Curers, magicians, physicians examine knowledge & expertise.

Show how native practitioners are effective & successful treating mental illness than Psychotherapist vs native practitioners in non-western societies.

Field work in Primitive, rural & urban Gets first & info with respect to patients in hospitals, nursing homes.

Considers that the units of investigation are populations & samples of popular culture other than Clinical Samples.

Holism dominates theoretical perspective of Ayurveda.

Medicine

Part science, limited

Examines Western Medical Systems

Examines non-medical aspects in relation to medical aspects.

Studies disease causation in terms of emotionalistic & naturalistic causes.

Only in single society.

Shows how Modern practitioners, physicians establish procedures of examining, intervening, practice.

Shows M.D.s less successful in treating mental illness than medical practitioners in non-western societies.

Confidence units of investigation are individuals & clinical samples.

Atomism dominates theoretical perspective of medical science.

PHYSICAL ANTHROPOLOGY (Organic/Biological)

Studies human beings as biological organisms.

Focus attention on biological evolution of humans / ancestors

Biological variation within & among human populations.

How humans are part of living world, why man considers as primates

How humans product of biological evolution - verifies story on basis of genetic distances computed with help of genetic studies.

Explains how humans came to have variation - temporal / spatial dimension.

FORMATIVE STAGE (328 BC - 1900 AD)

Aristotle, Andreas Vesalius, comparative anatomy, Lamarck, Darwin, Charles

DEVELOPMENT STAGE (1900 - 1945) - rapid growth, Human ecology, forensic A/c.

Tended Genetics, Discovery of Australopithecus, Incorporation of study of fossil primates

MODERN STAGE

Meaning, Scope and Development of Anthropology

- The word "anthropology" derived from the Greek terms "anthropos" (human being) and "logos" (study) and can be translated as "study of human beings". But that's not all. Anthropology tries to answer enormous variety of questions about humans such as:
 1. When, where and why humans appeared on the earth and why they have changed since then
 2. How and why modern human populations vary in physical features
 3. How and why societies on the past and present have varied in their customary ideas and practices.
- **Definition:** There are various definitions given by eminent anthropologists like
 - Krober defines it as "the science of groups of men and their behaviour and production".
 - Herskovitz defines it as "the study of man and his actions".
 - Oxford dictionary gives it as "Study of mankind especially of its societies and customs; study of structure and evolution of man as an animal".
- These definitions seek to point out that anthropology is a distinct subject which adopts a scientific approach to study of social, physical and cultural behavior of man. It studies the prehistoric man and seeks to trace out various factors that are responsible for human physical and cultural and social evolution of man and makes use of this knowledge to offer solutions to problems pertaining to future of mankind.

Nature and Scope:

- Anthropology's special role among the many disciplines that deal with humanity lies in its unique combination of holistic, historical and comparative methods.
- The basic proposition underlying holism in anthropology is that human behavior arises out of complex interactions taking place within a cultural system. The Holistic method involves the study of human beings or groups in terms of entire pattern of their lives. This human life will

be studied in a combination of biology, social relations, economics, art, etc and each fields influence on the other and their influence on the human.

- Historical method involves an attempt to describe the entire course of biological and cultural evolution and attempt to place each way of life in a historical perspective. Thus archeology and ethno history attempt to reconstruct the origins, development and inter-relationships among various people, whereas cultural anthropology interprets cultures of existing peoples on terms of historical influences on their present ways of life and on their probable future development.
- Comparative methods are used as a means of explaining the similarities and differences among various people of the earth. It attempts to isolate and define the laws and principles that account for development and perpetuation of such differences and similarities.
- In addition to these methods various approaches and themes make anthropological research and approach unique. Those themes and approaches are:
 - Comparative theme - Synchronic and Diachronic comparison
 - Holistic theme
 - Systems and process theme
 - Case study method
 - Emics and Etics Theme.

Relationship with other disciplines

2.1 Anthropology(A) and social science

As social science include history, sociology, economy and political science

- 1.history(H) : it studies particular civilization and culture on the basis of time period where as social anthropology studies the origin of civilization ,culture and process of evolution ,
- 2.both H and A study & describe human past and give importance to ancient aspects of man,
- 3.Agy studies physical aspect along with the culture where as history approaches man purely in the chronological point
- 4.agy studies human culture and history studies of political event
- 5.sociology(S) : study of societies , both A and S are similar in many aspects :-
- 6.Agy is a science of man & studies human behavior in social surroundings the ideas durkheim(scociologist) influenced Malinowski, R.brown, and thinkers idea of S and A similarity and dissimilarity.
- 7..sociology has borrowed ideas such as culture field, culture apparatus, interdependent tools., Culture lag, basic personality etc . aAgy helped sociology disapproving ideas of racism .
- 8.economic it deals with production, distribution and consumption in modern societies. Where as agy studies all the above including primitive, peasant and even urban society.

9. economy deals commodities and their prices , values and so on. Where as agy clearly sees principles of modern economics cannot be applied to primitive societies

10. political science: deals with philosophical ideals of plato and Aristotle and studies contemporary modern institutions of world . where as agy studies pre-literate, non literate societies ,

2.2 Anthropology and behavioral science

1. psychology studies man behavior in relation to environment. Agy studies mans holistically.

2. Agy is a comparative and analytical study of human behavior and experience.

3. The influence of psychology on agy and vice versa led to development of culture personality school ,

4. imp thinkers are M.Mead, R.Bendict, Kardiner etc

5. social psychology studies individual behavior under social environment and cultural agy studies institutions, human societies as a group.

6. both study man but different viewpoints, both try to understand man in the context of social behavior

7. case studies used by thinkers as how culture acts a social control and also culture influences development of personality and vice versa,

8. agy has given field work knowledge and cultural analysis of different societies where as psychology has given psycho analysis techniques and helped in building national character studies

9. psychology helps in understanding root causes of human behavior in different societies.

10. some methods of observation are commonly employed in both of these sciences, some methods of psychology like the introspection method, are not used in agy

Main Branches of Anthropology:

3.1 Social cultural anthropology

Social - Cultural anthropology:

1. Charles Winick defines social anthropology as the study of social behaviour, especially the systematic comparative study of social forms and institutions. Ideally the comparative studies include all human societies, primitive, civilised and historic.

2. Making a distinction between the two, cultural anthropology(term popular in USA) studies historically, the cultural traditions and their content in diachronic approach whereas social anthropology(term popular in UK) focuses on behaviour and social interaction in a non-historical, synchronic approach.

Cultural - Anthro - Studies historically Cultural traditions
in diachronic approach - Study a
phenomenon as it
changes through time

Social - Anthro - Behaviour
Social Interaction
Synchronic approach (same time)
non historical =

3. Various subfields have emerged within socio cultural anthropology which include ecological, economic, psychological anthropologies, cultural history etc. with specialised study over the specific aspects of culture.
4. Ethnology and social anthropology, were once considered the same but are now regarded as 2 different disciplines in that ethnologists try to reconstruct past history, even based on circumstantial evidences which the social anthropology doesn't do.
5. The emphasis of social anthropology has largely been on primitive societies, ie those in small number, territory with a simple technology and economy etc. This has been justified in that study of simple societies, could then be followed by complex. Also it is important in the context of vanishing societies.
6. The study of society as a whole in social anthropology provides better understanding rather than study of specific problems as in sociology.
7. Social anthropology has a wide scope - it studies culture, civilisation, institutions like family, kinship, political organisations, understanding of customs, traditions, religious beliefs etc based on systematic observation and does comparative analysis.
8. Comprehensiveness of approach is its important characteristic. It also studies origin and development of the social organisations. Comparative study helps abolition of ethnocentrism.
9. Royal anthropological institute defines aims of social anthropology as study of primitive cultures in present form, study of culture contact, reconstruction of social history, search for universally valid social laws.
10. Thus it examines every aspect of a single culture, every aspect of a single society.

3.2 Biological Anthropology

1. Physical anthropology is the oldest branch of anthropology. It is primarily concerned with human evolution within the context of culture. Biological sciences has made huge contributions to Physical anthropology, of these organic evolution and principles of genetics are significant.
2. There are three mains branches of Physical Anthropology,
 - a.Paleontology, It studies extinct primates and concerns itself with evolution of man.
 - b.Neontology , It studies living primates and examines comparative anatomy, physiology, human variation in terms of population genetics.
 - c.Ethology , It's the scientific study of animal behaviour such as that of free ranging to confined monkeys etc.
3. Physical anthropology tries to understand the extent to which biological factors exert influence upon the nature, behaviour and potentialities of humans. Human population Biology is a area of research in

that studies adaptations of humans to differing environments and hereditary characteristics of living population.

4. Physical Anthropology is inter related with genetics, anatomy, physiology, taxonomy etc. . It's closely related with cultural anthropology. Mating, inbreeding patterns food resources food habits are elements of cultural anthropology that affect human physical form and racial history which are elements of physical anthropology. The studies from physical anthropology in turn are also useful in the study of cultural anthropology

5. The studies of Physical Anthropology can be broadly divided into two streams , Classical and New physical Anthropology.

a. Classical Anthropology is characterised with obtaining anthropometric measurements, computing indices and other statistics. It focussed heavily on data collection and tabulation.

b. New Physical Anthropology on other hand focuses on comprehending and interpreting the data collected,

6. New physical anthropology was aided by classical anthropology in the form of its vast data collected. Unlike Classical anthropology, new physical anthropology lays emphasis on understanding the nature and kind of adaptation and not merely enumerating it.

Even in its new form new physical anthropology continued to be study of human evolution , it concerns itself with sources of variation and direction of Change among individuals and groups in the past and present

7. This new orientation of anthropology necessitates the development of appropriate quantitative and descriptive methods, it also shows us the inter relationship with different subdivisions of anthropology on account of analysis of data corresponding to its environment

8. Appreciation and evaluation of human variability , examining the factors that cause these have been the basic concerns of physical anthropology, to which Anthropometrics has made a significant contribution. Genetics is also playing a key role in the investigations these days .

9. Physical anthropology has been always concerned with man's physical characters, their origin, evolution and present stage of development. Physical anthropology is the comparative science of man as a physical organism in relation to his total environment i.e social , cultural and physical

10. Physical anthropology has contributed to the studies of Primatology, Primate Paleontology, Raciology, Human population genetics, eugenics, forensic sciences etc.

3.3 Archaeological anthropology -

Deals wid retrieval n analysis cultural n non cultural remains left behind by extinct humans, reconstructing der envt, culture n society n identify de socio cultural evolution

Aim- to reconstruct pre historic past n early historic setting of human kind

Scope-

A. Text free archaeological anthropology - on the basis of evidence provided by environmental factors in exposure of sites by natural processes

It has two sub branches namely old world n new world archaeology

B. Text aided archaeological anthropology - on the basis of written sources

C. Applied archaeological anthropology - includes salvage archaeology, war, industrial archeology n museology

New archaeological anthropology emphasised on cultural evolutionary perspective, systems approach n logico deductive reasoning

3.4 Lingusitic Anthropology

1. Study of speech and language as a socio-cultural phenomenon across space and time.

2. It is Linguistics in the context of culture and society. Therefore,Linguistic anthropology deals with history, structure, variation and meaning of language in the social and cultural contexts they occur.

3. Upto 1950's it dealt with only descriptive studies such as origin of language, classification and similarities and was called Anthropological linguistics

4. Contemporary Lingusitic Anthropology is considered to be both descriptive and analytical. It has 5 sub branches.

5. Historical or comparative Linguistics: study of emergence, divergence and dynamics of language over time in cultural context. 6. Structural Linguistics: Construction of Language. Deals with Phonemic, syntactic and morphemic structures.

7. Socio-Linguistics: study of speech in social and situational contexts.Covers regional dialects, secret languages, magic languages, folktales.

8. Ethnosemantics: to understand culture from the point of view of people. studies meanings the words carry for a culture group for a particular situation.

9. Psycho Linguistics: studies processes underlying the acquisition,use, transmission of language.

10. Contemporary Linguistic Anthropology tries to understand the historical linkages and tries to devise scripts to languages without one. It helps in establishing contacts with Alien and foreign culture groups and in devising contents and curriculum under tribal education policies.

Biological Factors in Human Evolution

Hominization process is the evolutionary transformation of hominoids into hominidae. It includes all those aspects of structural and behavioral changes that occurred in the hominid line finally leading to the evolution of modern man. The biological factors are :-

- **Erect Posture and Bipedal Locomotion:** The most obvious thing about human beings that differentiates them from all other animals is upright posture and bipedal locomotion. Many

BIOLOGICAL & CULTURAL EVOLUTION

Human Evolution

(Biological)

Cultural evolution

- Australopithecines (40 - 10 lakh ago)
- little or no culture.
- like animals

Sherwood L. Washburn

says - Biocultural feedback (Biology influenced culture & vice versa) creates for why humans different.

He says "Culture became more advantageous for the survival of our ancestors &

Natural selection favoured the genes responsible for such behaviour.

- Interplay b/w Genes & Culture - Acceleration of human evolution.

- Knowledge & techniques developed by man through cultural evolution influence & modify the biological evolution faced by them. - Significant change in Gene pools.

→ Expansion of frontal areas of cortex - remembering food

- Increased capacity of brain - Food gathering.

→ Hunting - planning, techniques - increase pressure on - Changes in physiological & biolog behavioural patterns. brain

Hunting, food gathering → on physiology & (Culture) inference anatomy

(Biology)

Writing - accelerated cultural momentum.

Hominization is an synergistic interaction b/w culture & biology, dependent & simultaneous

- Gene-culture co-evolution.
- Double headed impact.

BIOCULTURAL EVOLUTION IN PLEISTOCENE EPOCH

Enabled man to

- Prehensility, Erect posture, Bipedalism - make / use tools.
 → Pleistocene (1.6 miln yrs ago) man evolved with sedimentary culture - tool making. (Ice age began)
 Cultural evolution began to overtake biological evolution.

Lower Paleolithic culture / Old stone age - Homo habilis / man manufactured OLDOWAN tools - pebble tools by percussior

Lower

also
title

10

Homo erectus - Hand axes - Abbevillian (raw) - Incomplete
 Acheulean - Finer, advanced
 Continuous working end - Hand axe culture

Neanderthal - Flake culture - Mousterian

(Middle Paleolithic) - Points used for arrowheads / borers.

Upper Homo sapiens (Upper paleolithic) - Blade tool Complex [knife points / lunates]

MESOLITHIC - Middle Stone age - Microliths (small stones) hafted in a bone prepared by the pressure technique.

NEOLITHIC - New Stone age - Polished stone - Grinding / Polishing

20 DIFFERENCE

BIOLOGICALCULTURAL

- Earlier,

- Later to Biological.

- Continuity - to Organic evolution

- Separate, only after humans

- Transmission of Genetic info

- by behaviour means.

→ through DNA, only at single point (conception)

- Active, lifelong teaching / learning

- Cultural info is flexible, can be stored & transmitted.

- Slow.

- fast.

THEORIES OF ORGANIC EVOLUTION

Herbert Spencer coined term Evolution

- Process
Irreversible
- Process in which the lower forms of life by gradual modifications give rise to higher forms → Organic diversity & process of generating
 - Definite Direction / Always PROGRESSIVE.
 - Across time, organic process.
 - Multiplication of organs → Coordination / Integration of organs
 - Proliferation of functions → Internal adaptive mechanisms
 - Greater Complexity → Emergence / Divergence / Progress

PRE - DARWINIAN

- 1) Mythological theories - India, China, Babylon, Egypt.
- Accurate sequence of origin - Dasavatara's
- Universe made of Panchabhuṭī's.
- Life probably began in water.
- Padma Purana - 10 incarnations.

2) Spontaneous Generation - Greeks & Romans (Ancient)

Thales (624 - 548 BC) - Aquatic origin of life.

Greeks
Anaximander - From primordial fluid.

Anaximander - From primordial fluid.

Empedocles - father of Evolution Idea.

Aristotle - Inorganic to Organic stage.

Roman - Leucritius - Life appeared in water.

3) Great Chain of Being -

St. Augustine & Thomas Aquinas.

- All living things r created specially with fixed position hierarchy
- Lasted till 19th century.

4) Divine or Special Creation.

- 5) Theory of Variation - Francis Bacon - new species could emerge from old species by degenerative process caused due to mutability of species.

- 6) PERFORMANCE THEORY - Malpighi - preformed embryos in females called Homunculus; fertilization initiates growths.
- 7) Epigenesis - Casper F. Wolff - Growth with selective differentiation of embryonic tissues.
- 8) Encasement theory - Charles Bonnet
- 9) Theory of Heredity & Evolution - Maupertuis - Hereditary material is responsible for transmission.
- 10) Theory of Eternity of life - No beginning no End.
John Ray, C. Linnaeus, William Paley.
- 11) Theory of Catastrophism - Georges Cuvier - explains extinction of species by observing fossils.
- 12) Theory of Less Rigidity Programmed Evolution.
Erasmus Darwin - life from primordial protoplasmic mass.

- PRE-DARWINIAN THEORY - Lamarckian

- Jean Baptiste Lamarck - first scientist to give systematic theory of biological evolution called Lamarckism or theory of inheritance of acquired characteristics.
- Biology, Invertebrates, biosphere - named by him.
- Introduced systematic methodology for collecting, analysing, interpreting data.
- Got the idea of Acquired characters from theological doctrine of monogenesis - (All humanity ancestry shares a common ancestry)

Postulates

- 1) Theory of Elan vitæ / Growth: The internal forces of life tend to increase the size of an organism by growth in organs & systems - forces capable of making organs / systems - Growth Principle.
- 2) Theory of environmental pressure, needs & spontaneous formation of organs - Changes in environment bring about the development of new characters in organisms.
- 3) Use & Disuse - Organ dept or Use.
- 4) Inheritance of Ac. Chrs: Characters developed by animals during their lifetime in response to envt changes are called acquired characters - and transferred to next generation - forming new species in progress.

SIGNIFICANCE :- Simple, had some appeal.

- first completely Comprehensive Mechanistic theory
- lent its to prediction, therefore Testing.

Critical Analysis

- He suffered social ostracism; becoz of following:
 - 1) Organisms increased their size, but contrarily many show reduction in size.
 - 2) Organs out of need - why man's flight - not possible if ^{desire} needed
 - 3) Heart size not increasing inspite of continuous use.
 - 4) Experiments fail to justify Inheritance theory.
- August Weismann (Germplasm theory) says Acquired characters are not heritable because environmental factors don't influence the germ cells.
- Castle & Phillips performed transplant experiments to show environment has no effect on heredity.

NEO-LAMARCKISM

- Those who support Lamarck's doctrine gave experimental evidences for Lamarckism. - Spencer, E. D. Cope, Helle, Mc. Dougall, etc.,
- Considered adaptation is universal. It arises as a result of causal relationship of structure, function & environment.
- Changed environment - new habits - new structures - Variations - distinct species - engrained in heredity.
- Stresses direct action of environment on organic structure
- Rejected natural selection as sole mechanism of evolution.

DARWINIAN THEORY

Charles Darwin - 1836 - 'The Voyage of Beagle' book.

factors - Influenced Darwin to propose Darwinism.

1) Theory of Uniformitarianism - Charles Lyell.

- Time period required for evolution.

- Darwin came to know from ↑ that environment has been constantly changing - concluding that characteristics of organisms, face of earth could change over a vast span of time.

2) Ideas of Wallace on Evolutionary biology

3) Malthusian Essay on Population - suggest reproductive potential for humans far exceeds the natural resources necessary to support an ever increasing population.

This imbalance results in struggle for existence.

4) Darwin applied ↑ to all organisms - this struggle under changing environmental conditions ultimately resulted in changes in physical structure of organisms
 - unfit eliminated

5) Industrial revolution of England (favourable variations)

6) Empirical evidences during his voyage.

- fauna of Galapagos Islands

- Pampas of Argentina - not all species survived age.

7) Improvement through selective breeding - Artificial selection.

8) Anatomical evidences

In 1859 - Darwin published 'On the Origin of species by means of Natural Selection'.

Darwinian Theory - 3 truths, 2 inferences, 5 postulates.

TRUTHS

- 1) Reproductive capacity of animals/ plants is very high.
- 2) Population of species remains more/less same ^(for every generation) Constant
- 3) Variations occur universally.

INFERENCES

- 1) Struggle for Existence (inferred from ① & ②)
- 2) Nature selects only the fittest one to survive (③ & ④).

POSTULATES

- ① OVER PRODUCTION - Potential rate of propagation in many species is unbelievably high but survival rate low.
becoz of - Predation
 - Delicate & low viability
 - Low susceptibility against biotic & abiotic factors
- ② STRUGGLE FOR EXISTENCE - Population increase Geometric, food increase Arithmetic, Struggle for existence.
Many progeny eliminated - at all environmental levels.
- ③ VARIATION - Everlasting competition compels them to change according to conditions - to utilize natural resources and can survive successfully - creating variation.
- So difficult to find out two similar individuals.
- Without variation no possibility of evolution.
 - * Individual variations (recombination of genes)
 - * Sports (sudden variations)
 - * Variations due to use & disuse
 - * Hybrid variations
- ④ SURVIVAL OF FITTEST (Natural Selection)
 - Only individuals exhibiting variations are proved to be more beneficial in facing hardships

- Capacity of Adaptation and Pre-adaptation:

Only those species have future that are adapted to the present environment and at the same time pre-adapted for an uncertain future environment.

- Differential Reproduction.

⑤ ORIGIN OF SPECIES

- Struggle for existence, variability and inheritance. the successive generations tend to become better adapted to their environment. These adaptations are preserved and accumulated in the individuals of species and ultimately lead to emergence of new species from old ones.

CRITICISM - Richard Owen & Adam-Sedgwick.

- Younger ones will not be able to give full impression to variations they have inherited.
- Doesn't explain use & disuse of presence of vestigial organs.
- Didn't differentiate role of specialised / overspecialised organs.
- Darwin didn't account for arrival of fitter.
- Didn't differentiate b/w somatic / germinal variations.
- Didn't explain reasons for inheritance.
- No emphasis on role of cooperation in context of evolution.
- How from aquatic to terrestrial?
- Sexual selection of Darwin - objected.
- Mechanism of inheritance?
- Origin of Variation?

Supplementary theories of Darwin

Theory of Artificial selection: commonest method of producing new individuals under human control. - expecting offspring will have beneficial factors.

Two levels - Conscious

- Unconscious.

Theory of sexual selection: Always contest among males for possession of females - inferior males eliminated, thus sexual dimorphism becomes marked in highly adapt individuals.

10. Theory of Pangenesis :- In 1868 - Darwin proposed by how acquired variations are inherited. - Incorrect so abandoned.
- He says animals produce miniatures called Pangenesis, which reach sex glands to form eggs.

COMPARISON OF LAMARCK & DARWIN

Differences

Darwin	Lamarck
(adaptation)	(diversity)
- Vertical & horizontal aspects	Move on vertical
- Evolution by common descent	- Missing -
- Diversity is due to struggle for existence / favourable variants	- Diversity is due to intrinsic perfecting force.
- Population - unit	- Individual \rightarrow Unit.
- Modification of population	- Modification of individual
- Nature selects organism	- Nature directs organism for evoln
- But both emphasise on use & disuse and environment brings bodily changes.	

NEO-DARWINISM

Herbert Spencer, and following scientist carried out experiments to prove Darwin was right - so they are Neo-Darwinians.

EXPERIMENTS: Weldon - Shore crabs - Carapace - decrease - Pitt.

Ponton & Sanders - Butterfly pupae of different colors favourable traits - Davenport - Chicks - coloured, non-coloured - hawks.
 - Cenola - Green * mantis & Black mantis.
 - Kettlewell - Industrial melanism - different coloured moths
 One in industrial area & another in Village.

CONCLUSIONS - Gave scientific shape to theory.

- Accept Darwinism in terms of Universality of variations, Over production, importance of natural selection.

- Doesn't accept Pangenesis
- Emphasise natural selection is responsible for everything
- Adaptation results from multiple forces (not only natural selection)
- Gradual but not sudden
- N. selectn by itself doesn't cause genetic changes.
- Cooperation among organisms important for survival.

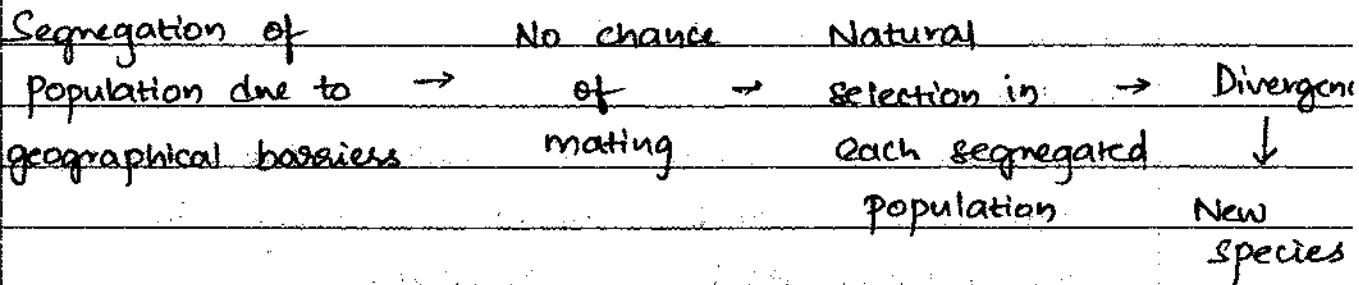
But incomplete and couldn't explain all dimensions of evolutionary theory.

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POST DARWINIAN THEORIES - on other mechanisms.

Darwin explained only one mechanism - N-selection.

1) Theory of Isolation - M. Wagner, 1868



2) Theory of Continuity of Germplasm

- August Weismann - says changes that occur in somatoplasm are not transmitted to next generation while changes in germ plasm are transmitted.

FEATURES - 1) Differentiation of protoplasm - Somatoplasm

Germplasm

- 2) Presence of determinants ^(chromosomes) in Germplasm, which further have determiners (Genes).
- 3) Immortality of Germplasm - perpetuates through meiosis
- 4) 'Id' - portion of Germplasm, responsible for development of characters in offspring - 'Id's from both the parents equal.

3) Theory of Orthogenesis - Rejected Natural selection.

Popularized by Theodor Eimer.

DARWINISM

- 1) N. selection sorting random, genetic variation
- 2) Selected traits are adaptive.

ORTHOGENESIS.

- 1) Driven by internal mechanisms but not towards a goal
- 2) Natural selection is not important

LAMARECKISM

- 1) Intrinsic drive towards perfection
- 2) Inheritance of acquired characteristics

- 4) Theory of Mutation: Hugo De Vries formulated the theory
- Darwin didn't explain arrival of fittest (Origin of variations)
 - But Vries conducted experiments on evening primrose & he observed variations caused by sudden changes, result of MUTATIONS.
 - Features are:
 - 1) Varieties of species - Progressive, Retrogressive, Degressive.
 - 2) Mutations - Sudden inheritable changes in wild type of PLANTS, transmitted to progeny.
 - 3) Mutants - Each plant which experienced mutation is mutant.
 - 4) Natural selection - Mutants are different from parents & mutation occurs in any direction & nature selects only those suitable and sudden change emphasizes.
 - Darwinists didn't accept 1.

- 5) Theory of Recapitulation - first by E. Severs, later formulated by F. Haeckel. (Biogenetic Law).
- ONTOGENY - Is growth (size) and development (shape) of an individual organism.
 - PHYLOGENY - Evolutionary history of species.
 - Theory says - Development of advanced species passes through stages represented by adult organisms of more primitive species.
 - Development of individual repeats the evolutionary history of race, condensing some stages and eliminating others.

EVIDENCES - General characters appear before special characters.

?

1) SYNTHETIC THEORY OF EVOLUTION

- which explains 1) Origin of new species 2) Process of evolution
- 2) Integrating views of Population geneticists & Dobzhansky Evolutionary biologists (1937).
- 1) Theory rejects 1) theory of inheritance of acquired characters & emphasis on Gradualness of evolution.
- 5) Modern evolutionists selected the best aspects of older concepts and combined them with their ideas in order to get a new concept - SYNTHETIC THEORY.

6) AIM

- to explain mechanism of evolution
- Evolution in terms of genetic change in populations leading to new species.

Concepts - Three Concepts:

I Production & redistribution of variation

- ELDERAGE - Difference in closely related animals called VARIATION.
 FUTUMANN - Evolution is modification of genes & gene frequencies.
 Any change from one generation to next in proportion of different genes is called evolution.

When Population is Large, Mating is Random, Mutations are rare.

Closed Population → then, frequencies of genes in a population

- (4) remain constant from generation to generation.

→ Gene frequency constant - then population in Genetic equilibrium or Hardy - Weinberg equilibrium

- Here state of evolution is ZERO (0). Hence evolution occurs when equilibrium is altered.

Genetic variation caused by following factors:

- 1) Gene mutation

2) Chromosomal aberrations3) Recombination - Mendelian Recombination
Crossing over

(i) Hybridisation (outbreeding) (c) Migration / Gene flow

(ii) Genetic drift (small populations) - (Small Wright effect)

- Force operating in small populations - here, gene frequencies fluctuate purely by chance. This change in frequency of genes purely by chance is called G. Drift.

- Insignificant in large populations.

- In small populations, some genes may be reduced in frequency or even lost by chance & others may be increased in frequency by chance.

- Thus gene pool changes without involving question of usefulness of traits.

(iv) founder principle - new population is established in isolation, its gene pool is not identical with parent population because of Sampling error.

IIAction of Natural Selection on Variation

- Genetic variations produce new phenotypes - may be advan/disevolve

1) ADAPTATIONS - Phenotype useful for organism in environment.

2) DIFFERENTIAL REPRODUCTION - one individual produces more than 1.

Better adapted - more surviving offsprings = greater no. in gene pool - leading to change in gene frequency. Thus natural selection promotes shift of more adaptive genotypes / phenotypes - spreading genetic novelty.

III

Role of Isolation - Separation of populations by some barriers preventing interbreeding.

- Prevents exchange of genes - isolating mechanism / Reproductive

~~SYMPATRIC~~ - Geographical isolation caused by physical separation of two populations

~~SYMPATRIC~~ Speciation by reproductive isolation.

Barriers → Parents → Genetic divergence → Exposure to different environments → Variation → Speciation
by N. selection & G. Drift
Interbreeding & gene flow.

MODERN
SYNTHESIS

Mutation

Hybridism

Recombin.

Variations $\xrightarrow{\text{N. favourable variations}}$ Isolation → Speciation

human morphological traits are directly attributable to these two facts of human life. Some of the changes are :

- Enlarging of lower vertebrae to absorb the forces of compression.
- A sharp backward curving of spine in lumbar region providing a solid platform to transfer the weight of body onto pelvis.
- Increase in the size and number of bones in sacrum to take up transmission of weight through pelvis and legs. Pelvic region became basin shaped to support vertical weight transference. Ischium a pelvic bone flattened allowing humans to sit comfortably.
- Knee joints have enlarged to support increased body weight. Double knee action to reduce energy during walking.
- The human foot is redesigned into a platform to support entire body weight rather than a grasping structure, toes got reduced and two arches developed to support weight.

- **Remodeling of face due to expansion of Brain:** The major trend of human evolutionary development was dramatic increase in the size of brain. Since the size of head as a whole shouldn't keep getting larger beyond limits allowed by process of birth, there was strong adaptive pressure to shorten the snout and reduce the size of face to make room for cranial expansion. The changes that took place were:
 - Foreman magnum is located at the centre of skulls base, with head balancing nicely on vertebral column.
 - The supra orbital ridges had diminished significantly, forehead became almost vertical, face became flat, nose became protruding, chin is prominent.

Theories of Organic Evolution

5.1 Pre-Darwinian (Lamarckism)

Attempts to explain the similarities and differences among species

Adaptations- are a major component to these theories.

Adaptations are features which make a species better suited to live and reproduce in its environment

Lamark

The evolutionary theory of Jean-Baptiste Lamark was based on the principle of:

1. Use and Disuse
2. Inheritance of acquired traits

Principle of Use and Disuse:

For an organism, new structures appeared in the course of evolution because they were needed. Structures that were present and were used became better developed and increased in size; structures that were not used decreased in size and eventually disappeared

Ex: muscles of an athlete vs. Appendix

Inheritance of Acquired Traits:

Useful characteristics acquired by an individual during its lifetime can be transmitted to its offspring

These acquired traits results in species that are better adapted to their environment

Ex: a giraffe's neck became longer as a result of stretching to reach higher branches. This acquired trait was then passed down to the offspring

Weismann

August Weismann did not agree with Lamark's theory of acquired traits

In a series of experiments, Weismann removed the tails of mice

The mating of these tailless mice produced offspring with tails of normal length

Weismann removed the tails of these mice and allowed them to mate

Again, offspring were produced with tails of normal length

The acquired condition of "taillessness" was not inherited

5.2 Darwin theory of evolution

Darwin in presenting his this theory of evolution in " origin of species " or " the preservation if favored race in struggle " made 3 observation & 2 deduction

Observation 1: all organism have potential for explosive population gr that would outstrip their food supply (idea from Malthus)

Observation 2 : population of sp. Remain more or less constant over generation

Deduction1: therefore must bestruggle for existence

Observation 3 : nature is full of variations , even in one animal group individuals vary

Deduction2: therefore some of these variations r favoured & some r disfavoured

Postulates

- 1) Overpopulation
- 2) Struggle for existence : inter species , intra species , struggle against envi

3) Hereditary & variation : Useful , permanent variations are heridited , give long with hi reproductive success

4) Survival of fittest /natural selection : nature selects organism with max useful variations

5) Origin of species : individuals selected by envi accumulate variations --> new species

Criticism

1) Couldn't explain inheritance of characters. He didn't account fir arrival of fittest

2) Didn't explain causes of variations , didn't identify significance of macro variations

3) Didn't explain occurrence of connecting link

4) Couldn't explain inheritance if specialised organs

5) Didn't explain use& disuse of vestigial organs

6) Didn't distinguish b/w somatic & germinal variations

7) Mostly emphasised on competition not on cooperation

8) Didn't explain evolution of terrestrial from aquatic organism

9) Though he criticised Lamarck he adopted his use& disuse theory .

Later Darwin's based on scientific experiments & observation gave scientific shape to Darwin theory .

5.3 Post-Darwinian (Rediscovery of Mendel, Wagner)

Post Darwinian theories:

Darwin's explanation of evolution by Natural Selection was followed by various theories where other forces of evolution have been given. They are:

1. Theory of Isolation:

Proposed by Wagner, which says that two or more populations of same species get separated because of some physical or geographical barriers or they may occupy different areas. Natural selection thus occurs independently in each segregating population.

2. Theory of Mutation:

Hugo De Vries stated that evolution proceeds by large, discrete and sudden changes or variations called as mutations. These mutations are inheritable by the progeny.

- Mutations may occur in any direction. Nature selects those which are suitable for survival and continuity. Other unsuitable mutants are eliminated by nature.

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- Mutations may occur in any direction. Nature selects those which are suitable for survival and continuity. Other unsuitable mutants are eliminated by nature.

- Genetists have shown that origin of species by mutations is common not only among plants but also among animals.

3. Rediscovery of Mendel's laws of heredity:

According to Correns and Tschermak, a) the factors given to the offspring by the parents do not mix but are segregated and b) if more than one pair of contrasting characteristics is considered in the same cross, the factors responsible for these are inherited independently.

4. Theory of continuity of germplasm:

Weismann proposed that somatoplasm makes up all bodily organs except reproductive cells and formation of complex organs during which they lose capacity to reproduce. Germplasm remains undifferentiated and retains its power to generate new life. Thus changes in somatoplasm are not transmitted but those in germplasm are transmitted to next generation.

5. Theory of Orthogenesis:

Haeckel and Lull's theories point out that variations or evolutionary changes occur along certain definite lines, guided by some undefined or inherent mystical forces.

Eimer views that laws of organic growth aided inheritance of acquired characters determine a straight line course of evolution.

6. Theory of recapitulation or embryological parallelism:

Proposed by Serres, it says an individual organism in its development tends to recapitulate or repeat the stages passed through by its ancestors.

Synthetic Theory Of Evolution

The need for this theory arose as Darwinism doesn't satisfactorily explain the origin and inheritance of variation. This theory consists of three main concepts

1. Production and redistribution of variation
2. Action of Natural selection on this variation
3. Role of isolation.

Factors that produce and redistribute variations:

1. **Genetic Mutations:** A mutation is a change on base sequence of DNA. For such changes to have evolutionary significance they must occur on sex cells as evolution is a change in allelic frequencies between generations. Mutations generally happen at gene level and bring about changes in hair, color, skin pigmentation and other somatic changes.
2. **Chromosomal Aberrations:** If a change happens above a gene level and chromosomes get changed then it's a chromosomal aberration. In this case there would be a change in either the structural aspects of chromosome or in the number of chromosomes present in the organism.
3. **Migration and Gene Flow:** Animals have a tendency to migrate and when they do that they come into contact with another population, it mates with the inmates of the population. Thus,

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genes of one population are transferred into another population which is called Gene flow. Gene flow brings about an addition or loss of genes in the gene pool and change in allele frequencies of the population.

4. Recombination: The genetic information is invariably reshuffled every generation because both parents contributes genes to the offspring in all sexually reproducing species. Such recombination doesn't in itself change allele frequencies but produce a whole array of genetic combinations on which natural selection can act and make every individual genetically unique.
5. Genetic Drift: It is an evolutionary force operating in small populations. In small populations the gene frequencies fluctuate purely by chance. Change in gene frequencies purely by chance is called genetic drift.

Action of Natural selection on Variation:

- The genetic variations produce new phenotypes which may have advantages or disadvantages. The organisms having genotype which gives it some advantage in a particular environment is said to be better adapted and have better adapted genes. Such organisms reproduce at a higher rate and leave more surviving offspring in next generation.
- Such a differential reproduction is due to natural selection where one individuals produces more young ones than others and these adapted organisms contribute a greater percentage of genes to the gene pool. If such a differential reproduction continues for many generations the adopted genotypes will become predominant thus changing the gene frequency.
- Thus natural selection promotes the development of more and more new adaptive genotypes and phenotypes. So natural selection is a creative force which spreads genetic novelty.

Role of isolation in formation of species:

- Isolation is separation of species by some barriers which prevent interbreeding. That prevents the exchange or mixing of genes between populations.
- Geographical isolation causes physical separation of two populations. These separated populations are exposed to different kinds of environmental factors acquiring variation and these variations are processed by natural selection. The nature and actions of recombinations, natural selection and genetic drift are different in different populations and for different environments.
- This independent occurrence of elemental forces of evolution on those isolated populations leads to progressive genetic divergence. This divergence leads to reproductive isolations. When this happens populations fail to interbreed even if geographical isolation disappears. Thus a new species is formed and the cycle of evolution repeats.

Dollo's rule:

- Proposed by Louis Dollo, a Belgian palaeontologist, the rule says "Evolution is irreversible and irrevocable. A structure that changes its form in evolution doesn't revert to its earlier form".
- It implies, once an animal lineage has passed through a number of different stages, a reversion, stage by stage to the original ancestral condition does not occur.

- Examples:

1) In dentition, once a tooth of particular series is lost, it does not recur again in the same series in the same form.

2) After extinction of flying reptiles, the combination of wings and reptile living did not come together.

- Exceptions:

1) Similar structures or same adaptive patterns could occur second time in evolutionary record. Ex: a) After flying reptiles become extinct, wings re evolved independently in birds and bats

b) Cetaceans (whales,dolphins) returned to aquatic environment in which vertebrates first evolved, but they haven't become fish, only developed similar structures (flippers) and shapes analogous to fish (fins).

2) Reversed mutations occurred in some bacteria, but only single step backward and not the whole sequence justifying Dollo's principle.

- Criticism: Being a descriptive generalisation, it could not be considered as a law of nature, but only a property of living organisms.

Cope's rule:

- Edward D.Cope, an American paleontologist proposed two laws in evolutionary biology :-

1. Population lineages tend to increase body size over geological time.

2. Animals which seem to be less specialised are found for a much longer time in the fossil record.

- Based on studies among fauna in North America, especially mammals, Cope proposed that the earliest fossil primates are very tiny and the later ones are large.

- Large size enhances ability to avoid predators and capture prey, enhances reproductive success and improves thermal efficiency.

- Examples:

1) Eocene ancestors of modern horse were about the size of a dog.

2) Camel, other herbivorous mammals, turtles, crocodiles, dinosaurs stand as an example to Cope's rule.

- Exceptions: The tendency towards size increase hasn't been universal. There are many exceptions.

1) Herbs and shrubs of recent times have originated from trees and other large plants.

2) In planktonic Foraminifera, A.J.Arnold observed that newer species are of small size.

3) Hooijer pointed out progressive size decrease in many vertebrates during Quarternary period.

- Criticism: It is only a descriptive generalisation, does not apply to all living organisms. Hence anthropologists reject Cope's rule as not being a law of nature.

Gause's rule (Principle of Competitive Exclusion)

- If two species occur at same trophic level in an ecosystem, they are likely to compete with each other for food. The competition may result in

- 1) Adaptive radiation of one or both species restricting them to separate niche and minimising competition.
- 2) Within the same or overlapping niches, equilibrium situation may be reached where one of the competitors declines in numbers to the point of extinction. This phenomenon called "Competitive Exclusion" was studied by Russian biologist Gause in several species of Paramecium.

- Examples:

- 1) Adaptive radiation is seen in finches in Galápagos Islands, which have undergone great diversification in their feeding habits.
- 2) Increased cultures of duckweed (Lamna) species, L.gibba was capable of excluding L.polyrrhiza.

- Criticism: Gause law speaks of parallel evolution in terms of structural adaptations but not in terms of physiological, protective animal association, biotic and organic adaptations.

Concepts and terms in Evolutionary Biology.

1. Convergence : It refers to the development of similar characteristics or adaptations in animals that differ in direct ancestry. It usually applies to one or a few characteristics of the animal than to its entirety.

Eg. : Retinal cells i.e rods which are more sensitive to dim light are present in deep sea fish, bats, lizards and lemurs.

2. Parallelism : This refers to when a common ancestor of two organisms was not very ancient and evolution in descendent lines followed more or less the same course. Parallelism implies a similarity in biological makeup of the ancestral forms, whereas convergence doesn't.

Eg : Lack of tail in gibbons, great apes and humans could be as their common ancestor had tails but evolved devoid of them in a parallel fashion in separate evolutionary lines after they diverged.

3. Homology and Analogy : Homology refers to similarity in origin i.e a common ancestor.

Homoplasy refers to similarity in appearance but not in origin. Analogy is similarity in function but not in origin. It can be learnt that parallel evolution following divergence leads to homologies while analogies and homoplasy might result in convergent evolution.

Eg. : Wings of species of birds is homologous while wings of birds and bats are analogous.

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4. Serial Homology : It is the similarity of structures between one part of an animal with another part of the same animal

Eg. Arm and leg of a man, i.e humerus bone of upper arm corresponds to femur of leg.

5. Adaptive Radiation : It is the evolutionary spread and differentiation of the descendants of one type of animal of whatever level of classification. It refers to the way a species evolves into progressively dissimilar organisms.

Eg. Mammals adapted in the Tertiary era while dinosaurs did not and hence became extinct.

6. Dollo's Law : It states that Evolution is irreversible to the extent that throwbacks to earlier forms do not occur in detail

Eg. Cetaceans may have returned to the aquatic environment in which vertebrates first evolved but they haven't become fish; they retain air breathing lungs etc. That are traces of their terrestrial past

7. Mosaic Evolution : This principle states that evolution of species tends to be inconstant and asymmetrical , i.e it may be rapid at once and slow another time , some times it might even stop.

Eg. Bipedalization and Encephalization , these traits evolved distinctly and separately with bipedalism preceding encephalization.

8. Cope's Rule : This principle states that living organisms have a tendency to increase in their size during the course of organic evolution . Though a majority of the present species are probably the largest of their respective class, this principle is not universal and has exceptions in both plant and animal kingdoms.

9. Gause's Rule : According to this rule, two organisms that occupy the same trophic level in the ecosystem in the process of achieving equilibrium might cause the one organism to dominate the other and adapt very effectively ultimately resulting in exclusion of the competitor. This adaptation by the dominating organism will be absent in if there is no competitor.

Primates Evolutionary Trends and Behaviour

The series of evolutionary trends given by Sir Wilfred E.LeGros Clark are:

1. Preservation of basic structure of limbs: Single bone in upper segment, paired bones in lower segment to permit some degree of rotation with five digit (pentadactyl) extremities for grasping, clavicle or collarbone retained in shoulder girdle to permit upper limb to have greater reach and range of movement in several directions.

2. Enhancement of free mobility of digits for climbing by grasping: It is indicated by the ability to move the digits (like thumb and great toe) independently, But unlike primates, in Humans the foot has become weight bearing organ rather than a grasping organ.

3| Evolution of flattened nails from compressed claws and development of highly sensitive tactile pads on the digits. These modifications were for facilitating a secure grip in the trees. In primates the palms and soles are naked of hair for better grip, 4. Abbreviation of snout or muzzle: Due to increase in the overall shape of the skull, there is a tendency for facial portions of the skull like snout area to become

relatively small. This trend is supported by behaviour trends where the higher primates use eyes and hands to do things that a prosimian would use his snout and mouth for. This is also accompanied by decrease in sense of smell due to decrease in olfactory areas of brain.

5. Evolution of visual structure: It is due to enlargement of visual areas of brain, change in structure of retina and nerves connecting it with brain for better coordination between sensory stimuli and muscular response, moving forward of eyes in head to permit stereoscopic vision. ex: the eyes of living tree shrews are located on the sides of head and in higher primates they are directly forward.

6. Changes in Dentition: Reduction in number of teeth due to reduction in face and jaws. preservation of simple cusp pattern of the molar teeth

7. Progressive expansion and elaboration of brain resulting in more accurate sensory perception and greater variety of behavioral responses to environmental factors. The changes are more predominant in cerebral cortex which has become expanded and its surface folded.

8. Development of gestational processes for nourishment of fetus before birth. In primates the mother gives necessary nourishment to the young through placenta, mammary glands. This association enables the young to learn various forms of behaviour which promote their survival.

9. Prolongation of Postnatal life periods: There is a well-marked trend for a lengthening of the period of growth and development and delay of maturation. This resulted in longer gestation period, increasing immaturity of infant at birth, longer postnatal growth period and later attainment of sexual maturity. The female primates usually have one infant at a time and thus the evolution is characterized

Behaviour pattern of primates

Primate Behaviour A large part of primate behaviour is learned rather than innate. Despite the diversity in behavioral patterns of primates primatologists like Jane Goodall (Chimpanzee), Dohlinow (Langur), George Schaller (Mountain Gorilla), C.R.Carpenter(Gibbon and Howler monkey) identified the following primate behaviours: 1. Group Living for benefits like defense against predators, enhanced food gathering, intensive social learning, assistance in rearing offspring and increased reproductive opportunities. ex: Baboons live within troops for entire life, social unit of chimpanzees is ever-changing. For primates particularly those that are diurnal group life may be crucial to survival.

2. Communication: through body movement, vocalizations, olfactory signals and facial gestures. Physical aggression ranges from simple gestures to violence.

3. Dominance-hierarchy and Dominance submission: ranking of primates in social status determined by physical strength, age, aggression and ability to attract others, dominance submission is the result of dominance hierarchy. For ex in Chimpanzees, if two males go after same fruit the subordinate holds back.

4. Dependency and Development: the prolonged dependency of infant monkeys and apes offers an evolutionary advantage by allowing infants more time to observe and learn the complex behaviors essential to survival.

5. Training and Learning: Primates often learn many things in social groups. for ex Method of feeding among chimpanzees: Termite fishing using a grass stalk to withdraw termites from a termite mound.

6. Sexual behavior: It varies among primates. Gibbons are monogamous, Chimpanzees are promiscuous. Thus most of the behavior patterns are learned and show a great diversity within the group and between groups of primates.

Primate Adaptations and Locomotion

What is a Primate?

- First, primates are members of the vertebrate class: Mammalia
- + 4000 mammals
- Primates are part of the subgroup of placental mammals

Three types of primates

- Prosimians (pre-monkeys)
- Monkeys (Old World and New World)
- Apes

Anthropoids

Common Mammal Traits

- Fur (or body hair in Humans)
- Long gestation & live birth (relative to other types of organisms)
- Heterodontism (different kinds of specialized teeth)
- Ability to maintain constant body temp (Homeothermy)
- Increased brain size (greater ability for learning and behavioral flexibility)

Characteristics of Primates

- Difficult to define by one or two common traits
- Primates are generalized (rather than specialized) mammals.
- Defined by evolutionary trends
- Not all traits found in every member of the order

Characteristics of Primates:

Limbs and Locomotion

- Tendency toward erect posture.
- Flexible, generalized limb structure
- Engage in a number of locomotor behaviors.

Hands and Feet

- High degree of grasping ability.
- 5 digits on hand and feet.
- Opposable thumb and partially opposable great toe.
- Tactile pads enriched with sensory nerve fibers at the ends of digits.

Diet and Teeth

- Lack of dietary specialization and tend to eat a wide variety of foods.

Generalized dentition, teeth are not specialized for processing one type of food.

Senses and the Brain

- Color vision (except for nocturnal primates)
- Depth perception
- Decreased reliance on the sense of smell (olfaction)
- Expansion and increased complexity of the brain

Maturation, Learning, and Behavior

- Longer gestation, fewer offspring, delayed maturation, and longer life span.
- Greater dependence on flexible, learned behavior.
- Tendency to live in social groups.
- Tendency for diurnal activity patterns.

Primate Adaptations:

Habitats

- Most are found in tropical or semitropical areas of the New and Old Worlds.
- Most are arboreal, living in forest or woodland habitats,
- Some Old World Monkeys have adapted to life on the ground.
- Gorillas and chimpanzees spend considerable time on the ground. *& maximum forest*

Diet and Teeth

- Primates are generally omnivorous,
- Most eat a combination of fruits, leaves, and insects.

- Most have four types of teeth: incisors, canines, premolars and molars. (*Heterodontum*)

Locomotion

- Most are quadrupedal, using all four limbs in their locomotion.
- Brachiating (arm swinging) is found among the apes.
- Prehensile tails, found only among the New World Monkeys, are used as an aid to locomotion.

Man as Primate, Anatomical Similarities and Dissimilarities between Man and Ape

11.1 Man as a Primate

Humans are placed within the order of primates within mammals. Primates lack a general specialization to describe them, and are characterised based on the series of evolutionary trends given by Clark. The following characters of man as a primate can be noted.

1. Primates have prehensile limbs adapted for arboreal life
2. Either the thumb or great toe or both are opposable.
3. They bear flat nails upon their digits, making grasping function of hands and feet easier.
4. They have well developed clavicle.
5. The orbits are completely surrounded by bony rings.
6. Dentition is diphyodont and heterodont, with different teeth to perform different functions.
7. Fewer offsprings, generally one at a time, with an efficient gestational process.
8. There are two pectorals located mammary glands.
9. There is pendulous penis and the testes are descended into the scrotum.
10. The stomach is simple.
11. Binocular vision and presence of bony eye sockets is observed.
12. Increased ability for adaptation to diversified ecological conditions is the most significant characteristic of man, highest being seen in man amongst all primates.

ORGANIC EVOLUTION

Process by which lower forms of life by gradual modifications accumulated through successive generations give rise to higher forms of life - generating organic diversity & process.

- Darwin says it is a descent with modifications.
- It involves a fairly continuous long-term multiplication of species therefore a corresponding increase in organic diversity.
- Involves a raising upper-level of biological efficiency. It reflects the emergence, divergence & progress of life across millions.

EVIDENCES FOR (HUMAN) EVOLUTION

Only circumstantial proof available as follows:

1) Evidences from Morphology and comparative Anatomy:
By comparing organs, musculature & tissues, it can be said that man & some other vertebrates have developed from same stock of evolution.

Homology - homologous organs have common origin & built on same fundamental pattern but perform varied functions different appearance.

Analogy - Analogous organs - same appearance & performance but of different ~~from~~ origin / pattern.

2) Vestigial Evidences: vestigial organs useless now, but might have been large & fit in ancestors.

3) Evidences from EMBRYOLOGY: Comparative Embryology, Ernst Haeckel's Biogenetic law / Theory of Recapitulation stating Ontogeny Recapitulates Phylogeny - which means embryos in their devt repeat the adult stages of their ancestral forms.

4) in PALEONTOLOGY: Comparing fossils of past & present

5) Biochem & PHYSIOLOGY: fundamental similarity among different groups of animals so far digestive, respiratory, reproductive physiology is concerned.

MALAKANTHIOO

AM 15/9/8

- 1) Taxonomy - Science of classification. Natural system of classification based upon similarity & such similarities of structure could be due to origin from common ancestors.
- 2) Genetics - Science of heredity.

MACRO EVOLUTION

Evolution which results in production of new adaptive change types through process of population fragmentation & genetic divergence.

- Operates above species level splitting populations of species into several subgroups - exhibiting changes in definite adaptive direction. These changes are known as Adaptive trends & phenomena as Macro evolution or Adaptive Radiation.

FEATURES: - Recs of mutations.

Occurs in organisms in a new adaptive zone.

Results in evolutionary divergence.

Produces groups of \approx special adaptations among divergent stocks leads to speciation in particular direction leading over specialisation & finally extinction.

Example: Evolution of reptiles & horses. Adaptive evolution of different reptilian or amphibian groups from initial reptile & amphibian ancestors of macro evolution.

MICRO EVOLUTION (M.E)

Process of evolution resulting from the interaction of the elemental forces of evolution (i.e., mutation, variations, recombination, natural selection) to produce relatively small changes in populations.

Basic process is change in gene frequencies in populations from one generation to another.

M.E force - Micro mutations are main source of producing changes in gene frequencies in gene pool.

Types of micro-evo. forces:

Shorter - results in producing segmental evolution.

longer - formation of new populations.

Ex: Invertebrate fossils.

M.E is continuous, gradual change in interbreeding populations, becoming geographically isolated into local populations.

MEGA EVOLUTION

Evolution of new types as result of general adapts from before generation, resulting in formation of new classes, groups, phyla. They are rare, but these organisms exist without extinction. All phyla, classes of organisms result of MEGA EVOLN.

Special features:

→ It includes experimentation & exploitation of new zone by members of ancestral stock in several divergent lines.

→ Pre adapted group of individuals then crosses ecological barriers & makes a break through into new zones.

Break through & shift are always rapid.

→ New zone is always ecologically accessible, no competition.

→ Initial shift always followed by macro evolutn.

Ex: Amphibians from fishes.

Reptiles from Amph.

VARIATIONS

- Differences b/w closely related organisms occurring in same env says no two organisms or parts of organisms are precisely alike same applies even for off-springs - parents & twins.
- Variations may influence any character of individual.
 - 1) Morphological - in shape, size, colour, pattern of body parts
 - 2) Physiological - Affecting physiological & living process of organs
 - 3) Psychological - mental traits
 - 4) Ecological - influence of Env't & usually non-inheritable

Sources of Variation:

Environt: Condns influence & induce variations.

Endocrine glands: Hormonal secretions influence development & differentiation of causing somatogenic & blastogenic variations.

MUTATION - Tamed by Hugo De Vries.

↳ large spontaneous inheritable changes, occurring suddenly.

THEORY: Based on observations on evening primrose.

says - new species originate as a result of these large, discontinuous variations which appear suddenly & full-fledged & from new species at once.

Main features of this theory are:

- Individuals with mutations are mutants - distinct from parents
- Mutants are inheritable - new race/species
- Mutants are large & sudden, occur in all directions, subjected to natural selection & which are usually destroyed by natural selection

Criticism: Darwinists say gradual evolution of species is contrary to this theory. B. A. Davis says Primrose is hybrid nature obtained by two wild species crossing.

GENETIC DRIFT & EVOLUTION

By Geneticist Sewall Wright in 1930. Theory also called as Scattering of variability, referring Random fluctuation in gene frequencies in a small population generation after generation purely by chance.

features:- Evolutionary force operating in small populations

Gene frequency in small populations changes by chance.

In small popn some genes may be lost or reduced & others may increase irrespective of selective advantage or disadvantage.

- By G.D a new mutation arising in small popn may be fixed or lost irrespective of its adaptive value. It may fix some non-adaptive traits in small popn. It tends to preserve or eliminate genes without distinction.

Isolated small populations of large popn come to possess some unusual characteristics not shown in large parental popn.

Influence of Genetic Drift on Evolution:

Plays considerable role.

- Most breeding populations of organisms are usually small
- The size of sub-populations they appear to be affected by chance events underlying G.D.
- Seasonal, annual or cyclical fluctuations may be observed in popn size. If season favours large gathering of popn, then G.D. may not take place.

SYSTEMATICS & TAXONOMY

- Systematics - Scientific study of the kinds & diversity of organisms & of any and all relationships among them.
- Classifies on basis of physical similarities. It collects data & compares physical features of organisms, studies traits by which relations b/w organisms can be determined & brings formal system of classification of organisms.
- It orders organisms into categories called TAXON.

TAXONOMY - Science of Systematics, with rules for constructing classifications, technical procedures, theoretical foundations on which classifications based. C. Linnaeus carried out first classifn on basis of physical similarities.

D/F B/W SYST & TAX

System is study of diversity of organisms & tiny is theoretical study of how classifs are made. The subject of classifs are organisms. The subject of taxonomy are classifications.

Use of Taxomic classifcne

- Provide a convenient & universally intelligible system of organisms
- Useful in understanding evolutionary relationships
- Hierarchy of organisms

Statics & dynamics, patterns of organic life.

Each Category has specific name, like Sub-kingdom, Sub-phylum, Sub-class, infra class.

DIVERSITY OF APPROACHES

four used for classifcny with evolutionary basis:

Phylogenetic: Based on Statistical Analysis of members of Category.

Typological: Based on concept of type.

Phenetic approach: Based on Overall Similarity - Phenetics.

Cladistic:

MAN'S PLACE IN PRIMATE ORDER

Metazoan - multicellular organism (Subkingdom)

Phylum - Chordata - flexible internal rod runs along back

Sub-phylum - Vertebrata - spinal cord covered with bone

Class - Mammalia - air breathing, hair as epidermal covering, warm blooded, viviparous, fetus nourished by blood.

Mammary glands, different shaped teeth, four chambered heart, uretra made from kidneys to urinary bladders.

Sub-division: Theria, again subdivided into Metatheria & Eutheria, man eutherian develop young inside the womb.

Infra-class - Placental

Order (a) - Primates

We are primates bcoz of prehensile limbs adapted for arboreal life, thumb opposable, flat nails, developed clavicle, atleast three kinds of teeth, brain with calcaneum fissure & posterior lobe, testes in scrotum, pendulous penis, female never has third trochanter.

→ Primates have two suborders: 1) Prosimii 2) Anthropoidea.

Prosimii - Tarsiidae, Lorisidae, Lemuroidea.

Anthropoidea - Platyrrhine (New world monkey) (flat nose) (Downward nose), Catarrhine (Old world monkey) (world) (forward nose)

Catarrhine - two super families - Cercopithecoidea (old world monkey) (not tail) Hominidae (Ape & Man) :

Hylabatidae (Gibbons, Siangs)	Pongidae (Orangutan, Gorilla Chimpanzee)	Hominidae (family) (Man) Has pre-maxilla bone, chin.
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Australopithecus
Extinct giving to Homo.

(Genus)

Homo

Habilis -

Erectus

Sapiens

neanderthalensis sapiens

WHY MAN PRIMATE

C. Linnaeus placed man in Order Primate.

- Presence of nails, no claws.

A pair of thoracically placed mammary glands.

Prehensile hands & feet, clavicle,

Orbits are directed forward instead of to the sides.

Unique Characteristics of Primates

Ability to rotate fore arm in & out.

Dependency on eyes than nose.

Not characterized by seasonal sex behaviour.

Emotional dependence.

MAN CAN STAND ERECT, ANTHROPOID CAN'T, WHY?

- Man alone has habitual bipedalism, specific changes effected in human skeleton are:

a) Skull: Well balanced, on first vertebral atlas, foramen magnum, placed centrally at back of skull.

b) Vertebral Column: Elastic ligaments to keep us erect, four alternative curves in V column tend to preserve the line of gravity & trunk in axis of sustentation passing through pelvis.

c) Thorax: Transverse diameter greater than dorso ventral diameter.

d) Pelvis: Ilium became short, sacral part excessive breadth, head of human femur bigger, acetabulum region very thick & in centre of pelvis.

e) Limbs: Arms shorter than legs.

f) Femur: Linea aspera, rough ridge back of femur, useful for dept of extensor muscles.

g) Foot: Short absorbing arch, mono-ductilism, less possibility of toe medial & lateral arches.

Neutral

Natural theory of Evolution - Non Darwinian Evolution.

- Kimura emphasize that mutations are neutral or nearly have neutral value.
- Genetic drift is responsible for divergence, all mutations are alike in adaptive value. It is only chance or random drift which delineates a novel collection of mutants into a group, divergent from parent stock / population.
- Speciation is not due to selection of advantageous genotypes, but elimination of deleterious alleles & random selection of neutral alleles.
- Adaptation does occur through natural selection, primarily to remove deleterious mutations from a population.

Assumptions Based of on two assumptions:

- 1) Selectively neutral mutations can occur in genes that code proteins -
- 2) Neutral alleles, not being selectively advantageous, simply drift in gene pool.

SPECIATION - O.F. Cook coined the term speciation.

- to understand evolution.

NATURAL SPECIATION : Rate of Speciation

Gradualism
(evolutionary biologist)

Punctuated Equilibrium
(Paleontologist)

Speciation occurs in 4 varieties:

- 1) Allopatric - Geographical & social change Ex: Galapago finches
- 2) Peripatric - Prevented from exchanging genes - founder effect
- 3) Parapatric - Zone of two diverging populations are separated but don't overlap.
- 4) Sympatric - Reproductive isolation

Autogenous (by mutation, natural selection, Genetic drift)

SPECIATION

Phyletic (Transformation) Allogenous (hybridisation)

True speciation Instantaneous

Gradual Sympatric

Allopatric

TERMS & CONCEPTS

DOLLO'S RULE - Evolution is irreversible & irrevocable.

- Structure that changes its form in evolution doesn't revert to its earlier form.

Exception: It doesn't mean that similar structures or even same adaptive patterns will not be repeated a second time in evolutionary record.

Critic

- Has no logical / substantive similarity to laws of Phys/Chem.
- It is only a descriptive generalisation - only a property, not a law.

COPE'S RULE - Only unspecialised animals survive and organisms have a tendency towards increasing in size during their evolution.

- Only those which can adapt to any type of environment alone can survive.

Critic

- But has many exceptions, it's not a law.

GAUSE'S RULE - Adaptive radiation is characterised by replacement of one form of organism by another form of organism consequent on their inability to share the same ecological niche for an indefinite period of time due to inherent differences in competitive ability and rates of reproduction.

- Simply - species ^{can't occupy} same ecological niche having same ecological requirements - less component species driven away or becomes extinct.

- Also called Competitive Exclusion principle

Adaptive radiation - process in which a relatively generalised ancestral group gives rise to many relatively more specialised descendants.

Ex: finches (Galapagos)

PARALLELISM -

Homologous.

- The evolution of two related species in same direction so that they resemble each other more than their common ancestor is called **Hom**.
- Their initial similarity is due to shared ancestral traits but their continued similarity is due to adaptation to similar conditions.

Homologous
analogous

CONVERGENCE - Evolution of similar adaptive traits in unrelated forms (not closely related phylogenetically)

- Similar adaptive traits as a result of adaptation to similar ways of life.
- Similar environmental demands make for similar phenotypic responses.

examples: 1) Ichthyosaurus (reptile).
 1) Fusiform type of body - Sharks, dolphin, porpoise, palaemon.
 2) Wings of bee, bird, bat : (different ancestors).

Only difference b/w Convergence & Hom is groups are adaptively and structurally similar and independently undergo changes in same direction ; b/w convergence groups are adaptively and structurally dissimilar or less similar, independently undergo some sort of opportunistic shift of one way of life.

Homologous

H

ANALOGOUS

An

- | | | |
|--|--|---|
| - Parallelism | | - Convergence |
| - Related to evolutionary descent and divergence | | - Similarity in form and purpose even though different ancestors. |
| - Wings of bat / Forelimbs of monkey (same ancestry - both with bones). | | - Wings of bat and wings of butterfly. |
| - Same origin, different ^(may be) function | | - Same function, Different origin |
| - Flippers of seal, wing of bat, forelimbs of mole, front leg of horse, arm of human | | |

ADAPTIVE RADIATION - coined by H. F. Osborn

- 2) Great variety adaptations to different niches.
- 1) formation of many new species following the availability of new environments or the development of new adaptation
- 3) A.R. is different from convergence, as in convergence similar forms due to similar envts. A.R. replaces one ancestral form by several descendant forms. The ancestral form adapts to one type & descendants to different types.
- 4) Evolutionary tendency to exploit unoccupied habitats may eventually produce an abundance of diverse species.
- 5) Adaptive radiations is evolution in several specialised directions.

* When a new form arises, it will diverge into as many variations as follows depending on

i) Its adaptive potential

ii) the adaptive opportunities of available zones.

6) Adaptive radiation involves transition from generalised to specialised characteristics.

7) A.R. "general" evolution is not process of Superior/inferior animals, rather a series of alternative strategies that have arisen in response to inconsistent environment.

8) Primitive traits doesn't mean inferior, so do derived traits doesn't mean superior.

9) There are animals only \leftarrow adopted not adopted.

MOSAIC EVOLUTION - Differential evolution of component parts of an organism. All parts of an organism donot change at the same rate in course of evolution and at same time period.

Ex: Human evolution

- Brings stage by stage change in diff parts
- provides max. limit upto a part of an organism
- flexible framework within diff organs
- develops in time compatible to other parts.

S.CHITHARANJAN
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Ancestral (possessed by ancestors).

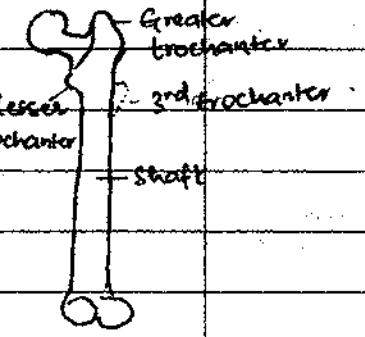
Characteristics of Primates: \rightarrow Derived ones (undergone change from ancestral stage)

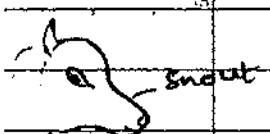
Ancestral features:

- Retention of Pentadactylysm.

- Generalized fore limb structure.
- Dentition - Cusp pattern of molar teeth.
- flexible generalized skeleton.
- Pendulous penis.

Derived features - Progressive shift of trunkal uprightness leading to habitual bipedalism

- 
- Absence of third trochanter.
 - Prehensile hand (ability to grasp).
 - Nails on digits.
 - Grasping thumb.
 - Rotation of fore arm.
 - free mobility of digits.
 - Power / precision grip.
 - Increased coördn of eye-hand & manual dexterity.
 - Dependence of eye than nose.
 - Reduction of snout.
 - Increased perfection of visual apparatus.
 - Binocular vision - bony eye sockets.
 - Decrease in olfactory centre in brain.
 - Brain - body ratio high.
 - Simple stomach.
 - Pectoral mammary glands.
 - Testes in scrotum.
 - Longer growth & matural periods.
 - Infant dependency.
 - Only one foetus.
 - Vocalization patterns & socio behavioural activities.



snout - producing portion of face.

Mammals - Air breathing

Warm blooded

Epidermal covering - hair

Viviparous

Placental nourishment

Mammary glands

Heterodont, rodent

four chambered

Body cavity - Thorax, abdomen

Animalia

Protozoans <



Metazoa

Non Chordata

Chordata

Rept
Amp
Pisces
Aves

CLASS

Mammalia

(egg laying)
Protheria

Theria (viviparous).
(young mass)

Metatheria
(outside womb)

Eutheria

Non placentals

Placentals

ORDERS

Carnivora

Perissodactyla

Proboscidea

Chiroptera

PRIMATES

Insectivora

Artiodactyla

Cetaceae

Rodentia

8. RESEARCH METHODS

F.W - study of people / culture in their nat. hab.

a) FIELD WORK - A'ly. problem - explanation of humanity, concerned with human beings past & present and with all of their works & activities.

- field work - study of people & culture in their ^{natural} habitat.
- Hallmark of cultural Anthrop.

First - Thorwood in Egypt, Levi-Strauss in France, Franz Boas in British Columbia, Haddon - Torres Strait.
 Malinowski - Trobriand Islanders.

NATURE OF A'LYICAL RESEARCH

- Participant Observation.
- Routinely trained art of studying / understanding cultures.
- Comparison with other cultures.
- Experimentation precedes both observation & hypothesis.
- Experiments already setup - but can't control them.
- Complete absorption of observer by the object of his observation.

SUBJECTIVITY & REFLEXIVITY

Demande of scientific research:

- Reliance on empirical evidence.
- Use of relevant concepts.
- Commitment to objectivity.
- Ethical neutrality
- Generality
- Predictions based on probability
- Testing of conclusions through replication.

OBJECTIVITY IN A'LYICAL RESEARCH

- Behaviour of human beings affected by many factors
- By particular, lacking exact prediction.
- Social phenomena are symbolically through words representing Culture, tradition, values - making Conclusion difficult.

- Social sciences qualitative.
- Social phenomena - greater heterogeneity.
- Influences preventing Objectivity
- Personal motives
- Customs &
- Social Inclinations of anthropologists.

Problems & Challenges at fieldwork

- One's own society is difficult to define.
- Field worker is stranger in his own society than those ^{of} others.

- Practical : whom to be involved with. Elite in society involved
 interfere actively, monopolizing Algs.
 - When there are two opposite groups.
 - People want to expel Algs, when commits mistake.

- Methodological :- choice of field, criteria to select field.
- Imposition of holism.

Total Problems -

Tools

45.1 Case Study:-

Case study is exploring and analysing the life of a social unit, can be a person, a family, an institution, a culture group, or an entire community. Its aim is to determine the factors that account for the complex behavior patterns of the unit. Case-data may be gathered on the entire life-cycle or on a definite sections of the cycle of a unit, but with a view to ascertaining the natural history of the social unit, and its relationships to the social factors and forces involved in the environment. Through the case-method the social researcher attempts to see the variety of factors within a social unit as an integrated whole.

In order to preserve the wholeness of cases the following methods can be followed.

- Breadth of data
- Levels of data
- Formation of indices and types
- Interaction in a time dimension

Case Study Materials:-

A variety of case-study materials are utilised in social research , personal documents, diaries, autobiographies and so on. All these materials to be evaluated in terms of

1. The writer's motives in providing the record
2. His opportunities to know the facts recorded
3. The bases and prejudices of respondent and recorder
4. The writer's insight into his intimate personal experiences and his ability to describe them

Personal documents are regarded as very valuable research data since they are self-revealing records which intentionally or unintentionally yield direct information regarding structure, dynamics and functioning of the author's mental life.

Life-History is a detailed voluntary account of person's own view of the events of his life as revealed under sympathetic questioning of a skilled enquirer and aims to reveal not only the objective facts of such a story, but their meanings to the informant.

Autobiographers are also useful in that they reveal causal relationships between early experiences and later dispositions.

Advantages:-

- 1) Allows the study of deviant cases
- 2) Case – study materials are used to relate the abstractions of ethnographic descriptions to the lives of the individuals
- 3) Life-History materials remain the source of information about social behavior
- 4) Materials are useful for examining the patterning of general values, foci of cultural interests, and perceptions of social and natural relationships.

- 5) Represent a more enlightening and fundamentally more real record of personal experiences with a wealth of concrete detail, multifarious reactions to social situations which escape the attention of most skilled investigators using other techniques

Disadvantages:-

- 1) It costs much in time and money.
- 2) Response of researcher, because he likely to feel a sense of certainty about his conclusions, ignoring to test reliability
- 3) Generalisation based on only a few cases are dangerous
- 4) Subjective data gathered do not lend themselves to quantitative methods
- 5) Lack of standardised and objectified procedures permitting corroboration of both data and generalisations
- 6) Records are open to errors of perception, memory, judgement and unconscious bias with a special tendency to over emphasize unusual events.

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Method - way of conducting / implementing research. CHITHARANJAN
Methodology - Science / philosophy behind all research. AIR#574

Distinctly b/w Technique, Method & Methodology.

Research is scientific & systematic search for pertinent info. on specific topic, finding a solution to a problem.

- Research methods are which used for conduct of research.

Three groups of methods:

- 1) Concerned with collection of data
- 2) Statistical techniques, used for establishing relationships b/w data & unknown
- 3) Used to evaluate accuracy of results obtained.

Research techniques refer to behaviour & instruments we use in performing research operations (more scientific).

Ex: Observations, recording data, processing data techniques

Research ~~method~~ : Behaviour & instruments used in selecting and constructing research technique.

Research Methodology: Way to systematically solve a problem.

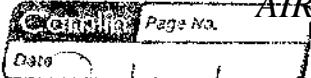
Science of studying how research is done scientifically.

- We study various steps adopted by a researcher in studying his research problem along with logic behind them.
- Researcher to design his methodology for his problem as the same may differ from problem to problem.
- It is principles that guide our research practices.

Explain - why we are using certain methods in our research.

Approach - line of thinking one adopts. - procedure

Perspective - how something is viewed. - framework.



TOOLS OF COLLECTING DATA

OBSERVATION - Basic method, is observing human int., trying to make sense out of human experience.

Types:

- 1) Controlled / uncontrolled -
- 2) Structured / unstructured -
- 3) Participant / non-p

Merits: members of community unaware of researcher's purpose.

- Great depth of experience, can record, check the truth of statements, rare occurrences can be seen.

Demerits: narrow range of experience, affecting changes in human behaviour of group, emotional involvement.

INTERVIEW - Informal verbal, focused on planned areas.

Intentional process, exchange of information, psychological effort

OBJECTIVES - Exchange of ideas, elicit of info - wide range data.

avoid
interrupting
e
infusing
questions

Don't make
interviewee
nervous

response
filled by
exponent

QUESTIONNAIRES / ~~surveys~~ - Its technique of data collection

- Emphasis on quantitative measurement.

- Better instrument to obtain info - Personal feelings, expects, future plans.

Types of questions: -1) Open ended 2) Closed ended 3) Contingency qm

Types of questionnaires: -1) Structured 2) Unstructured 3) Mixed 4) Pictorial

Merits: Attractive, printed legibly, appearance should evoke interest, item wise classifn, never repeat questions, embarrassing, threatening

Demerits: Anonymity, to the point, no vague answers.

Limited, non-literate, response rate ↓, misinterpretation of questions

SCHEDULE - filled by researcher in presence of respondent.

- Estb rapport, can explain unclear term, more clarity.

Anthropological approaches

- 1) Comparative approach -
- 2) Cross cultural comparison - across cultures of same period
- 3) Historical - Origin / drpt / evolution studied.

METHODS

CASE STUDY - Case is a social unit with deviant behaviour.

- Method of qualitative analysis : Obtain complete & detailed account

Chnts:

- Intensive, comprehensive, detailed.
- Personal & hidden dimensions.
- Retaining holistic & meaningful characteristics of real life events.

Sources: Life histories, personal documents, biographies, observation.

Advnt: In-depth analysis, sensitive studies, formulation of hypothesis.

Limits - Erroneous, faulty selection of case, no uniform method.
- Investigators bias, time consuming, costly.

GENEALOGICAL METHOD - Study of one's ancestors.

- Dvpd by W.H.R. Rivers during Torres Straits xpdn - 1898.
- Adopted by Ethno. researchers.

AIM - Analysis of social organisation - interpersonal relns & living arrangements b/w members of society.

- Requires extensive interviewing.
- Rivers monograph on TORBAS.
- Helpful studying kinship - Charting Pedigrees / mapping residence details.
- To study migration & trace early migrants - very useful.
- Drawing Kinship diagrams / genealogical chart.

3) Survey :- Systematic collectn of data from a population through interviews, questionnaires, schedules.

- Most tractable form.
- Researcher can elicit views, attitudes, perceptions, behaviour.
- Charm
- Sample study to generalise entire popul.
- Directly with respondents; conclusions from data.
- Surveyors should be skilled.

Procedure - Select field → Choose sample → Choose tools → Analyse data - Generalise

Type General, specific, Regional, Sample survey

Advantages Large popul., policy research, market behaviour, reliable, valid

Disadv. Low response rate; historical events can't be studied, sampling errors.

4) OBSERVATION

Tools & TECHNIQUES - Questionnaire & Interview

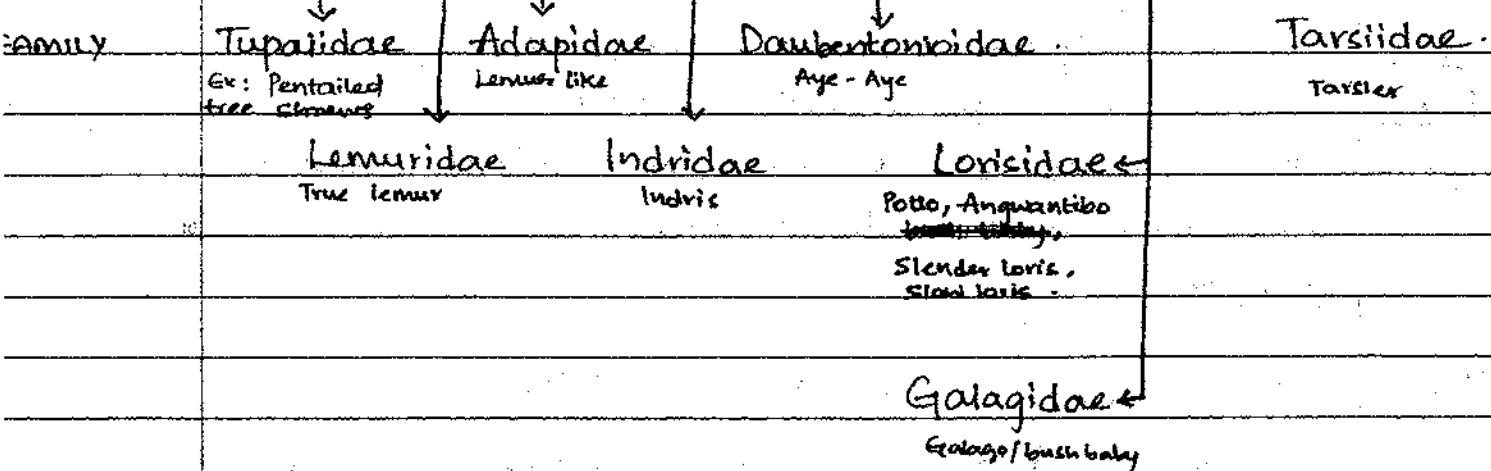
- Schedule is a tool to conduct interview / observation.

PRIM

UBORDER Primisians (Primitive primates)

infra-order Plesiadapiformes Lemuriformes Lorisiformes Tarsiiformes

Archaic primates



T.E.S.

Sub order

Anthropoids

Intra order

Platyrrhini

New world

Catarrhini

Old world

Apes
(Hominidae)↓
Hominidae

Primate Distribution: Humans live in all kinds of lands.

- Non-human primates is not wide. Live close to equator
- Western hemisphere - Central and South America - New World
- Eastern hemisphere - Africa, Asia - Old World - monkeys.

HABITATS

- South America - No terrestrial primates.
- New World monkeys - Tropical rain, swamp or lush forests
- Old " " - moist, warm, tropical rain forest.
- Guenons - Secondary growth forest
- Chimpanzee, Gorilla - Drier mountain forest.
- Macaque - tolerate colder climates of temperate zone.
- Langurs - Villages
- Rhesus, Bonnet Macaque - In civilisation, cities.

MOTION

- Three forms; not exclusive.
- a) Quadrupedalism - Tree shrew, all monkeys, Gorilla, Chimp.
 - Four legged walking both on ground & trees.
 - General varieties like.
 - * Slow climbing - Lorises & Potto, slow & cautious movement, feet like forceps, firm grip.
 - * Branch running & walking - prehensile grasp
 - Equal length of both arm & legs.
 - * Ground running & walking - Baboon, doesn't involve prehensile grasp. Equal length,
 - Hand with more precision grip.
 - * Kink knuckle walking - Structurally brachiatars, having long arms, fingers, short thumbs.
 - Walk on soles and knuckles
 - Disproportionate long arms.

BRACHIATION - Locomotion of Asian apes; body weight suspended by arms, swinging legs used for support

- Gibbon & Siñan - True brachiation
- Orangutan - Modified brachiation.

BIPEDALISM - habitual support ^{on} legs, which move alternately to propel it through space.

- Hands are free to carry and manipulate objects.
- Specialised Locomotion - humans (can jump, hop, climb, run)

ADAPTATIONS

- 1) Forelimb - corresponds to early generalised limb structure of early placental ancestors.
Ex: Retained clavicle, radio-ulna, pentadactylism.
- 2) Flexible skeleton - various locomotive patterns.
- 3) Grasping Big toe - (except humans) - for arboreal, insect predation
- 4) Grasping thumb - not all primates - manipulating objects
- 5) Claws to nails
- 6) Tactile pads - friction pads in grasping
- 7) Nose - Olfactory sense plays a crucial role, but for arboreal not so vital.
- 8) Eyes - Location - front - 3D Stereoscopic vision.
Bony eye socket - (not complete in primates)
Vision - Both 2D, B&W & 3D colour.
Stereoscopic vision - front of face, to determine distance
- aiding rapid movement through trees
- 3D vision improves accuracy.
- Vision vital in communication.
- 9) Facial expressions, body postures - means of communication
Upper lip not attached to gum
- 10) Teeth - Simple structure, differentiated

- Epitheliochorial - Blood vessel of mother / foetus in close contact (pass both vessels).
- Placenta
- Hemochorial - Foetal blood vessels surrounded by maternal blood (maternal pass - single vessel)
- 11) Longer life span - in relation to body size.
 - 12) Longer life cycle events
 - 13) Intelligence - Great awareness, abilities to manipulate envt.
 - 14) Learning - much primate adaptability is result of behavioural adaptations that are learned.
 - Large social units & long childhood periods.

PRIMATE BEHAVIOUR

Study of social behaviour of non-human primates gives us an idea of behaviour of our ancestral hominids before emergence of culture.

→ SOCIAL ORGANISATION - Most of non-human primates live in stable group.

1) 1F + Children - Rare - Orangutans, Lemurs, Galagos.

- Adults alone

2) 1M + 1F + Chdren - Common

3) 1F + Many M + Chdren - Rare - Marmosets, tamarins

4) 1M + Many F - Hamadryas baboons, Geladas, Langurs, Gorillas, howler monkeys.

- Minimum area is needed for maintenance of dietary needs of group. - So large are required.

- Specialised territorial defence behaviour.

- Loud vocalism in case of Chimps.

- Grooming → Playing & fighting.

- Allogrooming - mutual grooming - reduces tension

- Resource defense territoriality takes place when food is limited.

- Apes, monkey capable of symbolic communication.
- Facial expressions, olfactory signals, sound, touch ↑
- Agonistic displays - threatening gesture & stares.
- Comm by smell prevalent in primates + have good sensitive olfactory receptors.
- Scent marking - claiming territories.

New World Monkeys

Infraorder - Platyrrhini (flat nosed)

Distribution: S. America, Central American forests. Squirrel monkey

Capuchin - S.A. rainforests

Saki, Monk saki - Amazon, Orinoco basin.

Characteristics: Dental formula - $2:1:3:3 / 2:1:3:3$.

- Arched appearance of nails, toes.
- No cheek pouches.
- No prehensile tail.
- No ischial callosites.
- No protruding brow ridges.
- Thumb not fully opposable.

PHYLOGENY - Oligocene origin

OLD WORLD MONKEYS

Narrow spaced nostrils with downward direction.

Distribution: Asia and Africa (Absent in Europe).

Characteristics: Quadrupedal, $2:1:2:3 / 2:1:2:3$.

- Cheek pouches.
- Ischial callosites.
- No flattened nails.
- Toe - great independent movement.
- Nostril close to each other.
- Males bigger, bright colour hairs - Canine large in male.
- Baboons show sexual dimorphism, diurnal, ↑.
- Guerezas - brachiation, high trees.

SKELETAL CHANGES DUE TO ERECT POSTURE & ITS IMPLICATIONS

Habitual bipedalism - unique feature of man.

Erect posture.

- 1) SKULL: - Round and balanced on Atlas
 rotation of skull.
 - Large opening at base of skull - Foramen magnum
 - Vertical face with anterior facing eyes (flat face)
 - Changes in post cranial bones.
 - Vertical position of frontal bones, reduction in size of lower jaw.
 - Absence of sagittal crest in skull
 - Absence of well developed nuchal crest & nuchal muscles ^{reduction of}
 - Spherical shape of skull bcoz of above factors.

2) Vertebral Column:

- Solid box like construction of thorax region for equilibrium.
- a) Elastic anterior and posterior longitudinal ligaments b/w vertebrae to stay in erect position.
- b) Alternative curves - preserve the line of gravity
- Flattened chest of man - CoGravity backwards towards Spine.
- Modifications in sacrum to discharge the mechanical stress towards pelvis (Ilium, ischium & pubis).
 - ↓ Human ilium - extremely short & excessive breadth at sacral part - fan shaped.
 - Strong anterior iliac spine
 - Presence of Ilio femoral ligament
 - Flattened ischial base.
 - Reorganisation of muscular development
 - Larger and thicker acetabulum region

- Limbs:
- Shorter fore arm, short metacarpals.
 - Ridges for muscle attachments in femur are much more sharply defined.
 - Linea aspera - posterior surface of femur posses of rough ridge - prismatic form
 - foot change from grasping to supporting (becoz of posture)
 - Loss of opposability of great toes.
 - Shock absorbing arch on plantar aspect.
 - Tendency towards monodactyly.
 - Longitudinal axis b/w first & second toe.
 - Calcaneum became larger.

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11.2 Anatomical similarities and dissimilarities between Man and Apes

	SIMILARITIES	DISSIMILARITIES
Chimpanzee and Man	1. Skull and Pigmentation of Body. 2. Chest proportion of Chimpanzee	Canines 404 cc 13 ribs.
Orangutan and Man	1. High forehead. 2. same number of pair of ribs. Pronounced sex-dimor	1. shortness and degenerate character of legs. 395 cc. 2. Adoption of feet for suspension.
Gibbon and Man	1. Length of legs. 2. erect gait	1. excessive arm lengths 2. general size. 3. Pelvis 4. Hands and feet 5. Length of canine teeth 6. Size of brain.
Gorilla and Man	1. Hands 2. Feet 3. Pelvis 4. Size of brain. 5. 6 feet.	Massive Jaws of gorillas. 13 ribs. 500 cc.

Common apes
Posteriorly placed skull
Foramen magnum rare and
Presence of nuchal crest
Sagittal crest
Lesser cranial depth & more facies

S.C. CHITHARANJAN
PROTR#5674f
- Supraorbital &
- Dental arcade
- Depressed n
- Nasal bone
- Jaws @ x of brain
- Chin
- Prognathia
- Vertebrae curv
- Sacrum wide in a
- Linea aspera
- Great toe opposable



4.6 feet.

3' feet



Skeletal Changes due to Erect Posture and Its Implications

- A. Skull- skull well balanced on first vertebra, foramen magnum centrally placed
- B. Vertebral column - elastic ligaments between vertebral lamina, four alternative curves, extensor n spinal muscles in de direction of spinal process
- C. Thorax- transverse diameter more than dorsoventral diameter
- D. Pelvis- ileum has become short, sacral part enlarged, head of femur enlarged, acetabulum thicker n larger, n it is centrally placed
- E. Limbs- Legs longer than arms to withstand body weight

F. Femur - muscle attachments n ridges more sharply defined. Linea aspera is a characteristic feature of humans

G. Foot- less opposability of great toe, shock absorbing arches, medial n lateral arches, calcaneum larger n stronger, wedge shaped development of other tarsal bones

Phylogenetic Status, Features, Spatial Distribution, Cultural Characteristics and Differences among:

13.1 Australopithecines- Australopithecus (Gracile) forerunner of Homo .
Australopithecines: Height - 3.5 - 4' Weight - 30 - 70 kg
The fossils of Australopithecus were found at different places in Africa and outside Africa. It is a small brained biped with a number of species within the same genus. Most of these variants are associated with savanna living. Height - 3.5 - 4' Weight - 30 - 70 kg
foramen magnum
First discovery made by Raymond Dart-Taung.

Divided into two groups

1. Gracile:

- It is considered to be an ancestor of Homo
- Small and gracile in terms of body weight, skeletal features like dentition, facial musculature and cranial capacity.
- Omnivore and probable tool maker. Feebly developed supra orbital ridges proves his diet

It includes

1. A.Anamensis: Earliest Australopithecus species found in Northern Kenya

2. A.Afarensis:

- found at Lateoli in Tanzania and Hadar in Ethiopia
- human like footprints found at lateoli which confirm them to be bipedal
- Large ape like canines but did not fit into diastema. Thus side to side movement of lower jaw was possible
- A complete skeleton of gracile female called Lucy fossil was discovered by Donald Johnson at Hadar(Ethiopia)

3. A.Africanus (Southern ape of Africa)

- First Australopithecus to be discovered. Raymond Dart
- Taung fossil: Juvenile fossil, Foramen Magnum located underneath the skull indicating bipedalism and erect posture, incisors and canine teeth were short like humans
- Initially it was difficult to conclude on Australopithecus Africanus features based on child fossil but later discoveries by Robert Broom at Sterkfontein and others at Makapansgat helped in deriving a complete picture;
- Brain case is rounded, well developed forehead, moderate brow ridges.

2. Robustus or Paranthropus

- Large and robust with features such as supra orbital ridges and sagittal crest
- Larger dentition
- considered to be extinct with changing climate

It includes

1. A.Aethiopicus: earliest known robustus found in North Kenya and South Ethiopia

2. A.Robustus: discovered by Robert Broom at Kromdraai. It is found to be living at the same time of A.Africanus though they have marked different hominid features.

3. A.Boisei or Zizanthropus: Discovered by Louis Leakey at Olduvai Gorge in Tanzania. The discovery demonstrated the presence of early hominids in east Africa.

Geographical distribution:

South Africa:

Gracile:

1. Taung - A.Africanus.
 2. Sterkfontein - Plesianthropus Transvellenis
 3. Makapansgat - A.Prometheus
- Robust:
4. Kromdraai - A.Robustus
 5. Swartkrans - Paranthropus Crassidens

A. sediba

- 2 mya
- Equipped for climbing & walking
- Primitive shoulders like o legs, more lower like man

East Africa:

1. Omo(Ethiopia) - both gracile and robustus

Gracile:

2. Hadar(Ethiopia) - A.Afarensis
 3. Laetoli(Tanzania) - A.Afarensis
- Robusutus
4. Olduvai(Tanzania) - A.Boisei

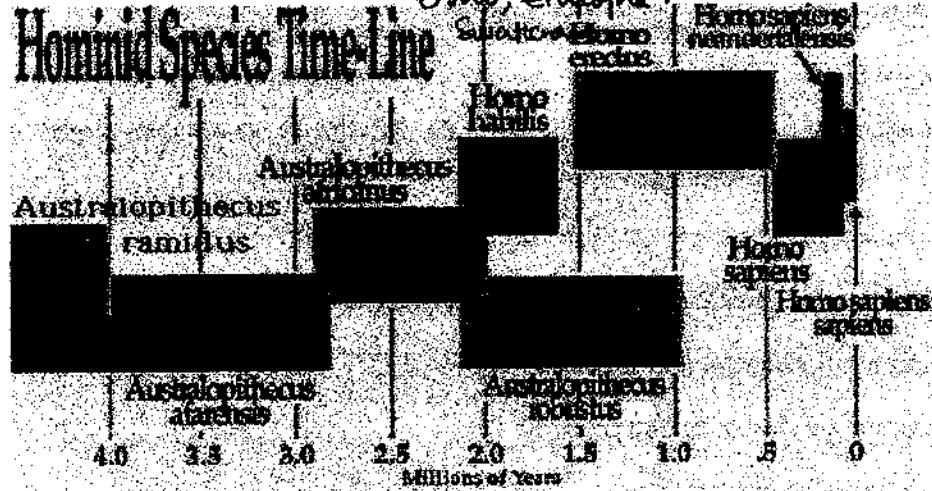
Gracile - A. Anam - Kenya

- A. Afra - South East Africa

- A. Afric - Trans,

13.2 Homo Habilis

Hominid Species Time Line



Homo habilis (ca. 2.5-1.6 mya)

Phylogeny:-

Robinson gave two varieties.

Two branch theory :- D.Johansson, 1979

Three branch - Alan Walker
(found. A. Aeth.)

A. Afarensis

Homo Habilis

A. Afri → Rob → Boisei.

Homo

A. Aeth → Boisei

A. Afri → Boisei

Gracile	Robust
4.4-2.0 mya	2.3-1.8 mya
3.5-4.1	4.4"
30-70 kg	40-80 kg
light built	heavy built
400-600 cc	500-650
Absent S. crest	Present
Temporal fossa medium	large
Poor brow ridge	Prominent
No Simian shelf	Yes
Absence of Divergent foot	Presence of Divergence
Psiptedal	Less erect



The earliest member of our own genus *Homo*

- is *Homo habilis*,
- who lived 2.5-1.6 million years ago
- Its remains were first found at Olduvai Gorge,
 - Tanzania,
 - but it is also known
 - from Kenya, Ethiopia, and South Africa
- *H. habilis* evolved from the *A. afarensis* and *A. africanus* lineage
 - and coexisted with *A. africanus*, *A. robustus*,
 - for about 200,000 years
 - Only a few fossil remains have been discovered so far, but these specimens exhibit a clear trend toward larger brain size.
 - *H. habilis* brains are about 30% larger than those of *A. africanus*.
- Brain size much bigger than Aus. (500-800)
- Teeth smaller, thinner enamel, more parabolic dental arcade,
- Skulls rounder, less prognathic, jaw muscles reduced.
- East and South Africa, same time as robusts.
- Handyman, associated with Pebble choppers (more later),

Sexual Dimorphism

- Males were much larger than females,

- The male is pictured on the left.
- Sexual dimorphism in *habilis* is expressed in significant size differences

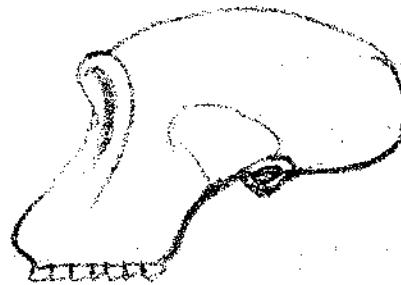
First Stone Tools:

Oldowan Pebble Choppers-

Tool Technology

Oldowan Pebble Choppers

- rounded pebbles
- portions broken to form sharp edge
- flakes used for butchering



Behavior

- Meat eating
- Home base, food sharing, sexual division of labor,
- Archaeological evidence
 - Animal bones and stone tools at sites (Olduvai)
 - Hunting or Scavenging?
- Homo habilis
- Height 1.0 metres
- Physique Relatively long arms
- Cranial Volume 500 – 650
- Known Date 2.0 – 1.6 million years ago
- Distribution Eastern & S? Africa
- Skull form Relatively small face; nose developed
- Jaws/Teeth Thinner jaw; smaller, narrow molars

13.3 Java man & peking man



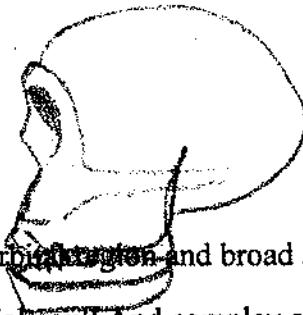
Homo erectus lived for more than one million years and spread from Africa to Asia . The fossils obtained were nick named as Java man and Peking man based on the location from which they were obtained .

Java man

- The discovery of Java man was first major Hominid find and helped understand the evolution and anatomy of early man. Its extinct remains were found in Java, Indonesia

General features

- They weigh around 70kg .
- Height : ~170cm



Anatomical features

- Skull : small in size with complex supra orbital region and broad , rounded occipital region
- Cranium : dolicocephalic with lower cranial vault And complex cranial sutures
- Forehead : receding , flat
- Teeth : smaller canines but largess incisors and molar. Diastema occurs in upper dental arch . They r essentially human with partly ape like features (overlapping canines)

Peking man

Peking man is an extinct hominid species of H. erectus , known from the fossils found in a village in Beijing. The story of the famed Peking Man fossils is one of discovery and loss. He is considered as ancestor of Chinese people . He post dates Java man

General characters

- Weighs around ~50 kg and shorter in stature than Java man

Anatomical features

- Skull : large in size with heavy continuous furrows separating forehead from supra orbital region
- Cranium : Dolicocephalic , has cranial capacity nearing modern man
- Forehead : receding but has bump like development
- Teeth : essentially modern , though with large canines & molars
- Limb bones : almost like modern man

Tools of H.erectus

- Used more advanced, sophisticated tools as hand axes . Mostly acheulian tools

- Tools associated with Java man are yet to b found but tools of Oldowan- technology are found in Java.

With better foraging and hunting skills they could exploit the environment . Judging by their long duration of stay it can b concluded that they were better adapted group.

Neanderthals:

The term 'Neanderthals' is derived from an assemblages of fossils found in Neander valley of Germany. There are two types: Classical Neanderthals and Progressive Neanderthals.

- Time Period: Appeared during third interglacial period from arounf 1,20,000 years ago to 30000 years ago
- Height and Weight: Male: 164-168 cms, 77 kgs; Female: 152-156 cms, 66 kgs
- Distribution: Mostly in Europe, Central Asia and Middle East

The main differences between Classical and Progressive types are in the skull. Both have similar post cranial features. The differences in the skull are:

Character	Classical Neanderthals	Progressive Neanderthals
Cranial Capacity	1600 CC	1400 CC
Skull ✓	Large and broad +	Long and less broad +
Cephalic Index ✓	Lower	Higher
Vault of skull ✓	Lower	Higher
Forehead ✓	Receding	Less Receding
Occipital Region	Protruding	Less Protruding
Supra Orbital Ridge✓	Large and continuous	Large and separation in middle
Orbits	Less rounded	More rounded
Upper Jaw ✓	Projecting	Not Projecting
Nose	Broad and Large	Less Broad
Chin ✓	Absent	Well Developed
Teeth	Always Large	Not always Large
Body Built ✓	Stocky	Medium
Face ✓	Long and Prognathic	Medium to short
Surface of Skull	Rough	Less Rough

Post Cranial Features are:

- The vertebral column was short and stout
- Ribs were strong indicating large thorax

- Limbs were shorter but stouter with powerful muscular attachments which was characteristic of Neanderthal man.
- Fingers were large and robust
- Femur was strong.

Cultural Characteristics:

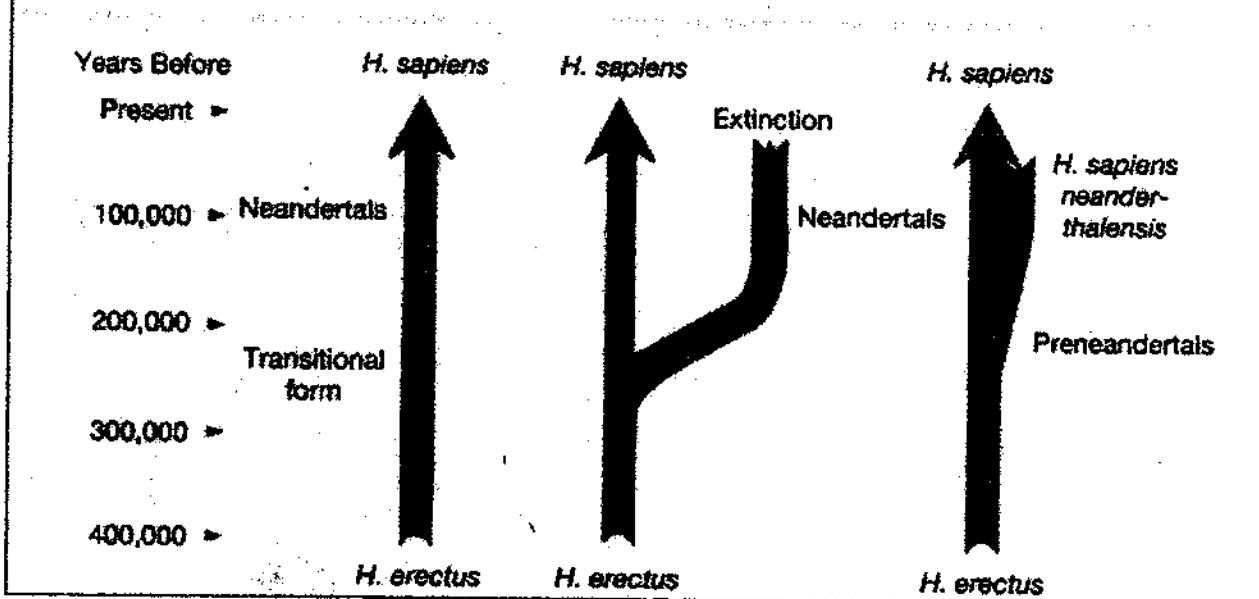
- ~~Mystical paleontology~~
- The flake industry of Mousterian tool technology always accompanied Neanderthal skeletal remains. It had smaller proportion of core tools like cleavers and hand axes and bigger proportion of small flake tools like scrapers. Some tools like Points might have been hafted or attached to shaft. Tools were involved in killing and butchering of animals and processing that food,
 - As ice sheet advanced into plains of Northern Europe people started living in Cave or rock shelters. These shelters are made comfortable for winter living by covering them with animal skins. Fire is regularly lit for warming and cooking,
 - Winter clothing: Recovery of Bone needles prove beyond doubt that Neanderthals tailored clothes which became very essential due to glacial climate,
 - Bear-cult: In a number of excavated caves the skulls of bears are placed in a rectangular lined pit covered with an enormous slab, Thus the big brown bear might have been an object of great reverence.
 - Language: Language development os doubtful as the pharynx is poorly developed which show their inability to pronounce vowels.
 - Ritualistic Burials: At certain places ritualistic burials with animals are indicated where dead body is associated with goat or bear skull. Many times bodies are accompanies with burial offerings such as flint tool kit and food offerings. Family cemeteries are also found.
 - Society and Religion: Group activities such as hunting, migration might have led to formation of nomadic society with inter personal relationship. This might have paved way for leadership and political system. To keep society in harmony some sort of religion must have appeared.
 - Neanderthals Philosophy: Neanderthals perhaps had awareness of dignity of individuals and interdependence of individuals and society.

Phylogeny:

There is a lot of controversy regarding the phylogenetic position of Neanderthal. There are a number of theories best represented by a diagram below:

S. Chitharanjan

Neanderthal Phylogeny



Gorham's Cave - Neanderthals. Low brow arch.
3.02m to 1.251m gold) Gibraltar

Rhodesian man - *Homo Rhodesiensis* (extinct) - Broken Hill skull
In 1921 Zwagerman found human remains in broken hill mine Rhodesia in south Africa.
It consisted of a skull with lower jaw, parts of femora, a tibia, a sacrum, portion of 2 pelvis and some fragments of other individuals. It belongs to upper Pleistocene period.

Tools had variations from Olduvian to Mousterian tool culture (predominance of flake tools)
Features of skull is very long and narrow, height is about 131cm
Cranial capacity around 1250 to 1400cc
Forehead receding and supra orbital ridge are prominent
Nasal aperture is very large
Orbit are high and great size
Teeth are of modern proportion. Canine is normal
He exhibits feature of Neanderthal and modern sapiens and therefore considered intermediate

Cro-magnon man

- Old man of Cromagnon, first discovered in 1868 in the Cromagnon cave in France by Lartet. Its estimated to be 30-40 thousand years
- Aurignacian culture of upper Palaeolithic consisting of bone and stone tools, cave painting sculpture and female figures. The tool culture is called reindeer culture, there was evidence of fishing
- Burial practise was elaborate in Cromagnon people, cave painting were elaborate.
- Cranial capacity 1500 to 1650 cc

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Homo Heidelbergensis - Extinct species,

- Discovered in Heidelberg, Germany - 1907.
- May be direct ancestor of H. neanderthalensis in Europe.
- 6 lakh - 2.5 lakh years ago across Europe.
- Stone tool techy close to that of Acheulean by H. erectus.
- Hunting activities shows ability to engage in boccal action.
- This jaw is believed to be transitional form H. w. - Heidelberg jaw / Mauer jaw [lacks a chin], thick & broad massive mandible but teeth are small.
- Cranium has massive brow ridges } of H. erectus link.
- Long & low braincase.
- Large cranial capacity.
- Vertical posterior cranial vault } of H. sapiens
- Separate brow ridges.
- parabolic jaw - dental arcade.

Heidelberg (Germany) → Homo

Homo erectus → Homo Heidelberg → Neanderthal

Homo. Rudolf

Homo sapiens

HAN

DS

CR

5.skull was dolicosopaly

6face and skull present a disharmony

7.craium is pentagonal in shape with wide rectangular orbit, bulged occiput .

8.strong and prominent face bones, long and narrow nose and well developed chin

Post cranial feature

9.well developed linear aspera, the bone texture indicates muscular individuals

10 stature 169 to 182cm (limb portion indicate negroid but overall he resembles more to caucosids)

Homo Sapiens- Cro Magnon Man, Grimaldi Man, Chancelade Man

16.1 Grimaldi Man, Chancelade Man

	Grimaldi Man	Chancelade Man
1. Discovery	At Grotte Des Enfants cave, near Grimaldi village on mediterranean coast, In Italy	At Rock shelter in Chancelade, Dordogne, France in 1888
2. Skeletons	Woman of 30 years, Boy of 15 years; Stained in red ochre implies intentional burial	Old man with arms folded and knees doubled up against body; Stained in red ochre implies intentional burial
3. Physical similarities with	Negroid; Acc to Prof Sollas and Boule - with Bushmen and Hottentots	Eskimos
4.Time & technology	Upper Paleolithic, Aurignacian	Upper Paleolithic, Magdalanian
5. Culture	Grave material has tools like double edged flints, knives, gravers, saws etc	Tools of ivory, bone, antler. Blades and harpoons were dominant. Evidence of cave paintings
6. Cranial features	cranial capacity 1250cc - 1450 cc ; Sexual dimorphism seen	cranial capacity 1530 cc(Keith), 1710 cc(Testut)
	skull has elliptical contour	
	small mastoid process	well developed mastoid process
	long, narrow and high skull - hyper dolicocephalic	dolicocephalic skull with sagittal crest
	face- large and short, narrow at chin; disharmonic face	face: wide and long ; prominent cheek bones

HOMO HABILIS

first fossil in Olduvai Gorge (Tanzania) - Louis Leakey - 1960.

- Intermediate b/w A. & Homo sapiens, becoz 700cc brain
- KNM-ER - 1470 - Koobifora, 1972 - Richard Leakey.
- Donald C. Johanson - found a family near HADAR, Ethiopia
KNM-ER-1813 (Female H. habilis).

Bernard Wood classifies it into two

<p>Homo habilis</p> <p>(Narrow face, narrow jaws, smaller grinding teeth)</p>	<p><i>H. rudolfensis</i> - like <i>A. afarensis</i> (broad face, heavy jaws, teeth)</p>
---	---

skull features Homo-like.

HABITAT - Unchipped rocks - MANUPOORTS - to construct wind
break walls - Olduvai Gorge - oldest manmade constructs ^{2m.y.}.

PERIOD 2.0 - 1.5 mya, Contemporary to *A. boisei*

FEATURES Short, disproportionate long arms.

less protruding face than *A. afarensis*.

Cranial capacity - 700 cc.

Dupd frontal lobes,

Reduced lower jaw, Brow ridges } when compared to *A. afarensis*.

- Digits similar to monkeys/ Apes.

- Structure of hand, teeth, position of great toe - same to man.

- Thumb - broad - Spatulate (broad round apex & narrow base)

- Smaller to modern humans.

- Mastered Oldowan era (Early paleolithic) tools.

- Social organisation.

- Round brain case, lesser crest.

- Parabolic dental arcade.

- Hind limb similar to humans.

- Tool maker.

CULTURAL FEATURES

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- Handy man - tool making.
- Lived near lakes & streams - Savannas - meat, ground pasture
- Great bipedality helpful
- foundation for human way of life.

TOOL MAKING TRADITION

- Created, maintained & perpetuated Olduvai tool tradition or Pebble tool tradition, with regional styles
 - Pre-Chelles Acheul
 - Kafcen
 - Pre-Stallan traditions.
- Pebble tool technology
3mya - 1.5 mya.
- flakes are not used.
- Animal bones found near sites, Butchering' sites, manufacturing sites, living floor.

- Tool Types
- Choppers, discoids, scrapers, burins - Olduvai tradition.
 - Simple & unspecialized
 - Didn't carry tools from place to place.
 - Ability to use natural object & to modify it.
 - Requires foresight, planning, ability to hold ideal pattern
 - Increasing standardisation.

- LIVELIHOOD
- Meat eating, more elaborate tool kit - Survival strategy
 - Food gatherer too - Sharing of food became systematic voluntary.
 - Sexual division of labour (becoz of baskets, bags, bowls)
- Human behaviours :- Setting temporary camps
Hunting big game / Stone tools.

- Savanas
- Plenty of food.
 - Higher cooperation
 - Organised social activities
 - Division of labour / meat sharing
 - Mutual dependence.

- Entered competitive world
- Phylogeny : H. habilis → Lankier → Homo Ergaster (sophisticated).
- Coexisted with A. boisei, but emerged becoz of stone tool specialised diet & innovation
 - + New evidence suggest coexistence

HOMO ERECTUS - ~~Zinj~~ (Pleistocene)

- Eugene Dubois - 1891 - Java - *Pithecanthropus erectus*.
- Omnivorous feeding
- Large brain - enhanced mental capacities - extended his area of interaction.

Envirnmt

- Open grasslands - named all over Old world.
- Adapted to different envts through cultural means
- Successfully adapted group
- Entire Africa, Europe, S.E. Asia, East Asia.

Geogrp distributionfeatures: Advanced features (so in Homo genus).

- 775-1427 cc. - Anterior placement of foramen magnum
- Height of cranium is more than its width.
- More parabolic dental arcade - teeth all same size & shape
- Taurodontism. - Reduced sagittal crest.
- Well devd. Linea aspera - Well devd. parietal lobe

Primitive features

- Sloping fore head - Thick cranium bones.
- Prominent brow ridge - Prognathic - large mandible
- Angular occipital spine - No chin
- Flatter nasal area - Divergent molar roots.
- 1st molar largest - Height 5-5'5". 53 kgs.
- Differences b/w China man / Java man. (Ref. TA).

Cultural Achievements

Tool traditions:- Tool makers of later paleolithic culture.

By middle pliocene - widely dispersed Old world

- Reached South Asia - 3-5 lakh yrs.
- Acheulean Tool tradition - Quartz

Distinct techniques:

i) Bifacial tradition: Core tradition in Olduvai gorge

Two stages in Africa Europe.

a) Abbevillian Culture - 6-4.4 ya. - Chellean hand axe.

- first Interglacial period.

- Versatile tools, Pear shaped.

b) Archeulian Culture - 40,000-60000 ya.

- first flaked, then tool is shaped.

- Better workmanship, specialisation.

iii) Chopper-Chopping Tradition - S.E. Asia.

- Spain in Andra; Zhoukoutien in China.

iv) Zigzag Cutting Surface.

v) Clactonian culture - England, Central Europe

vi) Levalloisian - flake tool technique, coexisted with others.

- Careful preparation of turtle shaped core.

FIRE - first users, oldest known hearths at Escale, France.

- Zouroudian Cave also contained hearths.

- Use of fire for cooking - charred bones.

vii) Gathering point.

SHELTERS - Open Campsites, constructed protective shelters.

viii) Close to water.

FOOD GATHERING - fruits & wild seeds as evidence.

Hunting - Big game hunters, elephant & deer bones

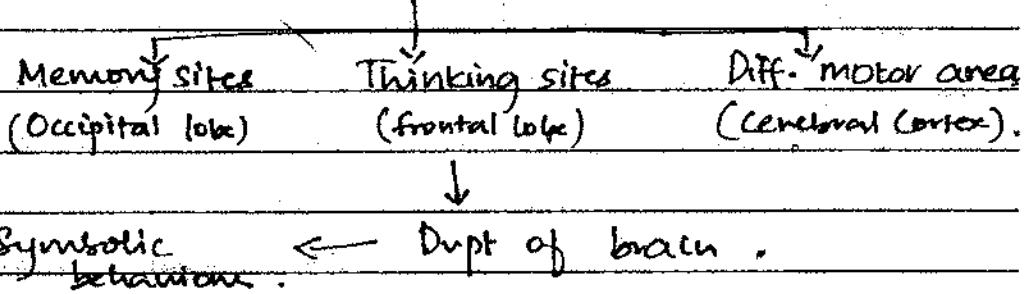
in Torralba, Terra Amata - Spain (Mammoth).

- Played role in evolution of mankind.

Cannibalism practiced - fractured human bones, enlarged foramen magnum - removal of brain - in China.

Communication - Thinking sites in frontal lobe, motor areas in cerebral cortex - symbolic behaviour (becoz of selective force)

Selective forces - [Fire], Tool making, Hunting, Group living



Sexual behaviour: Intra male competition more taxologically regulated, non-human type behaviour.

Phylogeny Le Gros Clarke, John Napier, David Philbeam, concluded duration of their existence was 1.8 million yrs = 0.20 mya.

- Successfully adapted group.
- Biological behavioural Component greater than cultural comp.
- JAVA / CHINA MAN - Close resemblance, Contemporary
 - No genetic differences, but specific in type (morphologic)
 - But Pithecanthropus more primitive, than Sinanthropus becoz of Ape like gap b/w lateral incisors.
 - Smooth palate.
 - Robustness of frontal part of mandible.

NEANDERTHALS

Early humans?

1.5ya to 35.000ya - Europe, N. Africa, Near East,

Intermediate stage between Erector & Sapiens

Hooton classified - Classical - Western Europe. (Conservative)

(Earlier, Generalized) Progressive - Southern Europe, Western Asia

Geological Time: Third Interglacial - 1.3ya

Habitat: Greater, extreme diversity of habitats. - Cool to dry climate

European Neanderthals were isolated from main genetic pool by glaciations and couldn't share in evolutionary gains made by middle east cousins.

Africa, Asia - people experienced pluvial conditions.

Separation of two groups - Cold - S. Am - H. Sapiens (Capable). Europe: Glaciation (Ice Age) - no interbreeding.

Biological: Classical & Progressive - only difference in skull.

Characters - Both similar in post cranial features.

- Short, stout vertebral column - Short in height.

- Large thorax - Short limbs.

- Large, robust fingers - Upright direct posture.

- Femur strong; large head - Life exp - 35-40 yrs.

Cultural - Cold Climate - wear skins, reside in caves.

Characteristics - Hunters, Tool makers - Crude language.

- First primitive religion

- Mousterian culture | Levalloisian method of Middle paleolithic

- Flake Industry - To produce flake tools of pre-determined size.

- Flake tools - Scrapers

- Tool Assemblages in Europe : -
- 1) Mousterian of Acheulian assemblage.
 - 2) Typical moustarian assemblage
 - 3) Quina moustarian assemblage.
 - 4) Ferrassie moustarian assemblage
 - 5) Denticulate moustarian assemblage

Africa - Tools adopted for specific requirements:

i) Sangoan tradition

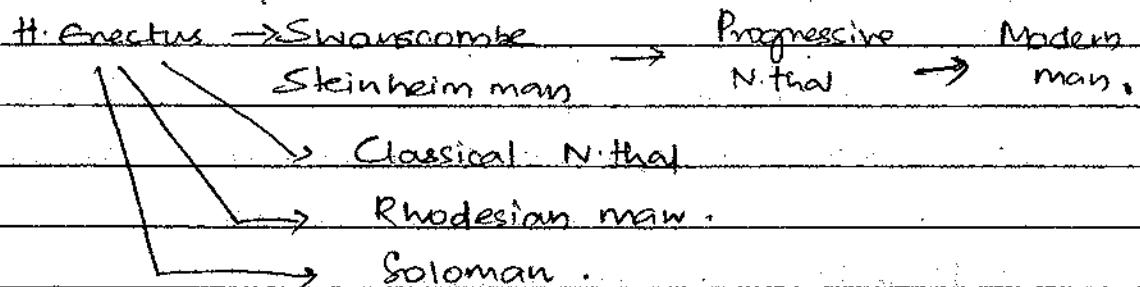
ii) Fauresmith tradition

- Cane, rock shelter dwelling, winter clothing, bone needles.
- Bear - cult (Brown bear - reverence).
- Human burials - funeral rituals (Shanidar cave, Iraq).
- Funeral offerings - flowers.
- Poor pharynx - Inability to pronounce vowels.
- Nomadic society, hunting, migration - society in harmony
- Surgical operation - Shanidar I. on right hand.
- La-Chappelle-aux-Saints man - severe arthritis.
- He is mixture of primitive and modern traits.

Phylogeny a) Presapian model. - Separate ancestors for Nean & humans

b) Pre neanderthal model - divergence of humans from Classical N d | from Progressive Nean d |.

c) H. erectus - sapiens model -



EXTINCTION

- i) Physical extermination - Modern human - better technology
- ii) Competitive exclusion - Change in ecological contn - N d |als unfit
- iii) Overspecialisation - Robust features for cold - Extinct - Climate norm
- iv) Total assimilation - Interbreeding

TRANSITIONAL FORMS

A period of transition b/w *H. erectus* & *H. sapiens* in general & *H. neanderthal* appear to coincide with

- Second Interglacial ? - So called Transient forms
- Third glacial periods. } ^(Riss) Combination of *erectus* & *sapiens*.
- Also called Pre-Mousterian *H. sapiens*/ Primitive *H. sapiens*.

above man

RHODESIAN MAN

- 0.12 mya.

- Formerly Broken Hill man
- 1921, by T. Zwagerman, Zambia.

(Exmple of Asymmetric evolution).

Modern features

- Long skull, narrow
- 1280-1400cc
- Teeth like modern species.

Primitive features

- Prominent supraorbital ridge.
- Massive Maxilla, Palate
- High & elongated orbits.
- Muzzle like face.

SALDANAH MAN (S.A.)

1953 - Tester Jolly, Singer discovered skull & lower jaw fragment

- Skull same as Rhodesian man.
- Jaw typically Mauer jaw.

HEIDELBERG MAN - 0.35 - 0.45 mya.

- Germany at Mauer.

- Features
- Large jaw
 - Ascending ramus was broad & square in shape.

Jaw displayed more simian features & teeth display more human features.

- Condylloid process was at a higher level.

- Horizontal ramus very high / massive

- Parabolic jaw like humans.

- Continuous dental series.

- No Diastema (like humans).

- Canines don't project

- Normal incisors.

MODERN MAN

S.CHITHARANJAN

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Date

			<u>CROMAGNON</u>	<u>GRIMALDI</u>	<u>CHANCELADE</u>
Place	- france.		- Italy		France.
By	Lartet in 1868 . 30-40,000 ya .		Intentional burial - Late pliocene .		1888 - Intentional burial . - Late pliocene epoch
Character	Upper paleolithic, Aurignacian culture - Bone / stone tools. - 180cm tall. - 1550 - 1650 cc . - Small brow ridges . Broad fore head. Pentagonal cranium Narrow skull - Broad face - Disharmonious L. Dicephalic skull - Long nose & narrow - Prognathism . - Marked Chin . - Efficient bipedal walking - Linea aspera present . Female - broader pelvis		Aurignacian culture - Upper paleolithic 5'3" (female). 1265cc (female) 1455cc Not developed .		Culture - Magdalenian - Upper paleolithic . 5'1" 1530 cc Vertical fore head . High vault - skull . Long & narrow . Triangular face .
					Dolicocephalic (cranial index - 70-74) Broad - Platyrhinine . Alveolar prognathism Poorly developed .
					Leptorrhynine (narrow) Prominent chin . Strong muscular body
					- Small mastoid process - Deep canine fossae - Very deep palate - Jaw is strong - Longer lower limbs . - Comparable to modern Negro . - Late incursion of African race in European territory .
					- Well devel mastoid proc - Narrow palate - Lower jaw strong/narrow - Longer upper limbs . - Modern day Eskimos - Bent femur, large foot .

NEGROID

(1) African Negroes

	Nikotes	Bantu	Bushmen	Pyg
True Negroes				
Dark brown	Dark skin	Yellowish brown		
Tolly hair all - 173 cm	Very tall slim	Short stature	Body hair absent.	
Dolicocephalic short leg	Dolicocephalic Long legged	Dolicocephalic	Bulbous forehead	- Congo
long arm				- Akka,
platyrhine	Platyrhine	Narrow nose	Platyrhine	Ba Twa, Bam Buta
thick lips	Less thick.		Thick Lips.	→ Very short
distribution		Lesser prognathism		- Mesencephalic
East Africa	Upper Nile valley Ex: Shilluk, Dinka, Kavirondo	Central & South Africa	Kalahari desert. Hottentot culturally different (S.W. Africa)	- Full lips, - Flat & - Wooly hair - Yellowish

(2) Oceanic Negroes

	Oceanic pygmies	Melanesians	Papuans
	Short / medium		Medium
	Dolicocephalous		Dolicocephalic
	Depressed nasal root frizzy hair		Broad nose
	Scanty body hair		Abundant.
	Less depd. brow ridges		Heavy brow ridges.
	Concave nasal		Convex nasal
	- New Guinea, Fiji, New Caledonia		- New Guinea, Melanesia.

Oceanic Negritos.

Formation not genetic, but envt. factors

- 1) Short statured - New Guinea, Philippines
- Congo, Malay peninsula, Sumatra, Andaman

Negrito.

African

Pygmy.

Negrito)

Asian

Asiatic pygmy

- 136cm

not everted

broad nose

brown

- Andamanee

Short - 148 cm

Small brachicephalic

Straight nose, sunken root

No jaw projection

Full lips - not everted

- Skin - Bronze to black

- Body hair absent

- Wooly head hair.

Oceanic Pygmy

- 146cm

- Muscular body

- Mesocephalic

- Short, straight nose

- Abundant body hair.

- Wooly, short, black head hair

- Yellowish brown skin colour

- New Guinea

Semang

Average - 152cm.

Mesocephalic

Round face, broad nose

Dark chocolate brown

Scanty body hair

Red short black hair

- Malay Peninsula, East Sumatra

Aeta

- 146cm

- Brachicephalic

- Short, broad, flat nose

- Moderate thick lips

- Sooty brown skin colour

- Body hair present

- Philippines.

Mongoloid features: Light yellow - yellowish brown
Brown to black in colour.
Coarse texture, straight
- Scanty body hair.

eyes S. CHIYAPPARANAHAN bro
M. M. P. Pathog. MTR#574
Cheek bones higher.

MONGOLOID

CLASSIC (Central Mongoloid)

- Siberia, Amur River - Buryat, Koryak, Goldi, Gilyak, Tibetans
- Brachycephalic
- Round forehead
- Very low root - nose
- No nasal depression
- Strong cheek bones
- Yellow skin
- Straight & coarse black hair.
- Sparse body hair.
- Mongoloid fold present.

ARCTIC (Eskimos)

- Northern Asia, Arctic coast, Greenland, Labrador, Western Alaska
- Eskimos, Chukchi, Kamchadals, Yakuts, Samoyeds.
- Straight black hair,
- Yellow skin
- Large broad, flat face
- Nasion, prominent nose.
- Remarkably small hands / feet
- Long trunks, short legs.
- Complete epicanthic - occasionally
- Greenland Eskimo
- Arctic Eskimo
- Eastern Alaskan
- Kuskokwim
- Mesencephalic
- Brachycephalic

SOUTHERN (Indo-Malayan)

Malay Type

- Distribution: Indochina, Southern China, Burma, Malay Peninsula, Philippines, Japanese.
- 158 cm - Avg.
 - Brachycephalic
 - Medium brow ridges.
 - Usually Mesanthine.
 - Scanty body / face hair.
 - Light yellow brown.
 - Prominent cheek bones.
 - Slender / shorter than Malay
 - Mesencephalic.
 - Narrow, longer, higher nose
 - Face narrower, longer, oval

Indonesian Type / Negrito

- Distribution: Thailand, Burma, Indochina
- Sl.
 - -
 - -
 - -
 - -
 - -

AMERICAN INDIAN (+ non-mongoloid strains)

- North - Middle - South America

DOLICO-MESOCEPHALIC .

a) Palaeo-Amerind / Lagoa Santa

- Brazil, Ecuador, Orinoco.
- Archaic South American race
- BOTOCUDO, BURU (living)
- Small skull
- Dolico cephalic
- Longer face, narrow
- Reddish brown
- Black wavy hair.

i) Northern Amerind .

- Tall stature
- Yellowish brown
- Black, straight hair
- Large, flat, oval face
- Straight / convex nose .

a) Neo- Amerind

- Short to tall
- Broad face
- Yellowish brown-fair
- Straight black hair.

b) Tehuelche .

- Very tall
- Square broad face
- Brownish skin
- Straight black hair
- Patagonia, Tierra del Fuego.

c) North West Coast Amerind .

- Lighter skin colour, hair
- Medium Stature
- NW of N. America .

Features:

- Light reddish white to olive brown
- Light coloured hair
- Moderate to profuse body hair.

- MedSLIGHTLY HANJAN
- Comlin Form No. AIR 1574
- Date _____
- Cheek bones not prominent

CAUCASOID

- 1) Mediterranean (migrated everywhere)
 - a) Classic
 - b) Atlantic
 - c) Indo-Afghan.
- 2) Nordic.
 - Germany, Baltic, British Island
- 3)
- 4)
- 5)
- 6) Armenoid
 - Turkey, Syria, Palestine
- 7) keltic.
 - Iceland, Scotland Wales
- 8) Lapps

Thin lips

Pronounced chin

Never Platyrhine

- High frequency of Kn
- High nasal bridge.

3) Alpine

- Central Europe

4) East Baltic

- Russia, Finland

5) Dinaric / Adriatic

- Yugoslavia, Albania

10)

9) Indo-Dravidian

10) Polynesia

20)

11) Ainu

- Northern Japan, Yezo, Sakhalin.

30)

AUSTRALOID

5

10

15

20

25

HOMINIZATION PROCESS

Consists of evolutionary transformation of hominoids into hominids. This process includes all aspects of structural & behavioural changes that occurred in hominid line finally leading to man.

a) Bipedalism: Oldest characteristics of all hominid. *A. ramidus* was biped, but stayed on trees. *A. afarensis* was more human-like than ape-like.

foot prints of *A. afarensis* in Laetoli; precision grip was greater than Chimp, less than a man in AA. Tool use enabled evolution of cerebral cortex. *Homo erectus* - art of tools & fire.

b) Modification of Jaw & Teeth: AA had dentitions ape like & some homo features. Reduction in size of teeth, jaw & jaw muscles seem to begin with *Australopithecines* & *H. habilis*.

c) Enlargement of brain: Encephalization process progressed after bipedalism & dentition changes.

Homo habilis brain more than *Australopithecines*.
About 2-1.5 million yrs ago.

d) Speech: Speech apparatus consists of three physiological components:

- i) Subglottal system - lungs & its muscles - for power of production of speech
- ii) Larynx
- iii) Supralaryngeal tracts - modulates acoustic energy

PALaeOLITHIC CULTURE

Homo habilis - earliest known, about early Pleistocene, 2 million yrs ago.

- 1961 - Leakey discovered - Handy man - maker of stone tools.
- Lived Subtropical savannas - near streams & lakes.
- Savanna - Good, big game - hunting.
- Made tools for adaptation - laid human way of life.

Tool making traditions:

H.H. created Oldowan tradition or pebble tool tradition with regional styles

traditions

Acheul

Kafue

Pre-Stallian Basch

- Oldowan - Pebble chopper technology - in East Turkana, Kenya⁽¹⁴⁾
- About 3 mill yrs ago

Types of Stone tools:

- Choppers, discoids, scrapers, burins.
- Choppers are simply stone clipped at one end to create sharp edge.

Never carried tools from camp to camp, made new when moved.

Habitation:

- Wind break walls, semi circular structures

Hunting - Savanna - Plenty food game, killing tools at sites.

Food gathering: Emphasised on meat-eating - bones seen.

Adapted Scavenging strategy.

- Ethno-archaeological interpretation reveal that Homo habilis women & children gathered roots, nuts, berries, seeds, men butchered their kills. Sharing of food.

LATER PALEOLITHIC CULTURE

Homo erectus lived Middle Pleistocene (1 - 1.5 m.y.e ago)

- lived in open grasslands.
- Around 2 - 3,00,000 yrs ago - roamed all over world.

Tool traditions: Bifacial tradition in Africa & Europe.

- Chopper-chipping tradition in South & East Asia.
- Clactonian tradition in England.
- Levalloisian tradition in England.

Stone tools: - Hand axes, Choppers & Chopping tools, Clactonian flake tools, Levalloisian tools.

First use of fire: Lower paleolithic hunters - first users.

- Oldest known hearths are those located at Escale in Southern France.
- Fire acted as gathering point, social solidarity & situation.
- Open Campsites, protective Shelters
- Zankoudians - cannibal, lived in caves.

Food gathering: Piles of gathered vegetables, fruits at Tabun fal.

Hunting: Big game hunting, At Terra Amata mammoth remains

- Played role in evolution of Human life.

Ritual Activity: Evidence at Torralba & Ambrona

Cannibalism: fractured bones & skulls of China man - brains removal.

Language: Capacity for symbolic behaviors.

MIDDLE PALEOLITHIC CULTURE 27

Neanderthals were practitioners. North Africa, S.E. Asia, Europe.

- Affected by warm glaciation in Europe into variety of different climatic zones.

Geo' distribution: Tundra comes till France, Germany.
Migration - Summer & winter.

Tool trade: i) Magdalenian

ii) Continuum of Achelian, Clactonian, Levalloisian of lower Pale

Tools: Special purpose use tools, new types like points, burins, borers, drills, dentellates, notches & knives.

Hunting: Neandertals great hunters - big game. Shells in some sites prove marine resources.

Shelters: - Open sites, caves, rock shelters with hearths to cook.

Burial of dead: Floral basket at Shanidar. Buried with bones of animals, hunting trophies, food.

Bear cult: Belief in supernaturals, religions into human evolution - Bear cult began - killing bear test for manhood.

Pitiful cannibalism: by inhabitants of Hortus in France.

Treatment: Shanidar man - shoulder & right arm deformed from birth, last hunted lived 40 yrs.

MESOLITHIC CULTURE

Social Diversity: Wamm glacier melted, modern climate, condus changed rapidly. Lakes more, forest more - fish more. herd hunting replaced by individual hunting.

- Bow & arrow use.

Tech advancements: In Europe four traditions:

- | | |
|---------------------------|----------------------|
| 1) Azilian tradition | in Middle East: |
| 2) Tardenoisian tradition | 1) Natufian (Jordan) |
| 3) Archale tradition | 2) Capsian (Africa) |
| 4) Maglemosian | |

- Experiments with cultivation of grasses

Shelters: Rock & cave shelters, stone coated pit houses.

Domestication: Dog domestication - aided hunting - fishing & plant domesticity

- Social aspects:

Glynn Issac opined that enculturation process continued as in Great apes with more details.

"Man and Hunter model" proposed by Issac and Leaky propounded that factors like physical strength and requirement of long duration of time for hunting made man involved in big game hunting. The female was involved in child care and thus institution of family evolved.

Jane Goodall rejected the man the hunter model and gave examples of chimpanzees, Gllanas of Kalahari where female were involved in food collecting.

51ya - 11aknya ~ .

Middle Paleolithic

- Mousterian

Tool culture: Flake tools

Heterogeneity

Upper pleistocene

1. Burin: used for engraving in tool culture

2. scrapper: scrapping barks of tree and dressing the hides

3. Points: Manufactured by levalloisian method or simple pressure flaking. are of various shapes and sizes. Large sized points were used as arrow head and small ones for fishing.

4. Borer: to drill holes.

Material: Siliceous rocks, agate, chalcedony, Quartzite

Sites: La Micoque, France

La Moustérien,

Kebara cave, Israel,

Intentional burial

Lifestyle:

- Biological evolution was Neanderthal man who lived in rock shelters and caves for the access of stone.
- Belief in supernatural powers evident from burial practices.
- Belief in after life as skulls were placed in particular directions along with tools
- In Shanidar fossils were found along with flowers indicating intentional burial.

11ya

Upper Paleolithic 105000 - 40000 ya.

Upper pleistocene

Blade tools and use of non-lithic material.

Tool material was bone and ivory along with stone.

Tool culture

1. Aurignatian or Blade-Burin culture:

- Discovered at La Aurignae.
- found knife blades, engraved blades, burin
- Sub species associated with this culture was Cromagnon.

2. Solutrian or Needle culture:

- discovered at Solutre
- flakes and needles both eyed and uneyed
- Cromagnon

3. Magdalanian culture or Art form culture:

- La Magdalene
- flake tools made of bones with art forms engraved which indicate their beliefs and lifestyle.
- Ivory and horn were used extensively.
- many of the evidences were in colder climate and there was dependence on reindeer.

Lifestyle:

- emergence of hunting and fishing societies
- use of animal hides to cover bodies

- building of shelters using bones and horn
- It is believed that language in a rudimentary form emerged
- social political life resembled band organisations.

Climatic changes, hafted tools
Mesolithic Age (Middle Stone Age) Early Homo sapiens, small life forms, too

Period during which early humans began to control fire and develop language (11,000 – 6,000 B.C.) Mesolithic Age (Middle Stone Age)

Mesolithic Age - Middle Stone Age (11,000 – 6,000 BCE) The name "Mesolithic" comes from two separate words, Mesos=Middle and Lithos=Stone.

Mesolithic Age is a period of transition from Old Stone Age to the New Stone Age.

MAIN FEATURES OF MESOLITHIC AGE

- Mesolithic Age is basically the blend of two societies, existing almost at the same time according to their immediate environment;

- Pastoral Societies.

Material: flint, jasper, agate.

- Horticultural Societies.

Technique: Pressure flaking.

Indirect flaking

- Not only use stones but bones,

- Bows and arrows

- Fish hooks

- Harpoons

- Characteristics:

- 1) formation of forests after melting of ice caps

- 2) started to depend on rivers

- 3) started domestication of animals

MAIN FEATURES:

- Horticulture is technology based on using hand tools to cultivate plants.

- Pastoralism is technology that supports the domestication of animals.

- Both of these strategies are capable of producing material surpluses.

- Farming communities began to be established. During this period, humans hunted and fished, and began to learn how to domesticate animals and plants. The late Mesolithic hunters are now known to have developed pottery (ceramic objects) and a sedentary lifestyle.

LIFE STYLE OF THE PEOPLE

- Such a large span of time involves quite a bit of variety.
- Cultures included: gradual domestication of plants and animals, formation of settled communities. People started living in huts instead of caves.

MAIN FEATURES:

- 1. Hunter-gatherers began to store food in containers (Surplus food).
- 2. Less reliance on large mammals for food -- more on fish.
- 3. Domestication of animals began with domestication of dogs.
- 4. Use of animals and much developed tools, instead of human, emerged in the field of cultivation. **Slash and burn technique** used by horticultural societies and use of stick and hoe for cultivation.

You would find farming tools, such as a stone hoe, during this time period.

5. Animals became smaller in size and faster than before, so human had to develop his stone tools (Microliths) and weapons made of bones and wood, in a lighter and more practical form, also some personal ornamentation and daily use items such as combs.

TOOLS USED

- Mesolithic tool kits were based on chipped stone and often include microliths (very small stone tools)

Geometrics	Non Geometrics
Lunates	Blade oblates
Triangles	Truncated blades
Trapezes	Hollow based poi

MAIN FEATURES:

- War fear was frequent as compare to Paleolithic age, as they used to quarrel over animals, pastures (in the desert areas), land (for cultivation) and water.
- Religion:
- In that period several religions were followed, mostly Islam, Judaism, Christianity were followed. (Ancestors worship was also followed)
- Nomadic / Sedentary:
- The people of this age were Nomadic as well as sedentary according to their surroundings.

Mesolithic Age vegetation

9. SOCIAL COMPLEXITY:

- In this age people started to form a leadership to combat war fear and to resolve their problems. (Governance started).
- They started to elect their leader politically, which was authorized to take decisions and was powerful enough to punish any one on behalf of his people.

□ 10. EDUCATION:

- Education was informal and was not institutionalized.
- Children used to learn from their elders as well as their own experiences.

• 11. MALE DOMINANT:

- During this age males started dominant as food production was mainly the job of males.

□ Review – Prehistoric Art

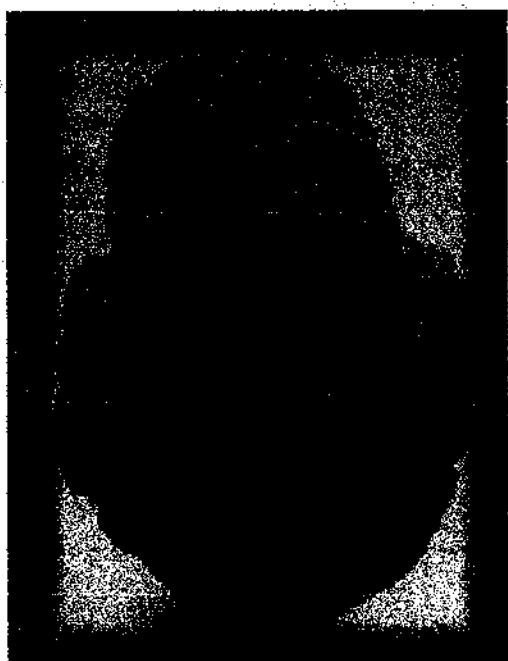
Three periods of Prehistoric Art.

Paleolithic Art – Cave Paintings, Venus figurines, Altamira Artforms, Bhimbetka

Mesolithic Art – Simple, no figures, only red used.

Neolithic Art – Figures, Pottery and Megaliths.

□ Mesolithic Art: The rich art of the Paleolithic is replaced by a Mesolithic art with many changes in style as well as meaning. Paleolithic cave art depicts colored drawings and expressive features of animals. A full range of color is used. Mesolithic art in contrast is schematic; no realistic figures are present and only the color red is used.



Paleolithic – Restricted to Upper paleolithic Europe – 1) Cave art 2) Home art (Jewelry, artifacts)
Outlines, drawings "Venus of Willendorf"
Paintings
Restricted to France, Spain, Italy.
Ex: Lascaux, France. Font De Gaume, France. Spain
Macromi art forms of France – refers hunting & Pinting
Bhattacharya says - art may be out of curiosity man towards nature.
- Sorcery presence from drawing on walls - animal body in

Neolithic revolution

Holocene , polished tools

The concept of " Neolithic revolution" was propounded by Gordon Childe in his book , New light on most ancient . Though it's called revolution it doesn't imply a single catastrophic change but his change was actually a gradual progress that began centuries earlier . So , it's generally treated as a 'transformation ' or 'evolution ' rather than revolution

CHANGES WITNESSED :



1. Food : hunting gathering to food production
2. Technology : complex . Different instruments for producing cereals , oil seeds etc.
3. Lifestyle : nomadic to sedentary . Establishment of small towns , monopolisation of land by the ones who came earlier ie , renters & owners . Later increase in population
4. Society : for the first time rich & poor classes ie land possessing - rich & those who don't have land - poor came up ; socio economic stratification & inequality
5. Specialisation : with increased technology people had leisure time . New skilled professionals as pot making , weavers , tool making came up
6. Political life : with increased means of production , land controlling power with his supporters base began assuming political authority.
7. Religion : complex . Hitherto dependent on nature but now with planting seeds , attributed the power to germinate to ' Mother Goddess'

Later multiplied Gods , each one being offered special rituals

Thus with favourable changes in climate and advancement of technology Neolithic phase phases showed remarkable changes.

Bronze Age

The Bronze Age is the period in that society when the most advanced metalworking happened by smelting copper and tin into an alloy of bronze and casting them into bronze artifacts. The Bronze Age is the second principal period of the three-age Stone-Bronze-Iron system.

Time period:

Middle East and Egypt: 3150 BC- 1200 BC

Indian Subcontinent: 3300 BC- 1700 BC

China: 2000 BC- 700 BC

Europe: 3200 BC- 600 BC

Characteristics:

- It was the beginning of usage of metal and metal implements by humans

- This time period is marked by usage of bronze, an alloy of copper and tin
- This period is characterized by development of proto writing
- The unorganized settlements of humans of stone age developed into highly evolved civilizations.
- Cities prospered for the first time in human history. Town planning was a characteristic of Indus valley.
- Trade networks developed and giant strides were made in the science of navigation.
- The potter's wheel was invented which had transformed how humans travel.
- Many aspects of social life developed during this period like government, law codes, empires, social stratification, slavery, organized warfare etc.
- One significant lacking in this period was that modern methods of accounting were not available. This led to what many believe that ancient empires were prone to disvalue staples in favor of luxuries and thereby perish by famines created by uneconomic trading.

Seima Turbino Phenomenon: The Altai Mountains in southern Russia and Mongolia have been identified as a point of origin this phenomena. Changes in climate in this region around 2000 BC and the ensuing ecological, economical, political changes triggered a rapid and massive migration westward into northeast Europe, eastward into China and southward into Vietnam, Thailand across 4000 miles. This migration taking place across 5-6 generations led to spread of metal working technologies, horse breeding and riding techniques across the frontiers.

With the discovery of iron technology in the middle of 2nd millennium a revolution in metal working and using followed which led to the end of Bronze Age and inception of iron age.

Iron age

Universally it is confirmed that iron age succeeded the copper age. Source of iron age includes archaeological excavations and literary source which makes the study of iron age more authentic.

Adoption of iron is coincided with changes in economic and political system i.e settled agriculture and specialization in metallurgy.

Iron age in India 11th century while in Greek 12th century Europe 9th century. The Americans did not have iron age until the arrival of Europeans.

First use of iron was in 4000 BC in ancient Egypt and in ~~Sumerian~~ civilization

According to Clayton first use of iron was unintentional it could have been a byproduct of smelting of other metals.

6. iron age in india can be classified into

1. gangetic region(1350) :

- a)recently excavated by rakesh tiwari in 2005 revising the time period given by clayton and sankalia
- b)cultivation of barely and rice, residential habitation constructed with mud bricks
- c)large complex of graves in timargh, taxila, chavada, mirzapur
- d)evidence of terracotta figurins horse, camel, individual and group of humans
- e)wide presence of swastik which later formed part of mainstream hindusim

2. ^{west} central region(1500-1300)

- a) Consisting of saurashtra, malwa and northern Maharashtra ,
- b) sparse of evidence of iron in the form of weaponry, no site indicated smelting

3. central region(800-500 BC)

At muski there is a evidence of iron face cover for horses and horse shoe made of iron

a)burning of dead bodies and the bone remanates buried in vessels along with the iron objects

b)megalithic structure of cists are found only in south india

c)presence of sarcophagic

d)rock cut caves used as chambers for dead body

e) pottery was black and red ware with conical shaped lids

f) iron implements sickle, swords with art engraving, tripods and trilids.

Typology of family

• nuclear family

- based on conjugal ties
- comprise of couple and child
- They are independent entity
- They have small kin group
- divorce dissolves family
- there is little difference in role of Husband and Wife
- suitable in industrial and HG societies

• extended family

- consanguinal ties
- made of 2 or more lineally linked people of same sex and their spouses, offsprings
- they may be organised on patrilineal or matrilineal basis
- suitable for agricultural societies
- large kin group
- In such societies land is important

• compound

- aggregate of nuclear family linked by common spouse
- they may be either polygynous or polyandrous

NATURE & CULTURE OF SOCIETY

In Anthropological perspective, all humans have culture (away from normal saying of uncultured people, cultured man). Everyone has Culture - Simple or Complex.

→ It is a totality of mental, rational & material, technological process & products.

→ Culture is potential guide & design for human living.

* Nature of Culture:

1) Historically Created design: Culture created five million years ago, every generation adds new - increasing its complexity - Cumulative.

2) Unique to human species: To have cultural ability, there must be a capacity to create & use language & symbols. Moral force only humans. Morality part of culture.

3) Non-genetic: It is product of social learning rather than biological heredity. Like animals, humans can't inherit behaviour, we just acquire culture.

4) Unity & Diversity: All humans have culture, but all cultures are not alike.

* Characteristics of Culture:

1) Learned through Social Interaction:

2) Culture is inculcated:

3) Culture is social:

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B.Pharm, MBA

4) Adaptive - Maladaptive parts of Culture die out

5) Structured by its components - Traits & complexes

6) Dynamic, integrative

Affective - ETHOS: Affective or emotional quality of culture, expressed in series of beliefs, thoughts & behaviour.

Totality - EIDOS: formal appearance of a culture from its constituents.

CULTURAL PROCESS (C.P.)

- A specific continuous action by which culture produce a situation or change, includes:

Actions promoting 1) human survival 2) human adjustment
3) changes way of life or resist the change.

- C.P. changes some parts specifically also, it may set chain reaction in society, because of web like structure of culture.

CULTURAL EVOLUTION

Evolution is process of social & cultural change in definite direction, from simple to complex, from homo to heterogeneity.

- As a culture or society evolves, more & more proliferation & diversification of parts takes place.

CULTURAL DIFFUSION - Type of cultural process where the cultural elements, complexes or aspects pass from one group to another. Borrowing involved.

Diffusion simple, occurs only when societies borrow, it may aid evolution.

By nature differ as, diffusion adds new items to a culture or a society, but nature of evolution is to change the existing items, complexes, institutions.

ACCULTURATION - Action that brings a major change in a culture as a result of direct or mediated contact between two cultures. But in diffusion - indirect & intermediate societies involve.

- Accult. only when two cultures relatively in contact continuously.
- In Accult. whole culture of one society is being displaced by culture of another society, but not in diffus.

TRANSCULTURATION : Exchange of cultural traits by two societies directly, without total replacement of cultures first hand contact.

ENCULTRATION : Learning process by which culture is passed from one to another generation.

Ongoing process, where inexperienced members learn traits from experienced persons, circulation of traits & complexe within society, if outside to another society - Diffusion

PATTERN OF CULTURE : The integrated arrangement of traits & complexes of culture with its unique configuration, with its systems of internal relationships, called Pattern of Culture.

NATURE OF CIVILISATION

Savagery → Barbarianism → Civilisation.

Culture is non materialistic, civilisation is.

Components are physical & technological
External & Objective.

Anthropos study both Culture & Civily, as they are
Complimentary, Interdependent, Interactive.

But Civily is external & objective, Culture is internal &
Subjective.

- Civily has precise standard but not culture
- Civily is advancing, but not culture
- Civily is transmitted without effort but not culture
- Civily is borrowed without change or loss
- Civily is body, culture is soul.

ETHNOCENTRISM

In-groups - Individuals belonging in different groups

Out groups - Individuals outside the in-groups.

- Attitude differs from ingroup to out group member

Defin:

View of things in which one's own group is the
centre of everything & others are scaled & rated
with reference to it.

- Ethnocentrism less wide & more peaceful in civilised.

Three levels of Ethnocentrism:

Positive - One's own way of life preferred to others.

Negative - One's own group becomes centre of everything

Extremely -ve - Powerful group imposes rule on others &
depreciates value of items held by other groups.

CULTURAL RELATIVISM -

Method whereby different societies or cultures are analysed objectively without using the values of one culture to judge worth of another.

- Implicit beliefs are relative to society, not comparative
So appropriateness of any positive or negative custom must be evaluated with regard to how this habit fits with other group habits.

Ethnocentrism - Exclusive, closed mind & culturally insensitive

C.Rim - Inclusive, open mind, culturally sensitive

NATURE OF SOCIETY

From functional point of view, society is defined as a complex of groups in reciprocal relationships, interacting upon one another, enabling human organisms to carry on their life-activities & helping each other fulfill each others interest.

→ From structural point of view, society is total social heritage of folkways, institutions, habits, ideals & sentiments

- Psychological awareness is required among parties for Social awareness / relationship = Reciprocal awareness.

Characteristics

- 1) Web of social relationships
- 2) Likeness
- 3) Difference - Diversity or variations
- 4) Difference subordinate to likeness
- 5) Interdependence
- 6) Cooperation

Aggregation consists of individuals collected together merely because of their passive subjection to same external conditions.

In aggregation (flocks) individuals collect as one, responsive to external stimulus & not to one another.

Two main theories of relationship of man & society

1) Social Contract theory

2) Organic theory

Social INSTITUTIONS

These are integrated around a principal function of society. It is organised form of customs, dogmas, rituals & procedures. Every organisation is depended upon certain recognised & established set of rules, traditions & usages. These usages & rules are named as institutions like Marriage, education, religion.

Characteristics Definite Objectives; certain rules, Definite procedures, Means of controlling people, usually symbolic, Stable, fulfills primary needs.

- Survival of society, needs culture & institutions as media through which culture works & ensures its going.
- Through institutions moral ideals, knowledge, traditions transferred from one generation to another.
- Binds members of group, Collective modes of behaviour.

Institutions refers to normative patterns of behaviour, institutional agencies are social systems through which these normative patterns express themselves.

→ Every society has 5 kinds of institutions;

Primary) → 1) Family 2) Economy 3) Religion 4) Education 5) State



economy) Marriage Bank Temple School Army

derived from divorce Trade Totem

Primary mono/polygamy Property Taboo

An instn never extincts, they are replaced by new.

SOCIAL GROUPS - Collection of human beings.

- Collection of individuals, interacting with common object of attention & participate in similar activities.

Interaction is main criteria than closeness.

Character Reciprocal relations - interrelations.

Sense of unity, we feelings, common interests, similar behaviour, group norms, dynamic.

Classification George Hassen - Unsocial, Pseudo-social, Anti-social, Pro-social

Dwight Sanderson - Based on membership.

↳ Voluntary, Involuntary; Delegate

Coleby - Primary Secondary

PRIMARY GROUPS - Nucleus of any social organization group in which small number of persons come into direct contact with one another.

- The sense of 'WE' high, Psychological fusion b/w individuals & sympathy & mutual identification.

Character Physical proximity, Stability, Similar background, limit self interest.

Importance - Shaping personality of individual, demand formal interactions amongst members, Aspirations strike a harmonic note, fullest opportunity to express ones personality, Satisfaction of human needs, stimulus to each of its members to develop their interests.

Ex: family, childhood friends.

Secondary Groups

Here human inter-relationships are superficial & human contacts undefined. Interaction limited scope, calculated in terms of self interests.

- lacks intimacy; more competitive than mutually helpful.

Characteristics

- Impersonal & formal overtures, fails to have personal impact on individual.
- Large in size, voluntary membership, formalisation of role importance
- Character of division of labor, emphasis on increasing efficiency of individual.

Ex: Employment, Vendor-to-client relationship.

REFERENCE GROUPS

By Hayman, - A group to which an individual relates himself as a part or to which he relates himself psychologically. Three types of members:

- 1) Actual members
- 2) Aspiring members
- 3) Potential members

It is a group to which an individual/group is compared.

KINSHIP BASED GROUPS (Lineage, Clan, Phratry, Mostry).

On principles of kinship. Constitute kinship groups. Membership in kinship-based group can be related to each other through Birth (Consanguineal) or marriage (Affinal).

Descent groups - A group defined on basis of descent from a common ancestor / related to each other through consanguineal kin / same parentage.

Allocation of individuals to a descent group is technically known as filiation.

Classified into:

Unilineal - kinship based group whose members reckon their descent / trace their descent through sex ONLY.
 Patrilineal or Matrilineal.

Ambilineal - individual has option regarding which lineage (male or female) he affiliates.

Double Unilineal - Double descent group. Descended from both fathers & mothers group.

Parallel - fathers - Son & Mother - Daughter.

Cross-sex - Father - Daughter, Mother - Son.

NON-KINSHIP BASED GROUPS (Band, Tribe, Age, Dom)

BAND - Hunting-gathering economy, small, nomadic, seasonal migration, autonomous, self sufficient.

Subsistence level of economy, lack of surplus, egalitarian informal leadership, exogamous - inter-band relationship.

TRIBE - Primitive, pre-literate, simple, cultural homogeneity unwritten common language, self perpetuating politics Organisation, united, common territory, collection of families.

Characteristics :- Endogamous, ↑, Common name.

→ larger groups, sedentary, Homogeneity in techy, econo Social organisation is kinship oriented.

AGE GROUPS Categories based on age, age grade.

Age Grade is simply a category of persons who happen to fall within a particular culturally distinguished age range. (Puberty, marriage, birth child)

AGE SET - Group of persons of similar age, sex who through some or all of life's stages together.

DORMITORIES - Members fall into some age group.

Community - Area of social living marked by some degree of social coherence.

Elements Group of people, definite locality, community sentiment permanency, nativity, wider ends, no legal status.

ASSOCIATION - Group of people organised for particular purpose.

Basic prerequisites: Group of people, organised, common purpose.

Voluntary & Involuntary.

Characteristics Concrete, established, determined aims; Compliance to rules and regulations mandatory.

Factors Role of interests, heterogeneous & specialised community, Role of leadership.

SOCIAL STRATIFICATION - group phenomenon.

When Biological & social differences come to be socially evaluated in terms of superiority & inferiority - social inequality result.

Social inequality - universal phenomenon, with hierarchy & without.

Social Stratification Social differentiation
(caste) (women, men)

S.S is a system of differentiation which includes a hierarchy of social positions whose occupants are treated as superior, equal, inferior relative to one another in socially important aspects.

Process Differentiation in term of certain values it associates with roles they have been allocated to.

Composition on basis of these values.

Differential rewarding to positions.

Differentiation of prestige / esteem

Nature Moral phenomenon for evaluating social, structural, behavioural interactional, material, existential.

Criteria Birth, wealth, occupation, ^{functional importance}, scarcity of personnel, Polity, Education

Forms i) Caste System - unique to India - hereditary, unequal divided right

Characteristics: Segmental division of society, social & religious hierarchy, restrictions on feeding & social intercourse, Exogamy, lack of unrestricted choice of occupation, Civil & religious disabilities. (in Rural, less advanced societies).

ii) Class system - No legal distinctions between classes, social orders, not by birth, but extent upon achievement & ability - seen in industrial societies.

Factors: Property, income, occupation, Education, power.

Diff b/w Class & Caste:

Open v/s closed, Divine vs secular, Exogamy, Caste consciousness

iii) Estate System - Legally defined, depended on birth & controlled by law, Inequality juristic, - Medieval Europe.

GENDER STRATIFICATION

Sex is physical condition, Gender is a social, cultural phenomenon

Occupational Segregation, minority groups,

functions of Social Stratification

MARRIAGE.

No perfect universal definition.

Characteristics: Charter of marriage, varies among societies,
Male choice, financial transactions, ceremonials, residence,
Authority, Stability

- Laws
- i) Proscriptive - Which person a person should/may not marry
 - Incest taboo, Inbreeding avoidance
 - familiarity breed avoidance - Israeli kibbutz
 - Preventing disruption of family - Freud
 - forming wider alliances - Claude Levi-Strauss
 - ii) Prescriptive - Exogamy, Endogamy - within social group
 - iii) Preferential - Person prefers certain categories of relatives over others for marriage.
 → Cousin marriage — Cross Cousin
 - Parallel Cousin

Levirate - man to marry wife of his deceased brother.

Sororate - Man to marry sister of deceased wife.

Types: Monogamy

Several brothers - 1 wife.

Adulphatic P. and

Polygamy — Polyandry — Todas, Kota, Khase, Nayars

women spend with other husband

Polygyny — Baigas, Nagas, ~~Todas~~, Gonds.

Polyandry - Bcoz of ~~less women~~ ^{less women}, Property considerations.

Hypergamy - Aruloma — Man marry - same or low caste

Women marry - same or upper caste

Hypogamy - Pratiloma -

Group marriage - Males & females sets share equal rights
over each other - Marquesans of Polynesia.

functions

Biological - Reproduction; satisfy sexual needs.

Economic - Division of labour.

Social fns - acquire new kinmen

Educational - child enculturation.

Marriage

Payments :- Bride price is a form of marriage payment in which the bride's group receives a payment of goods; money or livestock to compensate for loss of woman's labour & child she bears.

- Payment for labour of women.
- Reproductive value.
- It's an important variable to analyse social change, cultural evolution.

Dowry: Payment or gift of property that accompanies a bride upon marriage.

- Affirms alliance b/w two families.
- Provide a bride with some protection against husband. ^{abusive}
- Used to setup new household.

MARRIAGE

Marriage is cultural, mating is natural.

- 's - Everywhere a set of cultural patterns to sanction Parenthood
- & provide stable background for the care & rearing of children
- Universality: Some form of how to share gender division of labor
- Prolonged infant dependency, sexual competition

functions of families:

- 1) Fulfillment of biopsychic needs
- 2) Creation of new families
- 3) Specifies rights & responsibilities
- 4) Create alliances
- 5) Allocates goods & services

Ways of acquiring a mate India

Spouse Selection

Negotiated (arranged)	Practical face mate choice (permission required)	Total face mate choice
Service, 'Sonballs'	Capture Service	Elopement
Negotiation (No. known)	Intimation Probation	Third Intimation
Exchange	Total	Capture
Probation		

KINSHIP

Provides stability, continuity & definiteness to society.

Meaning:

Descent theorist: limit the scope to consanguineal relationships based on ties of blood.

Alliance theorist: Also includes affinal relationships (on marriage)

Defines as social recognition of biological ties

Kinship is relationship based on culturally defined principle of consanguinity (says Descent theorist).

Alliance - induces marriage in affinity

Defn: It is a cultural universal fundamental relationship b/w human beings.

- Arise out of two types of bonds: Consanguineal & Affinal

Marriage as foundation head of kinship

- Family resulting from marriage is molecule of kinship.

Two types of family

- 1) Family of Orientation
- 2) Family of procreation

In family of procreation - after marriage rules of residence

Rules of Residence

- 1) Patrilocal residence : Couple in bridegroom's parents home.
- 2) Matrilocal : Khatri, Garo, Nayars.
- 3) Bilocal : Samoans
- 4) Matri-Patrilocal : Alternate : - Dobuan
- 5) Avunculocal : With maternal uncle - Trobriand Islanders
- 6) Neolocal : Independent

Defined with reference to ~~as~~ CHITHARANJAN
Culturally recognized
is absolute.
AIR#574

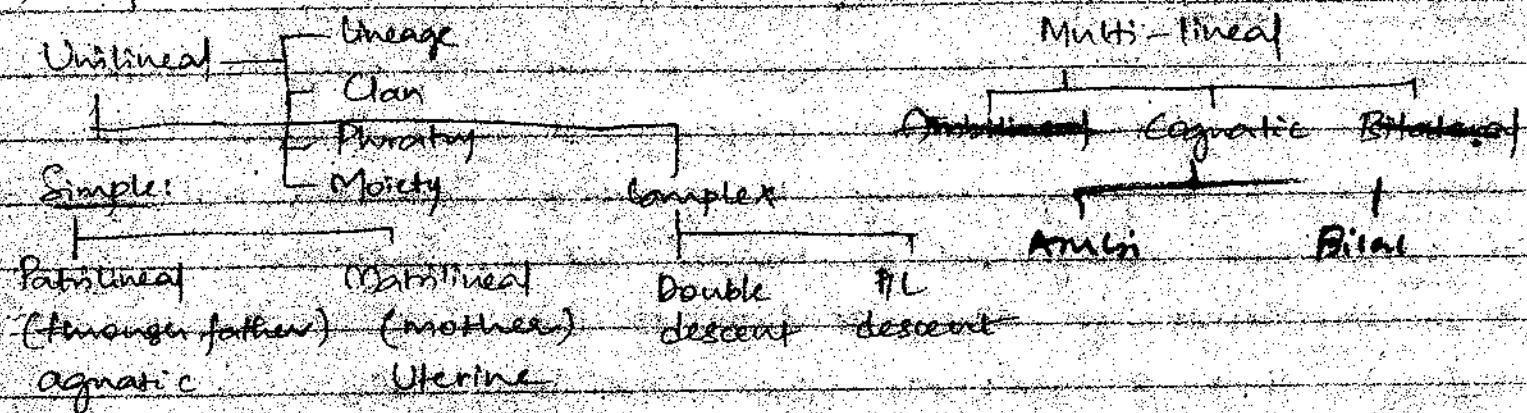
Principles of Descent

Descent is a principle arising out of a series of affiliations.

Types of Descent:

Concern tracing of relationships through succeeding generations.

Rules of Descent



Anthropologist generally classify unilineal descent group according to their size & nature; they are:

Lineage :- A unilineal group of kin who trace their descent from a known common ancestor/mess.

- All members of lineage can be identified
- Based on demonstrated descent

Type:- Patrilineage & Matrilineage.

- Prefer exogamy, common religious obligations
- Acts as corporation in many societies
- Corporate enterprise
- Controls behaviour of its members - Social control
- Mutual aid
- functioning on principle of segmentation & opposition

Clan - A unitized group of kin who claims but can't trace their actual descent from a remote common ancestor.

- Based on stipulated descent -

Two types: 1) Patriclans 2) Matriclans

Distribution: large portions have patriclans.

Attributes: Name: after animals usually.

Egotaxy & moieties are endogamous, common religious obligations.

Corporate character. Clan owns property, regulates distribution & controls inheritance of property among its members. Each clan has govt of its own. Have obligation to mutual aid & hospitality.

It is responsible for the conduct of each of its members.

ending: It is a political, legal & military unit.

PHRATRY - A unitized descent group composed of two or more clans.

Distribution: Among horticultural societies.

Types: Two: Patriphratries & matrifratries.

Attributes: Hopi red Indians - no names.

Egotaxy or Orgamy, have common religious obligations.

Totemism is seen. Phratry has solidarity.

MOIETY: A kinship group which is one half of dual division of society is moiety (one of two basic subdivisions of tribe).

Distribution: Wide occurrence than phratry.

Type: May be patrilineal or matrilineal.

Egotaxy, totemism, dual organisation having several features.

In some societies clan & moiety are same. Moieties with symbiotic contracts.

Dual organon helps easy detection of kinship relationships in society. It stipulates rights & duties of moieties in terms of exchange of specific service, moiety affiliation, intergroup gift exchange.

Nation building process in a state

It is process through which a country achieves a mature level of political status so that it becomes a civilized status to uphold the welfare of its citizens & effective govt. in charge of integrity of boundary of nation.

- Process of refinement in life of nation to play a constructive political role at global level.

N.B.P. on following factors:

- 1) Economic factor & economic devt. of nation.
 - 2) Many modern stresses on those constitutions framed. One side welfare confining which.
 - 3) Political dimensions vary country to country like Presid. King, Day.
- But common thing is to protect national sovereignty & integrity of nation.
 - With basic pldns like Political, economic, admn, education, cultural.
 - Newly decolonised - So European pldns like multi-ethnic conglomerates.
 - Native elites to prove themselves acceptable or legitimate effective rulers.
 - Creation of new economic order replacing traditional.
 - Poverty alleviation, education (modern).
 - Creating nationalistic culture, integration of all groups.

RELIGION

- Universal aspect of human behaviour → vary from society to society.
- Belief in supernatural.
- Provides explanations of life that people use to cope with death & evil.
- Expression of sacred, provides moral code.

THEORIES OF ORIGIN

a) Evolutionary

- 1) Animism: F.B. Taylor - Soul is early form of religion. Soul leaves body die, used to pray to ancestor souls - giving to nature worship.
- 2) Animatism: Maestri - belief in impersonal power in everything.
- 3) Naturalism (Max Müller): Nature worship - power in nature.
- 4) Totemism (Durkheim): Totem - ancestor orogen started worshipping totem.

James Frazer gave three explanations:

- 1) Conceptional theory: animal or plant was cause of conception.
- 2) Bush soul theory: Soul stored in bush.
- 3) Cooperative theory: Sharing tokens like food items of different groups.

b) Psychological theory

- by Sigmund Freud - transference (name it) - father killed by son, alienation functional theory.

Malinowski - Religion arose to reduce anxiety in crisis situations.

Padmaja Brown also says same

TOTEMISM

Religious system based on a wide variety of special relationships b/w an individual or a group & its totem.

Types of totems: Simple totem - Group having only one totem.

A.P. Elkin says simple totemism is - members of each sex have particular species as totem - Sex totem (1)

Individual totem: Shamans have Indi totem, whom they don't kill.
Conceptional totem: 1) Clan totems 2) Phratry totems 3) Moiety totems.

Importance of Totem

1. Secular importance - Symbolic basis divides society into complementary segments; classifies people & element
2. Religious importance
 - Common body of values, beliefs, customs
 - Basis of moral code in terms of food & incest taboos
 - Used to study myths of culture & society

COMPLEX UNILINEAL DESCENT GROUPS

Double descent

- Discrete combination of unilineal affiliation.
 - Affiliate an individual with a group of kin who are related to him/her through both father & mother.
- Matrilineal group is concerned with secular spouse & patrilineal group concerned with religious spouse (among alliance ties), and in Yako tribe it is vice versa.
- D-D work on the basis of distribution of rights & responsibilities b/w two unilineal descent groups - avoiding conflict.

BILINEAL KIN GROUPS - combined operation of double descent organization & dual organization.

- Patri-matriarch & matr-matriarch get superimposed to produce RTG.

MULTILINEAL DESCENT GROUPS

Ambilineal	Cognatic Systems:
affiliation to left	Affiliation to both parents
to individuals choice	Affiliation of individual to group who are to both parents irrespective of kinship lineages

COGNATIC GROUP : No discontinuities, well defined boundaries, clear-cut membership.

BILATERAL KIN GROUPS : kindreds larger in number, both side kins.

KIN CATEGORIES

Diversity: Several types.

1) Based on Degree of relationship.

Into three types:

- Primary kin: Person of same nuclear family as ego. (^{Total 8}_{children & parents})
- Secondary: Primary kin of ego's primary kin (total 33).
- Tertiary: Primary kin of secondary kin (15).

2) Based on Consanguineal & Affinal relationships

a) Consanguineal - Related through blood ties.

b) Affinal - through marriage.

3) Based on Descent:

- Lineal kin: Direct line of descent - Father, father's son, so on.
- Collateral: Indirect relations through mediation of another relation.

Parents: fundamental in kinship.

Cousins: Children of siblings & his/her spouse.

KINSHIP TERMINOLOGY

- A linguistic guide in human society defining degrees biological network & individual stands.

Morgan Classif.: Kinship terminology

Descriptive

"Doesn't group any relationship within nuclear family with any relationship outside of it under single label"

Ex: Father, Mother, Sister, Brother

Classificatory

"Denotes relationships inside & outside nuclear family of same words."

Ex: Uncle, Aunt, Niece

Ne

220/275 — Chawang Bhutia
— Yogesh Chettu

Y

MEDICAL ANTHROPOLOGY

Diet - cultural phenomenon, Social processes, resilience

- Anthropologists say illness is affected by social, cultural factors
- Diseases occurring due to Bio-cultural Synthesis.
- Discouraging health related medicine, belief, knowledge, practices

CONCEPTS OF BALANCE & EQUILIBRIUM

Humoral medical system prevailed until 1900's.

- Body Yin & Yang parts.

Biomedical paradigm

Biomedicine - dominant medical paradigm in western cultures today, with bio part of word emphasizing the biological emphasis of medical system.

SHAMAN: male part time Specialist involved in healing - Witch doctors
E. Fuller Torrey - four categories used by healers:

- 1) Naming process: Disease has name - gnoldha - Curable
- 2) Personality of doctor: demonstrate empathy, non possessive manner
- 3) Patients expectations
- 4) Curing techniques -

Politics & economic influences on Health

Power & economic diff. b/w societies have health consequences

KINSHIP

Consanguinity

kinship is

Web of Social Relationships

Affinity

forming important part of
humanity.

- It provides a way of transmitting status & property from one generation to next.

- Serves to establish & maintain effective social groups.

The rules governing kinship & relationships among the members of given society - RULES OF DESCENT.

Unilineal Descent - kinship exclusively through male/female lineage or clan - ancestor focused groups / claim descent from common ancestor.

Relationships can be demonstrated. Relationships are assumed.

Phratry - Several clans make claim from same ancestor

Moieties - Societies divided into two groups (for marriage)

Ex: Miwok Indians - Central California.

PATRILINEAL DESCENT - Male line.

Yoruba of West Nigeria - Idiies.

Women are imp. here, exogamous - usually associate with patrilocal residence.

Segmentation - Subdivision of clan / lineage when father dies (who is unifying factor) & form sub-clans.

MATRILINEAL - female line, inheritance rights through females, usually authority in males. Little role for husband / father.

* Matrix & patrilineal descent are not opposites.

~~Kinship culture can be both an asset & liability for HRM. It can lead to high levels of trust & reciprocity inside the work place, but it can also be ~~gap~~.~~

EXCLUSIONARY & NEPOTISTIC.

- Ex: Chile & S. America - more to kinship culture

USA - more to talent / educate

Parallel Descent: extremely rare - Saha in Santa Marta M.

Cognatic Descent / NON-UNILINEAL

A kin to both the parents, less in society. Two types

- 1) Double Descent: Descent matrilineal for some purpose & patrilineal for another purpose.

Ex: Yako of Nigeria - Patrilineages own movable, matrilineage own non-movable properties.

- 2) Bilateral Descent & Kindred: Individual traces descent through both parents simultaneously.
KINRED - Group of people closely related to one individual through both parents. (simply relatives). Kindred never same for two people except for siblings.

- 3) AMBIVALENT DESCENT - Kinship based group in which individual has an option regarding lineage to which he affiliates.

FORMS: Descent group is more than just a group of relatives providing warmth and sense of belonging, tightly organised working unit.

→ Regulation of marriage, as an economic unit,

LINEAGE: Unilineal group of kin who trace their descent from a known common ancestor → LINEAGE.

Consanguineal group, demonstrated descent

→ Patrilineage - Bítoto Red Indians of Amazonía, ^{Neves, Yanomamo} Míwok Red Indians

→ Matrilineage - Veddas, ^{Khasi, Ghang} Kuruchin of Canada, Tikopia of South Pacific

→ Ambilineage - Nukus of Micronesia, Samoans of Polynesia, Sarawaks

Characteristics: Named, exogamous, common religious obligations, corporate property ownership, unit of social control, mutual aid, fending groups.

CLAN: Unilineal descent group, can't trace descent from remote Common ancestor, can't demonstrate descent - Stipulated Descent principle

Two or more lineages = Clan

Patriclán - Chippewa Red Indians, Neves, Swazis.

Matriclán - Kwakiutl, Tlingit, Haid Red Indians, ^{Carolinian} Narragansett, Hopi, Zuni, Cherokee, Ashanti, Tonga, Nayar, Tabrianlanders

same characteristics as lineage with legal functions.

PATRILY: Unilineal descent group with two/more clans (in very few societies)
Hopi, Navaho, Mura Gonds, Rabhas of Assam, Ao Naga
Raj Gonds.

- Matriphratries
- Patrifratries
- May or be named, may or be exogamous, common religious obligations, gifts, political units (Aztecs), associated with Totems (Mura Gonds), solidarity, brotherhood.

MΟΙΕΤΥ: A kingship group which is one half of dual division of society is moiety.

Wide occurrence, Murungs in Australia, Tingit Red Indians, Winnebagos, Ao Nagas, Korkus of MP, Bondas of Orissa, Andhs of Adilabad, Todas of Nilgiris.

Usually exogamous, totemic group, dual organisation, half society.

EVOLUTION: Promiscuity - So only matrilineal, later evolution.

Lewis Morgan to patrilineal (becoz of accumulation of wealth & land)

George Murdoch contradicts above showing bilateral descent in Arctic hunter-gatherers.

STRUCTURAL PRINCIPLES

Kinship - Social relations rooted in biological facts.

To examine, has to follow below:

- (i) Men impregnate women. [Biological Compulsory for all kinship]
 (ii) Women bear children. [fact]
 (iii) Men control economic activity.
 (iv) Incest is Taboo.

- Patrilineal system provides easiest way to meet structural cond
 ↳ Most commonly found.

Each society has a particular way of assigning the CHARTERED WORK OF
Whole classificatory system

Correlation Date _____
Different group _____

KINSHIP TERMINOLOGY - Lewis Henry Morgan

Verbal element in kinship systems consists of terms by which each kin comprehends other. Societies use kin terms in addressing one another.

Subject to elaborate cultural rules.

Each society has a particular way of assigning the individual to his place in descent group. A set of terms designate the individual's position within groups to which he belongs. These labels are kinship terms.

Classification called K. Terminology.

Group particular kinds of persons separate different kinds of into single specific categories persons into distinct categories.

CLASSIFICATION Label, name; designation applied to a relative - K. Term.

3 ways : 1) Mode of use & With regard to some relatives, terms of reference as well as address are similar, but with term of address regard other relatives, it's different.

2) LINGUISTIC STRUCTURE - Elementary, derivative, descriptive.

Can't be reduced Compounded Combines two or (father) from elementary more elementary (Grand-father) fashion (such as)

3) RANGE OF APPS : Refers to number of terms covered by each kinship term.

Denotative

Classificatory

Only one category term

Applies to persons of two or more

Ex: Father, Mother, Husband.

kinship categories

Ex: G-father, cousin, uncle.

More denotative terms & less classificatory = Narrow range

Less " " " " " more " " - Broad range.

- Analysis: Kroeber & Lounie - Nine criteria for classification of relatives:
1. Criteria of generation
 2. Criteria of sex
 3. Criteria of affinity
 4. Criteria of collaterality
 5. " bifurcation
 6. Polarity
 7. Relative age
 8. Speaker's sex
 9. Decedence

Typology: Six typologies, identified according to way cousins classify

- i) Hawaiian → least complex, terms = Generational System.
Same generation = same term.
- Absence of strong unilineal descent group, cognatic descent
- ii) Eskimo: Rare, anglo-american cultures, bilateral kinship
only close members important, same term for aunts, uncle, cousins, either side.
- iii) Iroquois: Bifurcate merging system.
Chambers & Gross; unilineal descent
- iv) Omaha: Patrilineal descent, difference b/w father & mother side. Auneha merged with Nikki;
Complex & illogical.
- v) Crow: Amma, Pinni same term,
- vi) Sudanese: Rare, precise distinction.

Determinants - Multiple historical influences, morphological difference of language, elementary psychological process, universal sociological process, ~~po~~ customs of preferential marriage, constituents of kins & local groups.

- Allocation of individuals to descent groups called FILIATION.
- Can be through Father/mother or both

COMPLEMENTARY FILIATION: M. Fortes used (Descent theorists).

- Societies with unilineal descent groups, recognise kinship groups links with relatives who don't have don't belong to their own descent group.

→ Links with matrilineal - mother's side. (^{Patrilineal} tie having with Ram).

- Lineage links have political & hierarchical character, but C.F. is more emotional & more personal.

J. Goody stress its importance in property inheritance too.

Thus in patrilineal societies, while for political, jurid., military purposes ignored Unilineal for those in matrilineal, but at domestic level, links were recognised in form of comp. gifts from mother's side.

Fortes studied TALLENSI of Ghana.

ALLIANCE SYSTEM connotes a set of affinal / marriage rules through which descent groups are linked.

- L. Straws - highlighted by Claude Levi-Strauss.

- Universality of incest taboo gives rise to A.S.

As they don't marry in descent groups, they enter into alliance / marriage contracts with outside descent groups.

- Marital alliances are social forces promoting wider alliances.

- Solidarity b/w groups.

Straws divides kinship system into types, based on Alliance:

i) Elementary: Kinship terms determine, whom to marry/not

- These societies are dominated by prescribed marriage systems & hence called CLOSED SYSTEM of exchange.

Here two types of exchange systems:

Restricted Xchange - found in dual organisation societies - MOIETIES

- Direct transaction b/w groups - $A \rightarrow B$
- Wife givers are wife takers. - SYMMETRICAL.
- Usually involves Bilateral cross cousin marriage, no differentiation
b/w patr or matr only difference cross or II.

Generalised Xchange: - More groups involved.

- $A \rightarrow B$
 $B \rightarrow C$
 $C \rightarrow D$
- Indirect form of exchange - Chain process
 - Asymmetrical, found in Unilateral Cross cousin marriage
 - Differentiates patr & matrilineal

iv) Complex Structures - Leisure choice of finding a spouse to
other mechanism \Rightarrow Open System

Lewis Strauss Solidarity theory emphasis on Matrilateral
Cross cousin marriages \Rightarrow to enhance more ties.

FAMILY - multi dimensional concept

Who is part of family?

Defn based on situational requirements.

- Group based on marriage / contract, including recognition of rights & duties of parenthood, common residence for husband, wife & children & reciprocal economic obligations b/w husband & wife.

BASIC
STRUCTURE

Institutionalised mating relationship - ^{marital} Conjugal relationship ^{only when marriage}

\downarrow
without this

Biological mother - Genetrix

no family

" father - Genitor

Social mother - Mater } Sociologically, legally
" father - Pater } Recognised.

Natal group = B/w parents & children.

Dual nature of family { Conjugal family - Family of procreation - Mating pair

Natal family - family of orientation - Mating pair + Child

- family based on emotions - makes it ideal primary group

- sense of personal responsibility towards each other

- regulates social life, nuclear positioned in a society.

- Money economies makes couples more independent

& mobile.

Blood is thicker than water

Types . Nuclear family - Married couple + children.

Relatively isolated & independent unit, decision making unit,

Compound family - Nuclear families linked by common spouse

Extended family - Consanguineal family consists of two or more lineally related kin folk of same sex & their spouses & offspring occupying same household. Ties of linearity.

Advantages of extended family:

- 1) Clearly adaptive
- 2) Economic
- 3) Prevails in all predominant societies
- 4) Large no. of workers
- 5) Source of pride, prestige, power
- 6) Keeping land ^{Certain} ~~intact~~

IMPACT OF URBANISATION

With industrial urbanism three facets came to surface

- Patriarchal
- Partial Patriarchy
- Egalitarian

Characteristics of Urban family:

- Equal status of women
- Increased rates of divorce
- Lack of traditional education
- Changing status of individual
- Excess of individuality
- Limited size

Family in Urban setting

- Changing
- Transformation in cultural pattern
- Liberalistic ideologies of individual
- ↓ Subordination / Superordination
- ↓ Regulation of life by others
- More individualistic
- Moving away from traditions
- Rationalistic approach
- New civil codes & codes of conduct
- Concept of rational actions

Changing trends in Urban family:-

- Traditional family to Companionship family
- More socialist from autocratic
- Relationship based on will b/w husband & wife
- Mutual attraction / happiness based
- Self reliance instead of dominance
- Self styled relations

Family in urban setting is more private holding of its members than a collective possession of many relatives.

IMPACT OF INDUSTRIALISATION

- Achievement based performance.
- family used to be unit of production, but now factories became -
- functional job specific roles
- Geographical mobility
- Re-local residence = decreasing tradnl authority
- Undermining traditional control & exchange.
- Role bargaining b/w generations altered.
- family elders loose control on younger gen.

PROCESSES WEAKENING FAMILY CONTROL

- i) Increasing number of people earn their living from jobs
- ii) Need of efficiency in industry & economy requires jobs.
- iii) Gaining a living as an individual, not as a member of family.

- It is not that industrial process work against family but they are under strain.
- They give much less support to
- wide array of impersonal services obtained in open market - banks, schools, protection, enabling individuals to live more adequately from controls of kin network.

Q3. ECONOMIC ANTHROPOLOGY (E.A.)

Field that attempts to explain human economic behaviour in its widest historic, geographic, cultural scope.

- Studies processes of production, circulation & consumption of different sorts of objects in social settings.
- Need of consumption is universal to survive so study is important
- Its branch of Ay evolved since 1940's.
- Now E.A specialised into many sub branches like Economic history, Ay of subsistence, Ay of business
- Began with MALINOWSKI attempt to define material culture in 1922 (Trobrianders)

Economics ignores realities of life - only on stats, data but common in 'Psychology of Individual'.

E.Ay

helps to understand:

- 1) Subsistence economy - govt policy formulation in tribal areas.
- 2) Conducting business with foreigners & their custom base
- 3) Urban development, migration, distributor systems
- 4) To study community production, participation
- 5) Economic aspects of social rens.

Overall E.Ay is fusion of Anthropological variable of culture & Economics.

Every community has its way to meet its basic needs for existence - if not they extinct.

- Major economy study by Vidyarthi

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3. ECONOMIC ORGANISATION

freedom of contract, property rights, exchange.

Influence of culture on economy in economic theory.

EAL is to describe variety of economic arrangements developed by human kind in different times / places.

Aists interested in where, who, how commodities come from.

Perspectives :-

Three paradigm:

- 1) **FORMALISM**: Economics all about fulfilling unlimited wants of humankind with limited resources (Neoclassical economics)
Raymond Firth
- Assumptions → Individuals pursue utility maximization, choosing means.
Prodd K. Schneider
- Individuals do on rationality using available relevant info
- Individuals under conditions of scarcity & unlimited wants.
- Law of diminishing marginal utility.

Substantive meaning - provide goods & services to supply social & biological wants.

Formalist meaning - Profit motive people make choice among alternative

- 2) **SUBSTANTIVISM** : How humans make a living from their social & natural environment.
 - Formalist theory applicable to advanced societies.
 - Maximisation of profits, well-being.
 - Personal satisfaction in saving things.
 - Argues that man has unlimited ^{wants} resources and resources are limited.
 - So Scarcity is universal.
 - Argue that economic theory is applicable to all forms of economy.
 - Argue that trade is directed and a function of MARKET.
 - Argue that primitive markets (societies) have no money sys and only barter system.
 - No feedback of price system in non market spheres of economy.

FORMALIST - Raymond Firth:

SUBSTANTIVISM - By KARL POLANYI

- Applicable to primitive societies as it revolves around basic needs from nature & fellow beings

- Argue that
- Scarcity is socially determined condition
 - It may not exist where emphasis is on materialising acquisition & desirable objects have unlimited themselves. So there will n't be any scarcity & need for economizing
 - Economic theory not applicable to primitive societies.
 - Trade is just a peaceful method of acquiring things which are not available.
 - Money is independent of market & only useful in terms of payment, exchange.

Small Scale Economies - Manning Nash divided concept into

four themes:

- i) Technology & division of labour TECP
- ii) Structure of the productive unit TD
- iii) Systems & Media of exchange S.
- iv) Control of wealth & Capital C.

Forms of Media of Exchange (proposed by Karl Polanyi)

Systems of exchange of Goods & Services

1) Reciprocity: Is an exchange transaction that involves direct movement of goods or the services between two parties.

- A one for one exchange

(nothing expected in return) (roughly equal value) (force, Deception)

- Generalised, balanced & negative reciprocity.

- Differences in social rank influence reciprocity.

Kula system of trade in New Guinea (Malinowski)

2) Redistribution: Is a pooling transaction in which the goods are collected from members of a group by central authority & then divided among members of group.

- Potlatch - Giving : North West Pacific Coast Indians.

3) Market Exchange - Price setting mechanisms, bargaining behavior features - Buyers approach sellers, maximization of profit, exchange determines parties involved, setting of value of goods & services

~~Money has three purposes:-~~

a) As a medium of exchange } In Western societies.

b) As a standard of value } not in all societies.

c) Means of payment.

Agists distinguish b/w two types of money:

Our money

i) General purpose money - In true market economy - interchanging things

ii) Special purpose money - non commercial transactions.

- In small scale economies

- Cows, sheep, tools - only for special transactions

DEBATE b/w SUBSTANTIAL & FORMALISM

- Two approaches to study economic life of primitive people
- Debate about which is suitable.

SMALL SCALE ECONOMIES

To understand them, Manning Nash (1977), four things

- i) Technology & Division of labour
- ii) Structure of productive unit
- iii) Systems & media of exchange
- iv) Control of wealth & capital.

Principles governing Production, Distribution, Consumption.

Food collection economy. ← food gathering

Hunting fishing

Food Producing ← Pastoral
Horticultural
Agricultural

- live in
marginal areas
0.003% world
- Food gathering - Pygmies, Bachwa, Bush-men. (Africa).
Chenchu, Kukumba, Yanadi in South India, Ong, Jarawa sentinelis
 - Tundra, Arctic, Deserts, Dense forest.
 - Ainus of Japan, Semang, Sakai of Malaya.
- Kariera, Murngin - Australia.
 - Ong of Tierra Del Fuego, Siriono of Bolivia.
 - Shoshone, Miwok, Algonquins.

Characteristics Nomadic, low population, self sufficient & simple economic resources, full time craft specialization absent. Capital is limited, absence of surplus & trade, rare food shortage, informal political leadership, division labour-sex, Forest to mouth existence,

Hunting & fishing - Second oldest, 11000 yrs ago.
Near sea coast, gulf area (first fishing).

Ex: Kwakiutl, Blackfoot, Haida, Tlingit Red Indians, Alaskan Eskimos.

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Alaculuf, Chono, Yaghan - Chile

Dohomey. - Ivory coast.

Polyneans, Micronesians.

elaborate

Characteristics: Sedentary, high population, self sufficient, technology, Plenty of food & protein, Surplus trade, labour specialization, Div of age, sex, formal political leadership. [Fishing societies always sedentary - unequal distribution. Hunting - semi nomadism]. Not democratic, hierarchy of formal leaders.

PASTORAL - Same time with agricultural economies,

Animals domesticated with cutting.

Lapps, Chuckchee of Siberia, Kazak, Kirghiz, Tatars, Kalmyk Mongols, Nuer, Dinka, Maasai

Navajo of USA.

- Central Asia, Arabia - not suitable for cultivation.

Comilla of
REFUGEE

- Character:
- low populn, nomadism, small size, limited resources
 - communities
 - moderate economic resources, division of labours
 - move in fixed routes.
 - limited resources - so dense settlements not possible.
 - moderate economic resources.
 - men herd animals, milking
 - women cook, butter preparation
 - plenty of food & frequent food shortages.
 - supplementary hunting & gathering.
 - some surplus trade - interdependence with agri commts.
 - raiding & warfare frequent - political activity.
 - Rose admire authorities, becoz all participate.

HORTICULTURE

four parts of the world.

- 1) Islands of pacific - Trobrianders, Kurtachi.
- 2) Southern Asia - Munda Gond, Rengma Naga.
- 3) Africa below Sahara - Azande, Tiv, Yako
- 4) New world. - Hopi, Zuni, Red Indians, Yanamano.

Character:

- More sedentarianism.
- low to moderate density
- dense population support.
- self sufficient local groups.
- simple hand tool techn.
- Div labours - Age, sex, specialism.
- more money contribution.
- ~~Plenty~~ scarce food.
- Rose food shortages are supplemented by fish.
- part time political leadership.

AGRICULTURAL ECONOMY

8000 years ago - new plants; domestication

- Plough cultivation, animals use -

Ex: Baiga, Bhil, Bhuiya, Santals, Tepchas, Oraons, Azters

Characteristics:

- Sedentarianism
- High population density
- Permanent Rural urban commts
- Face frequent food shortages
- Wide individual economic differences
- Full time political officials.
- Complex economic resource
- 1) Complex technology
- 2) Div. of labour - sex, Age, specialization
- 3) Land ownership
- 4) Money - Capital

TRIBAL ECONOMY

Characteristics

- 1) Products without techny aids.
- 2) Economic activities with religion - sacrifices, blood sprinkling
- 3) Products for consumption - lack of exchanges.
- 4) Non-monetary economy, non-market economy, profit ^{non}
- 5) Community oriented approach.
- 6) No specialisation - no complex division of labour
- 7) Group / community property.
- 8) Economic backwardness

Globallion & Indigenous Economies

- Attachment to land, strong responsibility to preserve it.

Language - Protection for indigenous survival - extinction threats

Culture - No voice - swept by market aside.

key attributes - Globallion - a question of marginalisation for indigenous people

to define - Multi prolonged attack on their existence, livelihoods, journam

people's - They are vulnerable as on frontlines of globalisation expansion threat to traditional knowledge.

identity, loss of traditl sovereign rights on hunting grounds.

- Opening up of inaccessible areas.

- Privatisation of indigenous genome, - Reducing population

- Govt don't consult natives.

- They are living monographs to culture

- Immense biodiversity

Political System has five components:

- 1) Territorial / spatial aspect
- 2) Organisational aspect
- 3) Leadership aspect
- 4) Legal aspect
- 5) Inter polity affairs.

4. POLITICAL ORGANISATION

P. Aly studies the organisation & conduct of behaviour relating to use of power in all societies.

- Studies & deduces certain principles or laws regulating political behaviour of all societies.
- Legal Aly studies law and decision making in all societies.

Swartz - Politics is public in nature.

- Politics concerns goals / benefits, for which there is competition.
- It involves differences in power i.e., control among members of group.

What is politics — Process — Action

10. Political System

kinds of political system

How developed?

Effect of political system

Effect of non-industrial political system upon modern process in contemporary world?

POLITY is a group of people whose membership is defined in terms of a common territory & is under direction of political leader.

Features Spatial, organisational, leadership, legal, Inter-polity aspect.

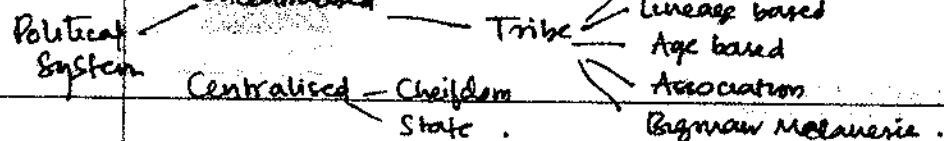
Policy - Public policy - guidelines that can lead directly to action

Public - People that a policy will affect, these public are members of polity.

POLITICS Political process - events & actions that lead to formulation & enforcement of public policy.

TYPES OF POLITICAL ORGANISATION

African Political System - Meyer Fortes & Evans Pritchard
 ↳ Band, Stateless society & State.



In 1950s Centralised & Uncentralised

Uncentralised : - no centralised authority, stateless political organism
acephalous.

BAND least complicated. Kinship relations & political structure are same. Autonomous groups among hunters, gatherers.
Each band exogamous kin group. Adult members take decisions by consensus.
Ex: Eskimos — Shaman — religious leader.
— Headman — proficient hunter.

TRIBAL POLITICAL ORGANISATION

Clan based — Each clan serves as seat of political authority.
Different clans within a tribe do various tasks.
Kinship groups Ex: Winnebago Red Indians of Wisconsin — 12 clans.

Lineage Nuer of Sudan, Tiv of Nigeria.

Age grade based : — Tribal societies of Africa, Oceania.

Kipsigis of East Africa.

Cut across kinship & territorial lines & serve different political functions.

Association based : — Cheyenne military clubs.

Melanesian Big man — Kapauku of West New Guinea.

Centralised Political Organisation

CHIEFDOM

Ranked society means → individuals, lineages have higher or lower social status than others.

In Chiefdom all parts of sub-units are structurally and functionally similar, unlike tribal organisation (decentralized)

- Centralised leadership, chief inherits office.

- Retributive system of exchange.

- Prevents outbreak of violence ≠ military power.

More densely populated, communities are permanent, found in pastoral societies, Ex: Chiefdom of Taupala.

STATE

Autonomous political unit, many communities, class stratification, intensive agriculture, high productivity, commercial exchange, foreign trade.

POWER

Universal aspect of social interaction, shaping relationships among members of group
 Large it is → Capacity to take independent action in the face of resistance from persons, groups or states / Ability to influence another.
 Characteristic phenomena both in Democratic & Authoritarian Power Systems. Not institutionalised by nature • Submission of people to structure.

Types

Positional (by virtue of position) & Non positional (position in social structure)
 Lundberg's classification → Coercive, Utilitarian, Identitive power
 Influence basis - force (Dictatorship), Domination (Power), Manipulation, Legitimate & Illegitimate power

Legal, Traditional, Charismatic

Direct & Indirect Power (Office to subordinate, Indirect - Covert).

SOURCES OF AUTHORITY :- Max Weber, three sources of AUTHORITY

1) Traditional 2) Charismatic 3) Legal

AUTHORITY is institutionalized power or legitimate power.

Based on consent, it is the right to take certain actions,

including decision to issue commands. Recognized right of leaders to allocate resources. Authority may increase or decrease with respect to the amount of power available to the single occupant. Leader of military coup, more power, less authority. Elected leader, both authority & power.

POWER

Legit / Illegitimate

Based on force, less democratic

Capacity of man to change behaviour of others.

→ Authority always subject to limits. If the limit is violated by those who possess authority, subordinate can ignore.

INDS : Based on Force, Constitutional, Charismatic, Religious, Divine Right, Ancestral heritage, Elite, traditional, Rational legal characteristics, Legitimacy, Dominance, Informal power, rationality, Acc'y.

LEGITIMACY

Sources - 1) Traditional
- sanctions of immemorial traditions

2) Exceptional personal quality, 3) Legality.

Basis for authority is logic or reason.

Without power, authority can accomplish little. Without authority, power can't be institutionalized. Legitimacy is

required to make political system work (along with force)

It is based on expectation that those who make decisions will meet certain obligations & decisions support the shared values of members of society.

Defn:- Capacity to produce and maintain a belief that the existing political system is most suitable to society.

Related to entire political system, it is a belief which leads the people to accept that it is morally right & proper to officials or leaders of govt to make binding rules. Every political system strives for legitimacy.

Perspectiv - Ideological, Source of legitimacy is ideology prevailing in society

Structural - Validation of structural/norms of regime.

S.CHITHARANJAN
AIR#574

Today law takes larger social control, because:

- 1) Customs lack an agency of authoritative jurisdiction which are secure.
- 2) Customs can't adapt to social changes quickly.
- 3) Customs is different among groups, there is a need for single code.
- 4) It became essential aspect of Government.

R. Brown defines law as - Social control through the systematic application of force of politically organised society.

He says fundamental rules of all societies are same.

DIFF. b/w PRIMITIVE LAW

- Spontaneous / gradual / slow
- No legisln. : territorial
- Based more on kinship ties.
- Predominantly a Criminal law.
- Based on ethos / public opinion.
- No difference b/w public / private wrongs
- Importance to sin & supernatural
- Intention not recognised
- scope for collective responsibility
- No grades of punishments
- Imprisonment rare.
- No law courts & police force.

MODERN LAW

- Planned, deliberate
- ✓ Legisn.
- Based on territorial ties.
- Several branches.
- Not necessarily
- Difference
- No
- Intention recognised
- No scope
- ✓
- ✓
- ✓

Public opinion: sum of methods

any influence which the society S. CHITHARANJAN members for the purpose of welfare as whole group. Date AIR#574 26

SOCIAL CONTROL - part of socialisation

Nature

Influence ^{it is}

Promoting welfare of society man is ^{part of social} Society in order to exist & progress has to exercise a certain control over its members since any marked deviation from established ways is considered threat to its welfare - such is social control.

NEED - to maintain old order.

or ^{or} to establish social unity

fns to regulate individual behavior

to provide social sanction.

to check cultural mal-adjustment

Socialisation is lifelong process of inheriting & disseminating norms, customs, ideologies, providing an individual with skills & habits necessary for participating within society

MEANS

Informal means

Belief, Social suggestions, Ideologies, Folkways, mores, customs, religion, art & literature, Humour & satire, public opinion.

formal means

Violent - Death penalty
Law, Education, Coercion ← Non-Violent - Strike, Boycott

LAW & CUSTOM

Law is a ^{created} make, custom is growth, spontaneous emerge

law needs a special agency for enforcement, customs don't

definite, clear Law is Specific, Customs aren't definite & clear as they aren't codified

Law is flexible & adaptable than customs

Customs fork & disappear without formal abolition & recognition

Law is more idealistic than customs

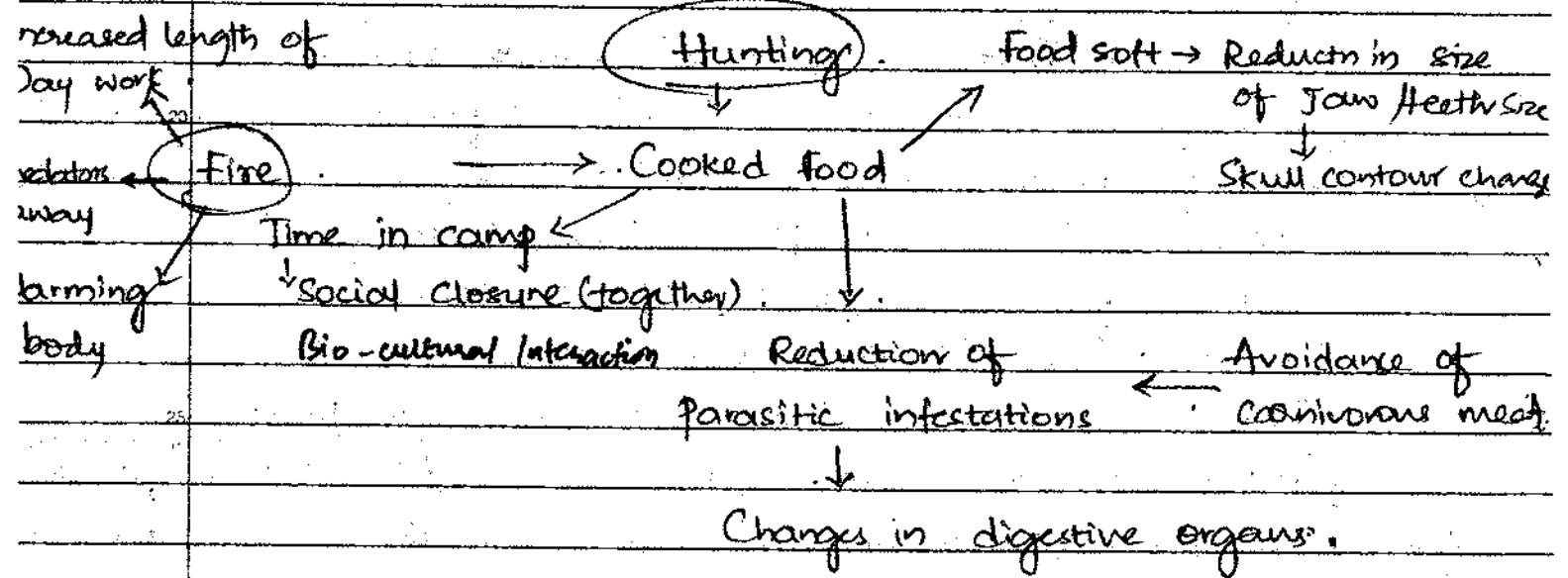
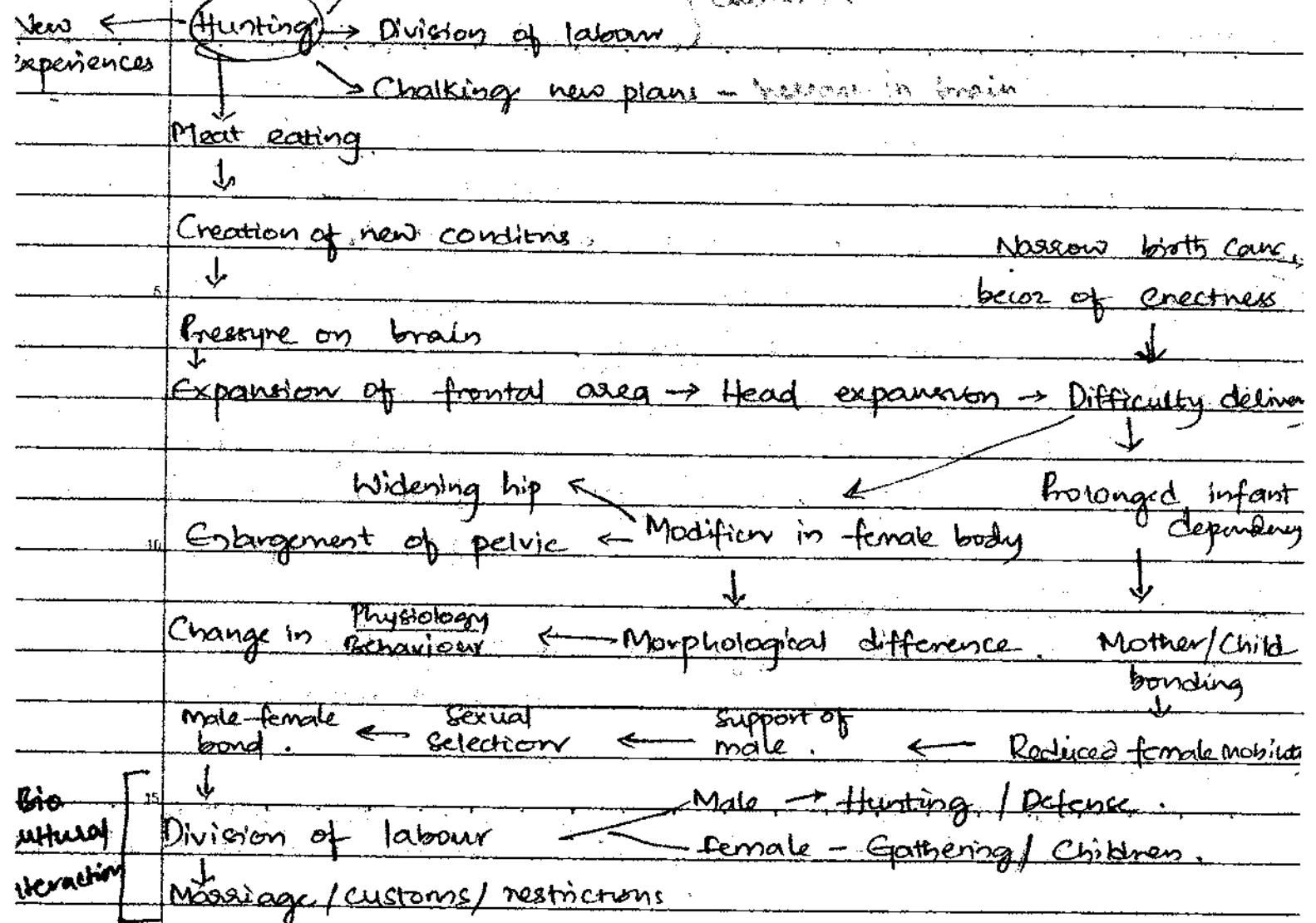
Customs consolidate law & facilitate its practice

Customs is important source of law / Both are ^{supplementary} to each other

LAW: Social norm, its violation beyond permissible limits evokes procedural response by authority to determine guilt & impose sanctions on wrong doer - legal institutions are necessary for law (Hobhouse & Wilson)
- Law enters only where selfish anti-social & disruptive tendencies are likely to violate customary usage

Male - Male bond

Cultural



- All definitions have
- Belief in supernatural aspects.
 - Explanation of life.
 - Provides a moral code.
 - Expression to sacredness.

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5. RELIGION

Define: Melford E. Spiro - An institution consisting of culturally patterned interaction with cultural postulated superhuman beings.
 Talcott Parsons - Sociologist - five factors in all religions:-

- Set of sacred entities
- Expressive symbols
- Ritual activities
- Social solidarity
- Relationship between supernatural world & moral values.

- All define have a common consensus - Religion is a kind of human behaviour - Verbal or non-verbal (rituals, myth, beliefs)

Characteristics: Holy/sacred, Response, revelations, beliefs, Rituals & Liturgy, Ethical codes, Community.

APPROACHES TO STUDY RELIGION

EVOLUTIONARY APPROACH

- John Lubbock - Origin of Civilisation & Primitive condition of Man - Evolutionary scheme - Atheism, fetishism, nature worship, totemism, Shamanism, monotheism, ethical monotheism
 E-B. Taylor - father of Modernity - Primitive culture (Body) Animism is beginning.
 H. Spencer - Ancestor worship beginning (Principle of sociology)
 Anthony Wallace - Classified religions into:
 1) Shamanic 2) Communal 3) Polytheism 4) Monotheism.

Sir James Frazer, religion is result of drift of original magic state of human culture - Major theory.

August Comte - father of Modern Sociology in his Positive Philosophy, three stages in evolution of human thinking - Sociological dimension to drift of human thinking.

Three stages passed by human thinking are:-

- 1) Theological Stage - lacks logic & orderliness, Children.
No scientific outlook, fictitious interpretation of events; Primitive man, Sub stages (3).
 - a) Fetishism - emotional attachment to an object.
 - b) Polytheism - Change due to dpt of mental faculties.
 - c) Monotheism
- 2) Metaphysical - Human problems more complex / intricate.
Belief in abstract transcendental activity would replace belief in personal concrete God. Abstract power/force guides & determines events - Discards belief in God.
- 3) Scientific / Positive : Man is satisfied with good work, Craving for scientific enquiry, rationality, no place for superstitions.

Psychological Approach

- Robert Randolph Marrett - Religion not problem solving p^{ro}blem
Answering questions of man not basis of religion.
It is profound emotional response.
- Emotive theories - Emotive factors are.
 - 1) Fear - Protection from envt (Wilhelm Wundt)
 - 2) Unspecified emotion - William Jones
 - 3) Fetishism
 - 4) Animatism

Sigmund Freud - Child believes in father, grows old & believes in a cosmic father to give him a support once he had from biological father.

HADD: Hypersensitivity Agency detecting Device.

- & mechanism that lets perceive humans that many things have agency/ability to act on their own accord
- Helps to make survival decisions

FUNCTIONAL APPROACH

To explain role, religion plays in life of individual / society.
 Objects of Religious worship symbolise social relationships
 and indeed play an important role in continuance
 of social group.

Religion has social role to play (Emile Durkheim)

- 1) Explains Social Suffering
- 2) Source of Social Cohesion
- 3) takes care of Social Welfare
- 4) Agency of social control
- 5) Controls & effects economic life (^{material progress} spiritual progress)
- 6) Integration of society

Universal functions of Religion

- 1) Disciplinary & preparatory agency
- 2) Ceremonial rituals perform Cohesive function
- 3) Revitalising function
- 4) Euphoric functions

Talcott Parsons - sees society not cohesive,
 instead becoming individualistic (contrary to Durkheim)

- 1) Source of social control
- 2) Source of conflict
- 3) Meaning to subjective experiences
- 4) Response to unknown (events)
- 5) helps in normative reinforcement
- 6) Source of social welfare
- 7) Strengthens moral values

Religion - kind of glue that holds society together

→ more concerned with society / social organisation

Cultural Materialism

→ Coined by Marvin Harris, 1968 - "Rule of Agical theory"

- Three schools → 1) Materialism

→ 2) C. Evolution

→ 3) C. Ecology (Julian Steward prop.)

4) Its extension of cultural similarities / differences b/w societies.

5) It defines three levels of societal framework
 (material realities) (organisational aspects) (symbolic repression) · Religion
 1) Infrastructure = kinetic system 2) Structure = Magic, Productivity, Reproductive, Techy, economy

- Harry's work with India earned Cow myth (1966).

6) Infrastructure guided & influenced technological / economic factors playing role in society CM says problems lies within infrastructure → structure relationship

Critics: Too simplistic to explain all cultural phenomena. → Unidirectional All drawbacks of Social Darwinism.

Culture & Personality Schools: Two principles 1) Culture influences personality

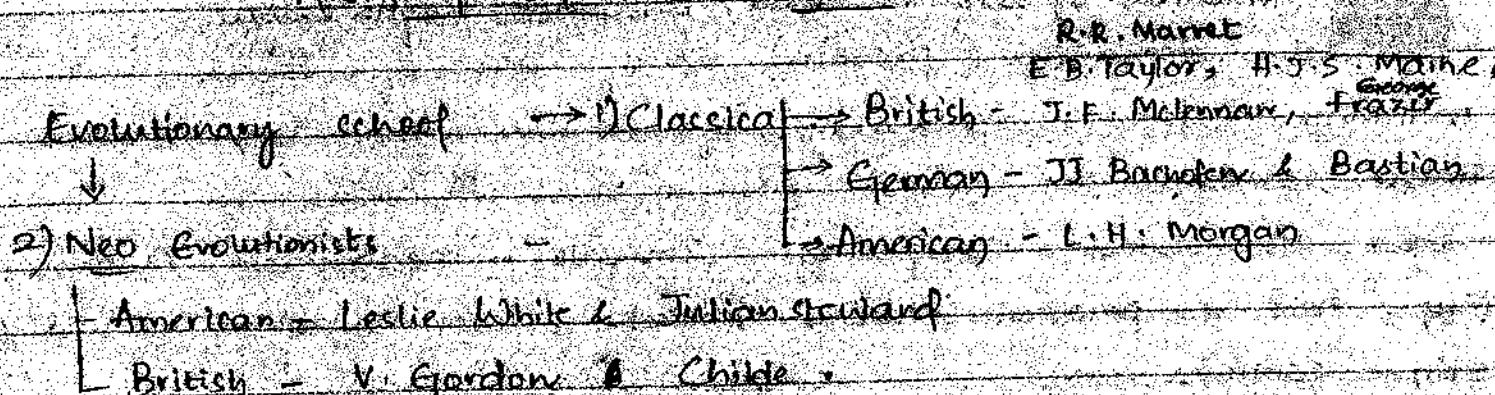
ii) Margaret Mead - compared Samoan & American Cultures.
 (Culture influence personality) No difference Adolescent stress.

approach Ruth
 iii) Benedict - Studied Japanese personality (personality influences culture)
 not surrender in WWII. Two types of personality i) Appollonian - Peace loving
 ii) Dyonian - Conflict loving

basic personality approach
 iv). Abraham Kardiner - Describes [personality structures] are found through institutions (related personality with institutions). Two types of personality
 a) Basic personality structure (through primary institutions - childhood, experience)
 b) Special personality structure (through secondary institutions - Religion, Ethics, art)
 Outcome of cultural influences of a person.

Total personality approach
 iv) Cora Dubois (See) - Tried to find a model personality.
 - Observation based studies to analyse culture of a group.
 - Certain personality structure is most frequently occurring structure within a society.

ANTHROPOLOGICAL THEORIES



Julian Steward provided typology for evolutionary schools based on assumptions & approaches employed in cultural evolution:

- i) Unilinear - Assumption that cultural evolution proceeds in successive development stages from homo to heterogeneity. Focus on particular cultures progressive.
- ii) Universal - focus on evolution of culture of mankind as a whole. White & Gordon support this.
- iii) Multilinear - establishes sequences of parallel development that could be investigated in empirical reality. Focus on particular evolution. Search for cultural parallels.

CLASSICAL EVOLUTIONISM

In early years, prevailing view was culture generally develops in a uniform & progressive manner. Most societies pass through same series of stages, to arrive ultimately at a common end & course of culture internally determined.

POSTULATES

- Mankind with a unity & not diversity. Primitive societies are ancestors of civilised societies.
- Human culture evolves in unilinear sequence.
 → Savagery, Barbarism & Civilisation.
- Progressing from homo to heterogeneity, indefinite to definite.

(Invention of zero in India, Babylonian, Mayan culture)

Cultural Similarities (parallel) exist bcoz of Psychic unity of mankind. Refers to commonality of human mind that allows similar reactions to same environmental situations.

Taylor formulated concept of survivals - meaningless customs, they had a practical intention initially, later became absurd & still continue.

Diversities occur because of differences in environments & situations, which are secondary significance in analysis of evolution of culture.

Comparative & historical methods are adopted

Adopted to study & justify fact that human cultures had undergone progressive change

Adopted to show similarities in culture & evoln from simple to civilized.

POINTS OF REACTION

Arguments like civilization has evolved or always existed was debatable.

Accomplishment: Efforts to establish scientific discipline of Anthropology laid foundation for organised discipline.

Legacy of three basic assumptions:

- a) Cultural phenomena studied in natural fashion,
- b) Psychic unity of mankind
- c) Use of comparative methods.

Criticism - One sided, partial analysis.

Similar cultural traits emerge due to similar cause is wrong.
Entire mankind went through same stages - wrong.

Arm-chair Anthropologists - methodology weak.

Neglected human invention & creativity, diffusion & migration.

HISTORICAL PARTICULARISM

- Developed by Franz Boas), as an alternative to world-wide theories of socio-cultural diff.ⁿ (by evolutionist & diffusionist)
- Emphasised on detailed regional studies of individual culture to discover the distribution of culture traits & to understand individual process of culture change at work.
- Collection & organisation of ethnographic data.
- Historically grounded investigation more accurately can be demonstrated.
- Examining the particulars of specific culture, so that sources of stimuli could be identified.

METHODOLOGY To understand the nature & change in culture of particular people, history of particular culture lay in study of individual traits of a particular culture in limited geographic region. After studying many cultures, history of region can be ascertained. Reconstructing history of particular culture by gathering ethnographic data, evidences, oral history recordings, participant observation. This approach called 'four-fold method'.

ACCOMPLISHMENT Focus on different cultures. Interplay of factors influencing culture & its change received more attention.

- Emphasis on collection of data, Oral cultures.

CRITICISM : vast data collection leading to broad theories.

Cultural diffusion is a process by which cultural traits ~~discovered~~^{SCHITHARANJAN} invented ~~are spread directly or indirectly to other societies.~~^{AKR#574}

DIFFUSIONISM - Culture has origins, not becoz of evolution, but ~~becoz of spread~~

- An attempt to understand nature of culture in terms of origin of culture traits & their spread from one society to another through integratn, trade, war, contact.
- Is Anti-evolutionist school of thought.

Emphasise idea that humans are basically uncreative & important inventions made only at one place & are diffused to other areas

Characteristics : Trait adoption depends on use & meaningfulness to socio-economic life.

- Original form of traits may not be retained during diffusion.
- From developed to underdeveloped culture.
- May create cultural change.

SCHOOLS - Based on nationality, three schools:

BRITISH - G.E. Smith, W.J. Perry, W.H.R. Rivers [Egypt as cradle of civilization].
Also called Pan-egyptian, heliocentric school as they say all cultures originated from one culture (Egypt) & rest of world.

Extreme anti-evolutionists (worship of sun - found everywhere)

Short lived becoz of bias to Egypt, ignored analysis of non-material culture (used migration as main Diffusion).

~~French, German, American, Australian, Indian, Chinese, Japanese~~

GERMAN : Was not extremist like British, refined, touched few evolutionary schemes. Says, Cultural traits and complexes that originate independently at different places. Inventions are continuous process, reach other places by diffusion.

- Postulated that migration of trait can be understood through study of historic data - Culture historic school.
- Different Culture Circles develop at different places due to diffusion (Culture circle school)
- Frederick Ratzel, frietz Graeber, father William Schmidt.

Weakness of German's - Methodology didn't explain dynamics of cultural change, overlooked reasons of acceptance, reject modification.

→ Culture area is dominant theme.

→ Franz Boas, Clark Wissler, A.L. Kroeber.

AMERICAN - Explain reasons for diffusion where the culture circle approach of German scholars failed.

- Diffusion of culture bcoz of process of imitation.
- Borrowing easy than invention.
- Diffusion traits are more similar in areas residing nearby.
- To explain diffusion - Culture Area approach devised.

World is divided into different cultural areas on basis of geographical regions (Culture area school).

CRITICS - No boundary. Can't translate into viable empirical method, extreme caution required.

- Over emphasis on material culture.

Factors: 1) Relation & communication 3) Competition with old traits
2) Need for new traits 4) Respect & recognition towards new traits.

Conditions: 1) Traits should be meaningful / economically / socially
2) Changes can take place due to envt factors
3) Diffusion always from high culture to low culture
4) May create cultural change in the group ^{deserts}.
5) Obstacles for cultural diffusion - transports, rivers,

Clark

Wissler : Concept of Age area, Relative age of cultural traits based on geographical distribution - Most widely distributed traits are oldest one. Two types of diffusion.

- i) Natural : Diffusion by natural agencies / trial & error method Time consuming, gradual.
- ii) Organised : Diffusion by organised agencies - Missionaries, invasions

FUNCTIONALISM

Malinowski & R. Brown (Structural Functionalism)

Brought to be corrective to the excess of evolutionary & diffusionist theories of 19th & historians of 20th centuries.

- Two versions:

i) Bio-cultural Functionalism - Malinowski

→ Social institutions developed to meet psychological needs

ii) Needs (culturally derived & instrumental) require institutional devices.

Malinowski believes satisfaction of these needs transformed the cultural instrumental activity into an acquired drive through psychological reinforcement. (Emphasised on individuals)

→ Structural Function - R. Brown

- Focus on social structure, individual irrelevant

Society is system of relationships & institutions are to maintain society as system

STRUCTURAL FUNCTIONALISM (Kroeber's work)

Just like body having various organs & its function for survival of body, same way in culture different ^{social} institutions.

7) Institutions of culture operate to satisfy human needs.

(Culture as means) Every aspect of culture has for ^{integrated} & dependent,

8) Cultural trait without function will not survive.

Each institution as a social system has personnel, charter, rules, technology

Theory of Need - Humans have social, economic, religious, physical, mental needs - so established, political, economic, moral, legal, religious, myth, art

9) Three levels of needs (Scientific theory of Culture) book.

i) Primary ii) Instrumental & iii) Integrative needs

Sex & feeding

↓
Education, legal

↓
Knowledge, religion, myth, art

Mother, family, kindred

↓
Political to achieve primary needs

↓
To integrate society

7 CULTURE - LANGUAGE - RELIGION

Language is a system of conventional spoken or written symbols by means of which human beings, as members of social group & participants in its culture, communicate.

Considerations - language as subject

- Normal person acquires in childhood ability - system of vocal communication.
- * Single language initially - mother tongue.
- Species specific to man;
- Infinite productivity & creativity
- Unrestricted to what they talk about.

Animal - Communication systems different - Language of bees
Only single theme, no independent communicative func.
haven't duped any spoken language.

→ Language - society interconnected - interaction.

Ling. Anthy :- Science of language known as Linguistics. Dealing in detail with these various aspects of language, understanding as social/cultural phenomena - Linguistic Anthy.

Importance Communicating thoughts, forge friendships, cultural ties, economic relationships, prerequisite for culture, tells features of country, defines culture of society,

Speech ✓ LANGUAGE:- SAUSSURE

- 25. Speech involves producing sound from Vocal box.
Just mimicing is different from acquisition of Syntax.
Whereas, deaf generally don't use speech but are able to communicate effectively using Sign language.
- for language - both anatomical & neurological changes in brain required.

NATURE OF LANGUAGE

- Three theoretical positions

- 1) Structural perspective - Structurally related elements for meaning
- 2) Communicative - language is vehicle of expression of full meaning
- 3) Interactional view - establishing interpersonal relationships.

characteristic : Systemic, dynamic, dialects (varieties of same language)

Sociolect (social variation), Dialect, Symbolic & arbitrary

origin - Divine creation hypothesis

- Natural evolution hypothesis.

How humans have derived first language

- Imitation -

- Necessity hypothesis .

VERBAL VS ORAL - Verbal means, concerned of words.

Oral - are vocal sounds such as grunt, singing a wondrous note .

NON-VERBAL - first scientific study by C. Darwin

Type: 1) Clothing & Bodily Characteristics - Height, discoloration

2) Physical Environment - furniture

a) Proxemics - Study of how people use/pervade physical space around them.

b) Chronemics - Study of use of time of nonverbal communication

3) Movement & bodily positions:

a) Kinesics - Interpretation of body language - facial expressions Gestures

b) Gestures -

c) Postures -

d) Haptics - Study of touching non-verbal comm

e) Oculistics - Eye gaze

f) Paralanguage - Vocality - tone, pitch, accent - nonverbal cues.

Approaches to study family

23.1 Typological and processual

- Sociologically family may be defined and discussed from 2 different angles
 - Typological – Study of family as an entity, group or association related by kinship bonds and the group is directed to serve important cultural purposes. Eg: Nuclear family, extended family, consanguinal family, conjugal family, joint family
 - Processual – Herein family is looked at as a process which can be divided into 3 to 4 well defined stages as follows
 - 1) Formative stage - individual growing as a child preparing for adult hood.
 - 2) Pre-nuptial stage – individual as a youth preparing themselves for marriage/ courtship and procreation
 - 3) Nuptial stage – Individual concentrates on his family for procreation
 - 4) post nuptial stage – When one generation passes on their tradition, culture to the new generation.

Impact of various factors on a Family

24.1 Impact of education and feminist movements on family

1. Feminist movements and the increased entry of women into the workplace beginning in the twentieth century has affected gender roles and the division of labor within the family.
2. Better education has resulted in greater financial independence and more career choices for women.
3. Women have begun to shun marriage. According to the U.S. Census Bureau, in 2005, unmarried households became the majority of all U.S. households.
4. Even after they marry, many of today's women put their careers above children, or put off having a family for several years.
5. The changing status of women has lead to a more equal division of household responsibilities.
6. Husbands increased their participation by only a small amount and the wives reduced the number of hours they devote to various household tasks. The most pressing problem in a family as a result is that of child care. A majority of working mothers pay for child care, even if not on a daily basis.
7. It has resulted in children feeling deprived of mother's attention. Many believe that this will effect children adversely leading to psychological problems and deviant behavior. But various studies have proved this notion as wrong.
8. It has affected the sex role attitudes of children. In general, when mothers work their children are more likely to approve of working women and of a more egalitarian division of domestic tasks.

9. The additional income of wives have improved the standards of families in which women work.
10. But some studies have reported that husbands of working wives experience less marital satisfaction with their marriages and a generally lower mental and physical well being than husbands whose wives stay at home.
11. With women becoming more independent and assertive, the divorce rates have shown an increasing trend.
12. The increased contribution of women to family income has given them a stronger voice in family decisions.
13. All these changes are substantial in some societies but insignificant in many.

Political aspects of kinship :

1. Kinship is the basis of classification in the small residential units
2. It acknowledges bond between members of the major named groups of the society
3. It provides the link with elders & in particular kinships who exercise political & religious formations for the groups , & for the society as a whole
4. It regulates the ownership of lands
- 5.it is the common basis of assistance in primary economic cooperation
- 6.it prescribes certain types of sex union & marriage
- 7.it is the basis for the assemblage of the members of the society of the birth , initiation
- 8.it largely recounts of the origins of present day social groups and distribution of territory among them
- 9.it projects the super natural world

Culture and Civilization

1. Culture can be defined as a complex whole which includes knowledge, belief, art, moral, law, custom and any other capabilities acquired by man as a member of the society.
2. Civilization is considered as the most advanced stage of culture. It includes material things used by man such as house, household commodities, weapons, instruments etc.
3. The relationship between culture and civilization:
 - i. Culture and civilization are interdependent. Culture needs civilization for further growth and civilization needs culture for its vital force and survival.
 - ii. The objects of civilization after a period of time acquire a cultural significance. Civilization tries to put certain limitations on culture - it determines the degree to which cultural activity can be pursued.

- iii. Culture and civilization are interactive - civilization is a vehicle of culture, culture responds to the stages of technological development.
 - iv. Every change in culture and its valuations has repercussions on the civilization structure. Civilization is the driving force of society and culture is its steering wheel.
4. Differences between culture and civilization:
- i. Civilization has a precise standard of measurement but not culture - while comparing the products of civilization, we can prove which is superior and which is inferior. eg. a car runs faster than a bullock cart. But, there is no measuring rod by which we can assess cultural objects. eg paintings of Picasso may appear to some an abomination while to others they are invaluable.
 - ii. Civilization is always advancing but not culture - The various constituents of civilization like machines, means of transport are constantly progressing. But concerning culture it cannot be asserted that art, literature, thoughts of today are superior to those of the past
 - iii. Civilization is transmitted without effort, but not culture - Objects of civilization can be easily adapted from generation or country to another but culture is not adapted with equal facility because it is related to inner tendency. The adoption of culture depends on personality and nature of people.
 - iv. Civilization is borrowed without change or loss, but not culture - eg. railways, motors, machines etc are borrowed as they are from one country to another but the elements of culture such as religion, art, literature are not borrowed in their original character.
 - v. Culture is internal and an end while civilization is external and a means - civilization is inclusive of external things while culture is related to internal thoughts, feelings, ideals and values. Civilization is what we have and culture is what we are.

Cultural relativism and ethnocentrism

1. Concept of ethnocentrism proposed by W G Sumner
 2. It is a point of view where one's own group is considered superior to other groups
 3. It results in an intense "we" feeling among members of a group
 4. Ethnocentric studies of culture result in prejudices
 5. Hence there is a need for non ethnocentric study of culture
 6. Cultural relativism proposed by Franz Boas as a scientific study of culture
 7. It is based on premise that there is no absolute good or bad. A trait is good or bad in relation to culture in which it operates
 8. Cultural relativism promotes tolerance and pluralism unlike ethnocentrism which promotes contempt and hatred
 9. Cultural relativism is characterised by inclusiveness and open mindedness while ethnocentrism is characterised by exclusiveness and close mindedness
10. Drawbacks of this concept
- a. It knowingly allows injustices to occur around the world

- b. According to cultural relativism, human rights are culturally relative
- c. This means it is entirely acceptable for women in the Middle East to get stoned to death for adultery, totally fine for girls to be denied schooling,
- d. Instead of understanding why certain cultures believe what they do, and engaging those cultures in open discussion about systems of beliefs, cultural relativism takes an entirely hands off approach

DESCENT

Rules of descent govern the kinship and relationships among the members of a society.

1) Unilineal Descent - descent through either of the sexes

a) Matrilineal - descent traced through the female line

eg. Khasi of NE India

b) Patrilineal - descent traced through the male line

c) Parallel Descent - males trace their descent through the male line, and females through the female line

eg. Saha of Colombia is the only reported society

2) Non-Unilineal Descent - descent through both the sexes

a) Double Descent - descent is matrilineal for some purposes and patrilineal for other purposes

eg. Yako of Nigeria

b) Bilateral Descent - descent is traced through both the parents simultaneously

eg. modern families of the west

c) Ambilineal Descent - in each generation, an individual has an option regarding the lineage

Filiation - It is the allocation of individuals to a descent group, as described above.

Complementary Filiation

- In societies with unilineal descent, people also recognise kinship links with relatives who do not belong to their own descent group,
- In Patrilineal societies, individuals have important social links with members of mother's family, and vice versa,

- While lineage links always have a political and hierarchical character, complementary filiation is more emotional and personal.
- Concept originally used to describe African societies, such as Tallesi of Ghana by M Fortes.

Economic Aspects of Marriage (Types of bride price and dowry)

1. In about 75% of the societies known to anthropology, one or more explicit economic transactions take place before or after the marriage.
2. Such economic transactions may take several forms: bride price, bride service, exchange of females, gift exchange, dowry or indirect dowry.
3. BRIDE PRICE
 - i. Or bride wealth is a gift of money or goods from the groom or his kin to the bride's kin.
 - ii. The gift usually grants the groom the right to marry the bride and the right to her children. It may be paid in goods, money, land or livestock.
 - iii. Of all the forms of economic transactions involved in marriage, bride price is the most common - 44% of societies with economic transactions during marriage.
 - iv. It is not payment for women, but rather is seen as a way of valuing the labor of women, the effort involved by the bride's family in raising the female and the labor value of the woman's offspring.
 - v. It is more common in patrilineal and patrilocal systems. It is also common where land is abundant and the labor of women and children contributes to group welfare.
 - vi. eg. Nandi tribe, Subanun of Philippines, Manus of Admiralty Islands.
4. BRIDE SERVICE - Requires the groom to work for the bride's family, sometimes before the marriage, sometimes after. It varies in duration, from a few months to several years. eg. North Alaskan Eskimo
5. EXCHANGES OF FEMALES - A sister or female relative of the groom is exchanged for the bride. eg. Tiv of West Africa.
6. GIFT EXCHANGE - Involves the exchange of gifts about equal value by the two kin groups to be linked by marriage. eg. Andaman Islanders
7. DOWRY
 - i. It is usually a substantial transfer of goods or money from the bride's family to the bride, the groom, the groom's kin or the couple.
 - ii. A woman's dowry might include personal possessions such as clothing and jewels, money, servants or land.
 - iii. It was practiced in medieval Europe and is still prevalent in South Asia.
 - iv. In India, it has become a matter of controversy and a subject for legal reform because of a large number of incidents in which women have been harassed and even murdered to extort richer dowries.
8. INDIRECT DOWRY
 - i. The dowry is provided by the bride's family to the bride, the groom or the couple.
 - ii. The payments to the bride originate from the groom's family. Because the goods are first given to the bride's father, who passes most of it and not all to her, this kind of transaction is called indirect dowry.
 - iv. eg. Basseri of Southern Iran.

Marriage Characteristics:

- 1) Charter (Objective of)
- 2) Mate choice
- 3) Financial transactions
- 4) Ceremonials
- 5) Residence
- 6) Authority & 7) Stability

functions of marriage

- 1) Biological
- 2) Economic
- 3) Social
- 4) Educational

Preferential, Prescriptive, proscriptive and open systems.

- Marriage Rules/Regulation:

- o Proscriptive (Inbreeding avoidance, familiarity breeds - Avoidance, Prevents disruption o family, forms wider ^{area} area)
- o Prescriptive
- o Preferential

• Proscriptive Rule : These are negative rules which restrict ppl from marrying certain categories of relatives.

o Eg : Incest Taboo

• Prescriptive Rule : Under this rule one has to marry within a select category only. There following are the types

o Endogamy : Where one is permitted to marry within his/her own group. Endogamy occurs in several forms. Eg: Tribal endogamy, caste, sub-caste, class, race, ethnic, village, deme (grouping based on certain socio-economic laws as in the Bedouins of Saudi Arabia), moiety (division into 2 groups)

o Exogamy : Where one must marry someone outside ones group. Occurs in several forms. Eg. Village level, lineage, clan, miety, Gothra exogamy (khaps in N. India)

o Hypergamy (Anuloma): Herein a man marries a girl from his caste or a lower caste. Eg. Rajputs, Jats

o Hypogamy (Pratiloma) : Herein a woman marries a man from her caste or a lower caste. This is generally not permitted in the traditional hindu society

— • Preferential Rule : In this several forms of mate selection are available but one is more likely/preferred than the others. Eg: Sister exchange as in case of Urali and Malaipandaram of Kerala, Cross cousin marriage in case of Gonds (AP), Kallar (TN), Kharia (Ch), Munda (Jh), Uncle - Niece marriage as in Konda reddis (AP), Parallel cousin marriage in arabs, Bedouins, Yanmamo red Indians (Venezuela)

Types of Marriage

Marriage is a customary transactions that function to establish the legitimacy of new born children as acceptable members of society.

Depending on the number of spouses, Marriage is divided into Monogamy & Polygamy.

Monogamy:-

Monogamy is a form of relationship in which an individual has only one partner during their lifetime. The term is also applied to the social behavior of some animals, referring to the state of having only one mate at any one time. Scientists use the term monogamy for different relationships. Biologists, biological anthropologists, and behavioral ecologists often use the term monogamy in the sense of sexual, if not genetic, monogamy. Modern biological researchers postulated the following four aspects of monogamy:

- Marital monogamy refers to marriages of only two people.
- Social monogamy refers to two partners living together, having sex with each other, and cooperating in acquiring basic resources such as shelter, food, and money.
- Sexual monogamy refers to two partners remaining sexually exclusive with each other and having no outside sex partners
- Genetic monogamy refers to sexually monogamous relationships with genetic evidence of paternity

When cultural or social anthropologists and other social scientists use the term monogamy, the meaning is social or marital monogamy. Marital monogamy may be further distinguished between:

marriage once in a lifetime;
marriage with only one person at a time, in contrast to bigamy or polygamy
and serial monogamy, remarriage after death or divorce.

Polygamy:-

Marriage to more than one person is called as a Polygamy. There are 2 forms of Polygamy Marriage.

Polygyny:- Marriage of one men to two or more women
Polyandry:-Marriage of one women to two or more men

Polygyny is found in tribes like Naga, Gonda, Baiga, Toda.

Polyandry is restricted in its distribution. It is found among Khasa, Ladakhi, Nayars.

In Polyandry, several brothers share similar wife it is called as a Adelphic or Fraternity Polyandry. It is found among Khasa, Toda. There need not be any class relationships between husbands and wife goes to spend some time with each husband. As long as woman live with one of her husbands , others doesn't have any claim on her. Polyandry is found to lead to fewer children to every woman and high incidence of sterility among women. But we are not yet certain of biological reasons. Among Khasa, there is a double standard of mortality.

Hypergamy:-

To prevent a woman from loosing casting & becoming ritually impure, manu & Ancient law givers prescribed Hypergamous(Anuloma) Marriage. Under which a man can marry from his own caste or from those below, But woman can marry from her own caste or above.

Hypogamy:- It is also called as pratiloma. Marriage of woman to a low caste is not permitted. Social consequences of such a practice have been borne out by historical facts. Brahmin girls had to choose between polygyny & spinsterhood. Among the Sudra's, Males have a consequences of

Hypergamy, either to pay a high bride price or to choose between polyandry & bachelorhood. This has often led to marriage by capture among lower castes.

Group Marriage:- Group Marriage is a type of marriage in which sets of males and sets of females share equal rights over each other.

Eg:- Marquesans of Polynesia.s

Marriage stability

1. A marriage ends when a divorce takes place. Divorce is a situation wherein husband and wife separates and gives up vows of marriage
2. Divorce in different societies is viewed differently. In traditional hindu society marriage is a sacrament and therefore divorce is a sin. But in most simple societies and western nations marriage is only a contract and divorce is much easier
3. There has been an increase in divorce rates in many parts of industrialised world. Major reasons for this are
 - a. Rise in individualism due to modernisation
 - b. Religious tolerance to divorce
 - c. Legal tolerance to divorce
 - d. Reduced social control
- e. Increasing heterogeneity in population leading to greater socio cultural incompatibility between spouses
4. Divorce among simple society is much more frequent and easier. Ex-among jad Bhotias , marriage can be dissolved by breaking a threat in front of village panchayat
5. However in societies where marriage payments are substantial or where women as an important economic asset, getting divorce is difficult

LIVE-IN RELATIONSHIP

Live-in relationship, also known as cohabitation is a consensual arrangement where in a couple lives together without entering a formal marriage. It need not necessarily involve sexual relations. It may be equivalent to Social Monogamy. Happy movie

6) Reasons for live-in

- to test compatibility before marriage
- do not want the hassles of a formal marriage
- see no benefit in the institution of marriage

- not in a position to legally marry
- 3) Elderly persons who have lost a partner or got divorced are increasingly preferring live-in relationship.
In some countries like UK & US, there is a provision for live-in partners to get themselves registered as domestic partners, but this does not make formal divorce necessary.

Indian Scenario

- 8) - Live-in relationship is not illegal but considered socially and morally improper.
 - Legally, it is permissible only in unmarried major persons of opposite sex.
- 9) - If a live-in relationship is continued for a long time there is a presumption of marriage, and all the laws regarding domestic violence, legitimacy of children, maintenance rights, inheritance rights are applicable.

Kinship terminology, topology

1. L.H morgan was the first to study kinship terminology. In his " consanguinity and affinity in primitive societies" he defines it as naming the kins.

2. G.P. murdoch classified it into classificatory and descriptive. In classificatory no. Of different kins are grouped together and called by same kinship terms. In descriptive the kinship term reflects the relation an individual as with his kin.

3. murdoch extensively studied kinship systems of :

4. eskimo - rare system used by anglo Indians and food foraging people of central America. It emphasizes importance to nuclear family given by individual specific terms.

5. Hawaiian - system is least complex. Usage of small no. Of terms. they practice bilocal residence.

6. sudanese - most descriptive system

Terms are associated with specific duties and responsibilities attributed to individual.

7. omaha - complex one followed in matrilineal society. Mother and her sisters , father and his brothers referred to by same name.

8. crow indian - mirror image of omaha. Individuals in mothers matrilineal group are not lumped whereas father's matrilineal group are.

9. Iroquois - similar to omaha and crow indians with regard to parental generation but not in regard to our own generation.

10. thus kinship terminology indicates relative importance or unimportance given to kins. It reflects kind of family , rules of descent , residence .

- Law is tool to serve justice.
- Justice is a concept that stands for everything fair & legal.
- Justice has moral backing.
- Law has legal backing.

Laws and justice in primitive society

Law is a cultural, universal & social norm. If it is violated, society takes appropriate steps to take action against the violator.

According to Radcliffe Brown, "law is social control through which systematic application of force of politically organized society". In simpler terms, Law is specific ways of enforcing rules. In his view, simple societies have no laws, although all have customs which are supported by sanctions.

Malinowski argues that rules of law are distinguished from rules of custom, that "they are regarded as the obligations of one person & the rightful claim of one person not by psychological motive but by definite social machinery of binding force based upon mutual dependence".

According to Gluckman primitive societies have rule of law but not legal rules and calls such societies as legal. Brown calls legal as Jeiral, meaning law in the sense of something enacted. Whether it is advanced society with "legal rules" or a primitive society with "rule of law", it does not matter. But rules of all societies are same. They safeguard life & limb, rights of Property. So justice means giving people their right rather than enforcing laws.

Primitive Laws:

Laws in the primitive societies are unwritten laws. There is neither any court nor any codified body of laws. They vary from society to society. Every society has its own specified customs and conventions, which comply with the norms of the respective society.

Sources of Primitive Laws:-

1) Customs:- Like the civilized societies, Primitive societies also have laws to regulate the individual and social life. Social custom is the most important source of law. Laws in primitive societies have their origin in social custom. The people who adopted useful behaviour of social life are good people and those people who do opposite are considered as bad people. This helps people to adopt those behaviours, and later on takes place the social custom. Thus social customs are handed over from generation to generation and tradition goes on forming. When a social custom is approved and if it breaches consider as a punishment, then custom becomes a social law.

2) Social Organization:- All primitive societies have an organization, which is headed by chief or leader to regulate the individuals. Sufficient power is provided to leader, but he shouldn't do anything against the interests of tribe as a whole. In some cases, decision of leader is considered as a law and all members has to abide by the decision.

3) Public opinion:- It is very important in primitive societies and if any one violates the public opinion, he/she has been subjected to punishment. Thus public opinion has a control on members of primitive societies in the form of a law.

4) Religion:- The compliance of rules and regulation connected with the names of deity as a compulsory and no one dares to violate.

5) Panchayats:- Some primitive societies have Panchayats, to regulate the individuals and also to settle the disputes among them. The decision of Panchayat is regarded as a law.

Characteristics of primitive law:-

- 1) Primitive law is considered in terms of kinship rather than territorial terms.
- 2) In primitive societies, public opinion is more useful. Public opinion in the primitive societies originate from the moral and ethical notions of the concerned.
- 3) Fails to discriminate between private and public wrongs as in the modern tents of justice.
- 4) Primitive law is predominantly a criminal law. The scope of civil law is limited.

- 5) Everybody in primitive society is a representative
- 6) Sin and supernatural punishment is associated with the primitive law.
- 7) Intention is not recognized in primitive law.
- 8) The main characteristic of Primitive law is the kinship tie and the collective responsibility of kin.
- 9) Primitive law is not associated with legislative, executive and judiciary.

Nature of Primitive Law-

- 1) Kinship bond is the basis for primitive law and which unites different members of society.
- 2) Most of the problems in primitive societies are solved through Public opinion. Since it is a small society, collecting the opinion of all members is easy and also is generally a correct judgement.
- 3) It is a common belief in the primitive societies is that, if crimes are not punished by society some supernatural power will punish the society. So, they keep watch on the crimes and when detected they are subjected to punishment.
- 4) In Primitive society more attention is paid to the misbehaviour than intention.
- 5) There is collective responsibility behind primitive law because it rests on the principle of kinship bond.

Justice in Primitive Societies:

Justice in primitive society is very simple here face to face relations generally followed due to the fear of public opinion. Since a primitive society is generally a little community, social mockery is the biggest punishment. Primitive societies establishes guilt on the basis of evidence. In this context it resorts to supernatural devices like Divination, conditional, ordeal, oath.

Divination:- It is the process of evoking knowledge of some secret by manipulative techniques. Like, the Azande of Africa fed poison to chechin, declaring repeatedly " If this change be true, let the chechin die or if it is lie, spare to live"

Conditional: Conditional cense enters a judicial procedure among almost all people. It is assertion that always implies the sentence " If what i say is not true, then supernatural may destroy me".

Oath-: Oath is a formal declaration that testimony given is true. The offender has to take an oath and has to tell whether he has committed offence or not, If he tells lies some supernatural power will punish. This is the belief of Primitive societies. It may or may not sanction a supernatural power against falsehood. It is accompanied by ritual act.

Ordeal: Sometimes the persons accused are put to torture in primitive societies before the declaration of judgement in criminal cases. If he set free of injury he is believed to be non-guilty.

Punishments : Punishments are in several forms. Punishment is normally eye for eye, murder for murder (eg-Nuer)s. There are no prison institution in primitive societies, there are provision of mutilation which resulted in death of culprit. Capital punishment is given in case of homicide, but sometimes death punishment is given to one of his family members. Punishments are not same for the same crime. The same crime may be differently punished according to who have been wronged. Imposing of fine is common among the primitive societies. They are paid in a way of compensation to the aggrieved party. Compensation is in the form of animals, material goods etc. The custom of pay compensation is wergild.

Meaning, scope and relevance of economic anthropology

1. Definition
- a. It is a comparative cross cultural study of economic systems

- b. It involves study of economic systems in socio cultural context
- 2. It uses ethnographic methods of study which involves in depth holistic study of a society. This approach to study of economy sets economic anthropology apart from economy

3. **Scope**

- a. Describe various economic arrangements in different times and places
- b. Understand socio cultural context in which systems of production , distribution and exchange operate. Ex- Kula ring
- c. Study economic aspects of social relationship
- d. Study both primitive and modern societies (Economics study on modern societies).

4. **Relevance**

- a. Helps understand relation between culture and economy
- b. Helps understand decision making process in primitive societies
- c. Economic anthropology is more important today to analyse impact of new phenomenon like transnational capitalism, globalization on indigenous people

Uncentred - Band, Tribe

EVOLUTION OF POLITICAL SYSTEMS

- Centralised - Chiefdom, State

1. Band Organization: *least complicated*.

- i. Societies composed of fairly small and usually nomadic groups of people that are politically autonomous.
- ii. In Band organization, the local group or community is the largest group that acts as a political unit. All adults take decisions by consensus, wrong doers are judged by public opinion.
- iii. Bands are typically small, with less than 100 people. Each small band occupies a large territory so population density is low.
- iv. Political decision making within the band is usually informal i.e. the formal, permanent office of leader does not exist. Decisions are taken by the community as a whole or made by the best-qualified member.
- v. An informal headman may be a proficient hunter, or a person most accomplished in rituals. Leadership stems not from power but from influence, not from office but from admired personal qualities.
- vi. Egalitarian.
- vii. Usually hunter-gatherers.

Ex: Eskimos - political structure - Shaman
- Headman

2. Tribal Organization:

- i. When local communities mostly act autonomously but there are kinship groups (such as clans or lineages) or associations (such as age-sets) that can potentially integrate several local groups into a larger unit i.e. Tribe,

- ii. All the communities in a tribe may be linked only occasionally for some political/military purpose.
- iii. Multilocal but not society wide integration. It is not permanent - integration comes into play only when outsider threat arises; when the threat disappears, the communities revert to self-sufficiency. It is informal - not headed by political officials.
- iv. Societies with tribal organization are generally food producers.
- v. Population density is higher, local groups are larger and the way of life is more sedentary than in bands.
- vi. Largely Egalitarian.

- Lampola Chiefdom
- 3. Chiefdom Organization - Made up of parts that are structurally/functionally different -
 - i. Is a formal structure that integrates more than one community into a political unit.
 - ii. The formal structure could consist of a council with or without a chief, but most commonly there is a chief. It has centralised leadership (sometimes hereditary).
 - iii. Most societies at the chiefdom level of Organization contain more than one multicomunity political unit or chiefdom, each headed by a district chief or a council.
 - iv. Densely populated. Communities are more permanent because of their greater economic productivity. exists in ranked societies (Chiefdom of Lampola, Africa)
 - v. The position of chief, which is sometimes hereditary and permanent, bestows high status on the holder. Have social ranking and accord the chief and his family greater prestige.
 - vi. The chief may redistribute goods, plan and direct the use of public labor, supervise religious ceremonies and direct military activities, prevents outbreak of violence b/w segments.

4. State Organization:

- i. An autonomous political unit, encompassing many communities within its territory and having a centralized government.
- ii. States include a wide range of permanent institutions with legislative, executive and judiciary functions and a large bureaucracy.
- iii. Both internally and externally, legitimacy is the central basis for power.
- iv. Government tries to maintain a monopoly on the use of physical force through formal and specialized instruments of social control - police, militia, standing army.
- v. Emergence of cities, high degree of economic and other kinds of specialization, and market or commercial exchange.
- vi. High level of social stratification.

ANTHROPOLOGICAL APPROACHES TO STUDY RELIGION

• Evolutionary Approaches

- Early anthropologists used the data from the studies of primitive societies to speculate about the genesis and functions of religion.
- Evolutionists believed that religion is a problem solving phenomenon.
- John Lubbock made an early attempt to combine archaeological evidence of prehistoric people and anthropological evidence of primitive people. He outlined an evolutionary scheme, Atheism > Fetishism > Nature Worship > Totemism > Shamanism > Anthropomorphism > Monotheism > Ethical Monotheism.

- E B Tylor in his book Primitive Culture, proposed that Animism is the earliest and most basic religious form, and from that evolved Fetishism > Belief in demons > Polytheism > Monotheism.
- Herbert Spencer also considered a system similar to Tylor, but felt that Ancestor Worship preceded Animism.
- James Frazer in his book The Golden Bough, believes that religion is the result of evolution from the magic stage of human culture.

- Psychological Approach

- Religion is a profound emotional response to various aspects of life and various emotive factors were given to explain the basis of religion.
- Wilhelm Wundt considered religion as a projection of fear into the environment.
- William James viewed that religion has a strong emotional base, but not associated with any particular emotion.

- Functional Approach

- It explains the functional significance of religion, and the role it plays in the life of an individual and the society.
- Malinowski considers religion as a device to secure mental and psychological stability in an individual's life.
- Radcliffe Brown felt that religion is to assure a social solidarity and homogeneity.
- According to Emile Durkheim, religion forms a media through which a society understands the universe, and also people seek justification of the existing social order through religion.

SACRED AND PROFANE

- It was proposed as the central characteristic of religion by Emile Durkheim in his book, 'The Elementary Forms of Religious Life', and said that it has a universal validity.
- The sacred includes everything that is regarded as extraordinary and associated with sentiments of awe, respect, mystery, and reverence by the believers.
- Sacred things may include objects, living organisms, elements of nature, places, holy days, ceremonies and other activities like pilgrimages.
- The profane is everything that is not considered sacred, and includes all the mundane things and activities.

<u>Anima</u> <u>tribe</u> <u>Animals</u>	<u>Sacred</u>	<u>Profane</u>
	Xtraordinary sentiments, respect reverence	- NOT sacred - mundane activities
<u>Criticism:</u> European tribes - Not universal - Buddhism, no deities	- Objects, pilgrimages everything - Isolated, not mixed - Non-utilitarian, nonempirical, ambiguous, strength giving Result of conscience of society	208

- Sacred entities are kept apart isolated, and are never to be intermingled with the profane.
- Durkheim described the characteristics of the sacred as non-utilitarian, non-empirical, ambiguous, strength giving, and does not involve knowledge but involves power.
- Sacredness is not intrinsic to the object, but is a result of the collective conscience of the society.
- He further examined this concept based on his study of totemism in the Arunta tribe of Central Australia.
- Many anthropologists criticized that it was a product of European religious thought rather than a universally applicable criterion. Some eastern religions like Buddhism disapprove any dualism, even between sacred and profane.

Origin of languages in human society

ORIGIN OF LANGUAGES

There are two main hypothesis concerning the origin of language:

1. Divine Creation Hypothesis

- i. Many societies throughout history believed that language is the gift of the gods to humans. This belief predicates that humans were created from the start with an innate capacity to use language.
- ii. It is impossible to prove that the first anatomically modern humans possessed creative language. It is also impossible to disprove the hypothesis that primitive languages might have existed at some point in the distant past of the Homo sapiens development.

2. Natural Evolution Hypothesis

- i. According to this, at some point in their evolutionary development, humans acquired a more sophisticated brain which made language invention and learning possible.
- ii. The simple vocalizations and gestures inherited from our primate ancestors then gave way to a creative system of language.

There are several hypotheses as to how language might have been consciously invented by humans, which are divided into two sets:-

I. The IMITATION HYPOTHESES - believe that language began through some sort of human mimicry of natural occurring sounds or movements. Some of them are:

- a. The DING-DONG HYPOTHESIS - says that language began when humans started naming objects, actions and phenomena after a recognizable sound associated with it in real life. eg. boom for explosions, crash for thunder. *E.B.Taylor*
- b. The POOH-POOH HYPOTHESIS - holds that the first words came from involuntary exclamations of dislike, hunger, pain or pleasure, eventually leading to the expression of more developed ideas and emotions. eg. ha-ha-ha, wa-wa-wa (*Electra, Feeding - Hawes*) .
- c. The BOW-BOW HYPOTHESIS - holds that vocabulary developed from the imitations of animal noises such as Moo, hiss, meow, quack-quack etc. *Jacques Rousseau & Darwin wrote*
- d. TA-TA HYPOTHESIS - speech may have developed from gestures that began to be imitated by the organs of speech i.e. the first words were lip icons of hand gestures

Functional

- II. The NECESSITY HYPOTHESES - believe that language began as a response to some acute necessity in the community. Some of them are:
- a. WARNING HYPOTHESIS - Language may have evolved from warning signals such as those used by animals. Such as look out, run, help etc to alert members of the tribe when some beast was approaching.
 - b. YO-HE-HO HYPOTHESIS - Language developed on the basis of human cooperative efforts. The earliest language was chanting to simulate collective effort like moving great stones to block off cave entrances, repeating warlike phrases to inflame the fighting spirit etc.
 - c. THE LYING HYPOTHESIS - Since all real intentions or emotions get involuntarily expressed by gesture, look or sound, voluntary communication must have been invented for the purpose of lying or deceiving.

Social Context Of Language Use:-

- 1) Language is much more than external expression & communication of internal thoughts formulated independently of their verbalization. Society & Language are mutually indispensable.
Language can be develop in a social setting & human society can be maintained only among people speaking & understanding a common language. Every individual language is acquired by man a members of society & along with other aspects of society's culture in which he is bought up.
 - 2) If language is transmitted as part of culture, culture as a whole is transmitted through language.
 - 3) Social Linguistics is the study of the effect of all aspects of society, including cultural norms, expectations & context, on the way language is used. As the usage of language varies from place to places and also varies among social classes & it is these sociolects that sociolinguistic studies.
- 4) Some fundamental concept of Sociolinguistics are explained here- :
- a) Speech Community - : It describes more or less discrete groups of people who use language in unique & mutually accepted way among themselves. The members can be of Profession, students, Family friends & friends. The members will often develop jargon to serve the groups special purposes & priorities.
 - b) Prestige-: It is crucial for Socio-Linguistic analysis, certain speech habits are assigned positive(or) negative & these are automatically assigned to the speaker. It can be realized on individual sound or phenomenon level on pronunciation. On a macro scale, prestige values extend to Language choice.
 - c) Social Networks-: Understanding language in society means one also has to understand the social networks. A social network is another way of describing a particular community in terms of relations between individual members in a community. A network could be tight or loose depending on how members interact with each other. The loosens/tightness of a social network may affect speech patterns adopted by a speaker. A social network may apply to a macro- level of a country or city, inter-personnel level of neighbourhood or a single family.
 - d) Class Differences-: Class & occupation are among the most important linguistic markers found in society. Class & Language variety are related. Members of working class tends to speak less standard language, while the lower, middle & upper class will in turn speak closer to the standard language. The upper class, even members of upper middle class may often speak less standard language than middle class. This is because not only class, Class aspiration must be important.
 - e) Class Aspirations-: William Labov in 1960's, Social aspirations influence speech patterns. This is true for class aspirations with certain class also. In process of wishing to be associated with certain

1872 - Darwin - expression of emotions in Man & Animals

AIR#574

i) Facial expressions (huge proportion)

↳ smile or frown.

happy, sadness, anger, fear same throughout

ii) Gestures

- Deliberate movements & signals -

waving, pointing
indicators, finger
~~body parts~~

class (upper class & Upper middle class) people moving in that direction socioeconomically will adjust their speech patterns to adjust like them, they often hypercorrect, which involves overcorrecting their speech to the point of introducing new errors.

f) Social Language codes- : Bernstein in his book " Elaborated & restricted codes their social origins & some consequences", which he used to classify the various patterns for different social issues.

ü Restricted Code-: It is an example of speech code used by working class. He stated that this type of code allows strong bonds between group members, who tend to behave largely on the basis of distinctions such as male, female, older & younger. The usage of language in away which brings unity between people & members often do not explicit about meaning, as they share knowledge & common understanding often bring them together. The difference with the restricted code is they emphasis on "we" as a social group than "I".

ü Elaborated Code-: Middle & Upper class use this language to gain access to education & career advancement. Bonds within this social group are not as well defined & people achieve their social identity largely on the basis of individual disposition & temperament. It emphasis more on "I" with this social group rather than working class.

Kinesics - Interpretation of body language as expressions &

Cultural Materialism :-

Leslie white approach of Cultural Materialism is primarily a mechanism of harnessing energy & of putting it to work in service of man. Culture is also a mechanism of challenging & regulating human behavior. Social systems are determined by the technological terms.

White approach to cultural materialism is given as follows

1. Cultural system can be divided into 3 sub systems-:

- a) Technology constitutes most basic system, which includes tools, weapons, knowledge of use. This is a means for capturing & utilizing energy.
- b) Social structural includes kinship, marriage, family etc.
- c) Ideological includes morals & beliefs.

All 3 subsystems influence each other mutually. Technology sub system influences other two. Hence, Social & ideological are influenced by technology.

2. Culture is a system in itself & depends upon man for its survival

3. Fundamental function of culture is capturing & utilizing free energy.

4. Amount of energy captured and utilized is determined by the technological sub systems. The more efficient the technology, more is the energy utilized and captured, which leads to the development of culture as a whole. This is expressed by White as the " Law of Cultural Development" which states, "Cultural advances as the amount of energy harnessed per capita per year increases so as the efficiency of the economy of the means of controlling energy is increased or both".

The law is expressed by the formula $C = E^* T$, where E is the energy, T is technology and C is cultural development.

Criticism:-

1) Para-linguistics

Report to vocal communication.

Tone of voice, loudness, pitch.

Change refers to meaning
change of sentence

2) Body language &

Posture.

- arm crossing,
leg crossing
attitudes.

3) Proxemics

Study of spatial
distances b/w individuals

4) Eye gaze

hostility, interest, attraction

5) Haptics

Communication

6) Appearance

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Cultural materialism has been termed "vulgar materialism" by Marxists such as J. Friedman because opponents believe that the cultural materialists empirical approach to culture change is too simple and straightforward (Friedman 1974).

Marxists believe that cultural materialists rely too heavily on the one-directional infrastructure-superstructure relationship to explain culture change, and that the relationship between the "base" (a distinct level of a sociocultural system, underlying the structure, in Marxist terminology) and the superstructure must be dialectically viewed (Friedman 1974). They argue that a cultural materialist approach can disregard the superstructure to such an extent that the effect of superstructure on shaping structural elements can be overlooked.

Symbolic and interpretive theories

1. Symbolic anthropology studies the way people understand their surroundings, as well as the actions and utterances of the other members of their society. interpretations form a shared cultural system of meaning
2. Symbolic anthropology studies symbols and the processes, such as myth and ritual, by which humans assign meanings to these symbols to address fundamental questions about human social life
3. Turner states that symbols initiate social action. According to Clifford Geertz, man is in need of symbolic "sources of illumination" to orient himself with respect to the system of meaning that is any particular culture
4. Geertz's position illustrates the **interpretive approach** to symbolic anthropology, while Turner's illustrates the **symbolic approach**.
5. Symbolic anthropology views culture as an independent system of meaning deciphered by interpreting key symbols and rituals
6. two major premises
 - o beliefs, however unintelligible, become comprehensible when understood as part of a cultural system of meaning
 - o second major premise is that actions are guided by interpretation
7. Traditionally, symbolic anthropology has focused on religion, cosmology, ritual activity, and expressive customs such as mythology and the performing arts
8. They study role of symbols in the everyday life of a group of people
9. Turner was much more interested in investigating whether symbols actually functioned within the social process
10. Geertz focused much more on the ways in which symbols operate within culture, like how individuals "see, feel, and think about the world"

- He believed that an analysis of culture should "not [be] an experimental science in search of law but an interpretive one in search of meaning"
- defined culture as "an historically transmitted pattern of meanings embodied in symbols"
- symbols are "vehicles of 'culture'"
- symbols should not be studied in and of themselves, but for what they can reveal about culture
- Geertz characterized culture as a social phenomenon and a shared system of intersubjective symbols and meanings

11. Victor Witter Turner

- Turner was not interested in symbols as vehicles of "culture" as Geertz was but instead investigated symbols as "operators in the social process"
- Turner felt that these "operators," by their arrangement and context, produce "social transformations" which tie the people in a society to the society's norms, resolve conflict, and aid in changing the status of the actors

12. Schneider defined culture as a system of symbols and meanings

- Schneider was interested in the connections between the cultural symbols and observable events
- He defined a cultural system as "a series of symbols" where a symbol is "something which stands for something else"

13. Criticisms:

- Marxists charge that symbolic anthropology, while describing social conduct and symbolic systems, does not attempt to explain these systems, instead focusing too much on the individual symbols themselves
- symbolic anthropology did not attempt to carry out their research in a manner so that other researchers could reproduce their results.

↳ study of human cognition in cultural / cross cultural aspects .

Cognitive anthropology

1. Cognitive anthropology addresses the ways in which people ~~communicate~~ and think about events and objects in the world.
2. provides a link between human thought processes and the physical and ideational aspects of culture .
3. culture is composed of logical rules that are based on ideas that can be accessed in the mind
4. every culture embodies its own unique organizational system for understanding things

Tyler

1. Culture is cognitive organisation of material phenomenon like events, behaviour and emotions
- 2) Cognition is investigated both as content & process ,
- 3) Approach in Cultural Anthro in which scholars seek to explain patterns of
 - ↳ shared knowledge
 - ↳ Cultural innovation
 - ↳ Transmission
- } overtime & space using methods & theories of
 - ↳ cognitive sciences .

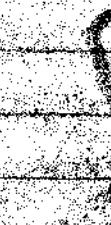
2. Culture can be grasped only in non-empirical terms. Real culture exists in mind of culture bearers.
3. Cognitive Anthropologists believe that the world itself is chaotic and humans understand it through classification.
4. each culture has its own system of classification
 - a. For example, although the Americans distinguish between dew, fog, ice and snow, the Koyas of India do not. They call all these forms mancu and do not think the differences among them are significant. *mancu*
 - b. On the other hand, the Koyas distinguish seven different kinds of bamboo by giving them different names while the Americans call all of them simply bamboo.
5. This shows that people in different cultures may perceive the same phenomenon differently because of their own cultural system
6. It is an approach that stresses how people make sense of reality according to their own indigenous cognitive categories[Emic approach], not those of the anthropologist[Etic]
7. Culture isn't unitary phenomenon as they cant be described one set of organisational principles.. Each member has unique model of culture
8. He favoured ethnosemantic approach for studying people's views on their culture

Conklin

1. Studied hanunoo community in phillipines
2. Culture is a system of knowledge that shows how people organise their experience conceptually so that I can transmit person to person and generation to generation
3. People in society construct their world in terms of their culture. With help of culture people segregate what is significant and insignificant, anticipate events, take a course of action
4. Conklin demonstrates that Hanunoo color terms do not segment the color spectrum in the same manner as western color terms, and in fact incorporate additional sensory information, such as wetness and dryness.
5. Each culture has an unique set of concepts , categories and rules. However there is also underlying commonality
6. Culture as a cognitive system can be understood by examining interrelationship between language and culture.
 - a. Just as language is conceptual code underlying speech, culture is conceptual code for social behaviour
 - b. Linguistic variability is a guide to study cultural variability

Criticism

1. It has been criticised as an abstract theory
2. There is Lack of consensus on how to study culture in mind



Provides info about

- 1) Mendelian principles of segregation
- 2) Independent assortment
- 3) Info on allelism & linkage

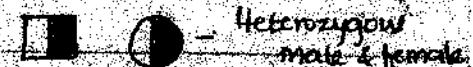
Types of Pedigree (depends on nature of gene causing character).

A gene can be:

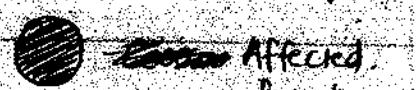
- 1) Autosomal dominant
- 2) Autosomal recessive
- 3) Sex chromosomal dominant
- 4) Recessive
- 5) Holandric
- 6) Mitochondrial



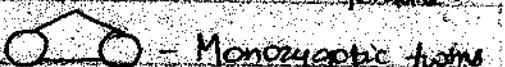
Consanguineous



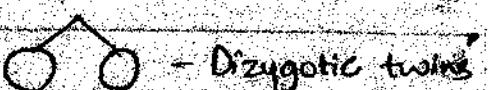
Heterozygous male & female



Affected female



Monzygotic twins



Dizygotic twins

POST MODERNISM

- There is no true objectivity
- So authentic implementation of scientific method is possible.
- Culture can't be completely described - because observer is part of culture
- All interpretations of culture & history are valid.
- Field work is uninteresting.
- Key Authors are Michael Foucault, Vincent Crapanzano, Renato Rosaldo

Accomplishments :- Heightening sensitivity of collection of data.
Made artists aware of their unconscious assumptions.
- Emphasised on how knowledge is generated & interpreted.
- Polyvalency.

Criticism: Questioning f.w. is unacceptable.

Ongoing debate whether Artsy should rely on Scientific/humanistic approach

9.1 HUMAN GENETICS

H.G. is Study of inheritance as it occurs in human beings.
Genes can be common factor of qualities of most human inherited traits.

To study it, previously various hindrances like

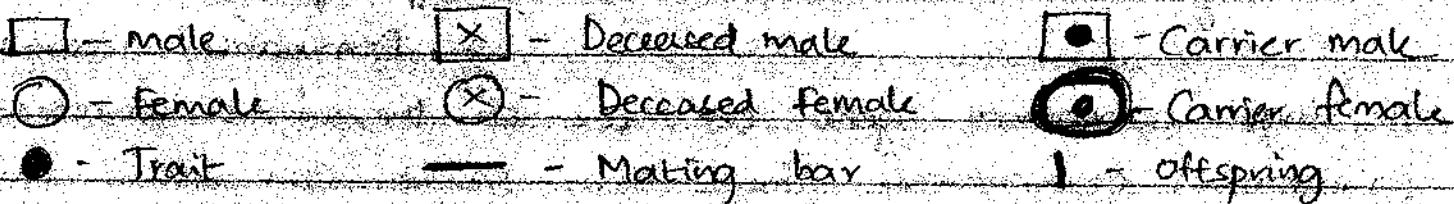
- 1) Social hindrance
- 2) No. of offspring in each marriage is very small
- 3) Life span of man long
- 4) Majority humans are heterozygous.

Recent years, advent of newer techniques helped understanding mechanism of inheritance of number of characteristic of man.

PEDIGREE ANALYSIS (Suggested by Galton)

Since we want go forward, we go backward & draw a tree-like Pedigree Chart (showing characters of previous family members).

Pedigree chart is a diagram that shows the occurrence & appearance or phenotypes (observable characteristics) of particular gene or organism & its ancestors from one generation to the next.



Pedigree used to:

- To help detect many different genetic diseases
- to help determine the chances for a parent to produce an offspring with a specific trait (produce healthy children)

(index case)

Proband: ie first affected family member who seeks medical attention for a genetic disorder.

If male = Propositus.

Female = Proposita.

Penetrance - % expressed frequency with which CHITINASE AIR#574 of given genotype some degree of specific mutant phenotype associated with it.

Four different kinds of traits can be identified by pedigree analysis -

Autosomal	Dominant
Recessive	
	SEX-linked dominant
	SEX-linked recessive

What is Dominance?

It is relationship b/w alleles of one gene, in which one allele is expressed over a second allele at same locus.

- first allele is dominant, Second allele is recessive.

Where a gene exists in two allelic versions, three combinations of alleles (Genotype) are possible - AA, Aa, aa
- AA, aa are homozygotes - show different phenotype
Aa - Heterozygous - shows same phenotype as AA
so A is dominant, a is recessive.

Autosomal Dominance:

One way of trait or disorder can be passed down through families, if you inherit the abnormal gene from only one parent, you can get the disease.

Inheriting a disease depends on → Type of Chromosome affected

→ Dominant / recessive

A single abnormal gene (one of the first 22 non sex (Autosomal) chromosomes from one parent can cause an autosomal disorder.

A parent with an autosomal dominant condi. has 50% chance of having a child with that condition (for each pregnancy). Each child's risk for the disease doesn't depend on whether their sibling has disease.

- Children who don't inherit the abnormal gene will not develop or pass on disease.

Parents - AB (Autosomal gene)
AA (Mother)
Father - AA

50:50

AA AA RA RA

~~A~~ Characters of Autosomal Dominant diseases

- 1) No skipping of generations (trait expressed if present - 'D')
- 2) Every affected individual has an affected parent.
- 3) If one generation doesn't express - then doesn't reappear in future generations - Trait is lost.
- 4) Male & females equally affected - so ↓
- 5) Equal proportion of normal & affected children.
- 6) Transmission among all sex is observed.

Diseases:- Huntington's disease

Achondroplasia -

Brachydactyly

Porphyria -

Polydactyly .

How to differentiate with Sex(X) linked diseases.

- 1) If affected male present passes trait to Son - Autosomal dominant
- 2) If not manifested in Son (or sonography \bar{X}) - then Sexlinked gene.
- 3) If equal abnormal daughters & affected daughters - definitely not Sex linked
- 4) If gene is Sexlinked - then would have passed to all daughters
- 5) If Sexlinked recessive - not expressed in any daughter ..

Autosomal Recessive — Requires double dose (homozygous state).

Two copies of an abnormal gene must be present in order for disease / trait to develop.

In gene, one from father & mother. Recessive inheritance means both genes in a pair must be abnormal. People with only one defective gene is a carrier. Couples without disease & but carrier (recessive generally) in each pregnancy:

- i) 25% chance child normal
- ii) 50% carrier
- iii) 25% Abnormal

Aa	Aa
Parents:	Father Mother
	(Carriers)

AA	Aa	Aa	aa
normal	Carrier	carrier	abnormal

Features determining mode of inheritance:

- Both male & female have an equal chance of getting disease.
- Trait seen in same generation - Brothers & Sisters (Siblings)
- Not seen in parents or offsprings
- Parents of proband may be closely related (consanguineous)
- If one parent is ^(Aa) carrier & another affected, then 50% of children will be affected & rest will be ^(aa) carriers (Heterozygous) (Homozygous) — (Pseudo-dominant inheritance)
- If both parents affected - all children affected
- If one parent carrier, another normal - 50% normal, 50% carriers
- If one parent affected, another parent normal - All children carriers

Ex: [Sickle cell Anemia]

Phenylketonuria

Alkaptonuria

Albinism

Schizophrenia

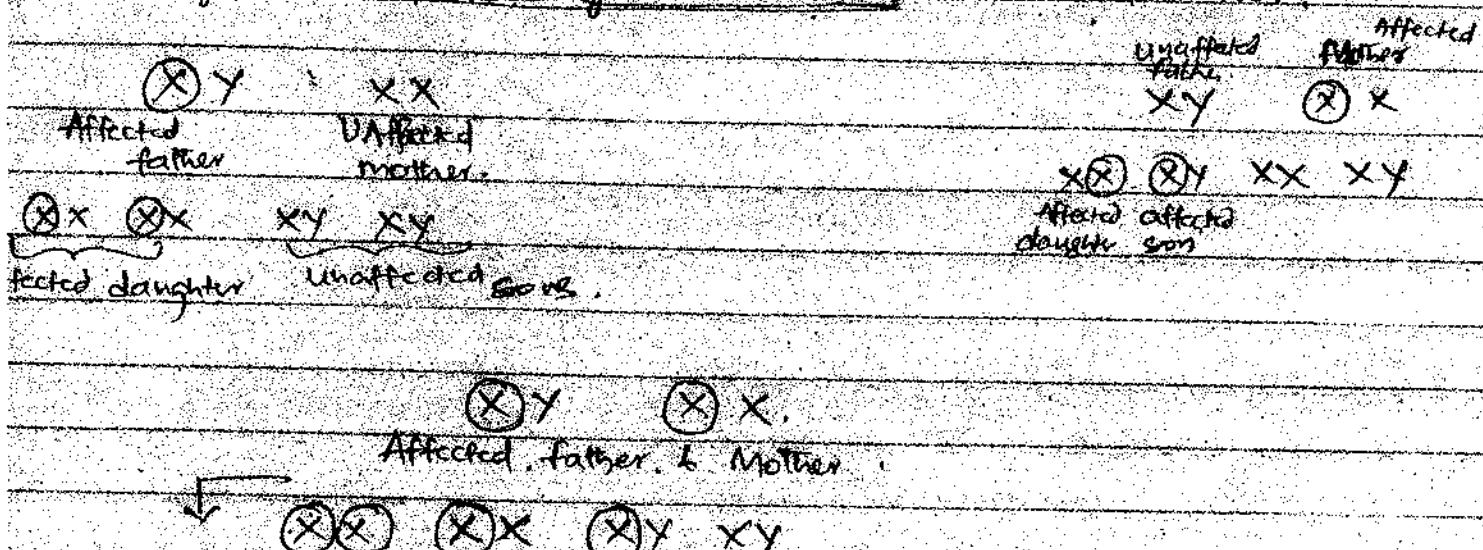
Cystic fibrosis

SEX-LINKED INHERITANCE - due to genes located on X and Y chromosomes - X linked AIR#574 527

X-linked Dominance

- Genes responsible for trait/disorder is on X chromosome and only one copy of allele is sufficient to cause disorder when inherited from parent who has disorder.
- females - XX, (two copies of X).
- Males - XY

Males are hemizygous for X chromosome, having only one copy. As a result, X-linked dominant disorders show higher expressivity in males than females.



25% daughters have disorder - since daughters receive father's X-chromosome

0% Son's has chance of getting trait/disorder.

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TWIN METHOD (Francis Galton laid foundations)

Two types of twins:

- 1) Monozygotic - Origin from single zygote - genetically identical
Same sex - identical twins (undergo mitotic cleavage)
same sex
same blood group
looks same
- 2) Dizygotic - Two sperms x Two eggs - Fraternal twins
(may not have same sex, blood group, features)

Monozygotes are completely homozygotic if any change in phenotype is b/c of envt., thus we can evaluate the role of heredity & envt on twins; envt on one.

CONCORDANCE: If both possess the character or are free from it, the pair is CONCORDANT (Phenotypically Similar).

If only one possesses the trait - DISCORDANT (Phenotypically dissimilar).

ACE model - Additive Genetics, Common Environment, Unique Environment.

for Monozygotic - Correlation $\rightarrow r_{MZ} = A+C$ (both 100%)

for Dizygotic = $\frac{1}{2} A+C$ (Only 50% genetic share (A))

Diagnosis of Zygosity is of three types:

- 1) Placental method: Based on layers surrounding zygote
- 2) Similarity method: Tissue antibodies, Comparison of physical traits
- 3) DNA fingerprinting: Mono- has same, Dizygotic differs

HERITABILITY ESTIMATES

Phenotypic Variations universal phenomena, three reasons:

- i) Genetic
- ii) Environmental
- iii) Interaction b/w Genetics & Envrt.

Heritability - Proportion of phenotypic variation in any population that can be attributed to genetic factors.

Two types of estimations for heritability of a particular trait are used by geneticists.

i) Variance between MZ & DZ twins

Based on comparison of twins for degree of concordance & discordance.

Ex: Polio has high concordance among MZ twins, less in DZ, thus polio has high genetic susceptibility.

$$V_{DZ} - V_{MZ}$$

$$V_{DZ}$$

If a character has strong environmental influence, V_{DZ} value would be high & as high as V_{MZ} . So Correlation Coeff would be zero.

If a character with strong genetic tendency, V_{DZ} value would be low, compared to V_{MZ} . So Coeff would be value 1 (approx).

By values of genetic & envt Components, heritability calculated:

$$H^2 = \frac{V_A}{V_T} \quad (V_T = V_G + V_E)$$

G - Genotypic variance
E - Env var

V_T = Total variance

ii) Variance b/w MZ twins shared apart

MZ twins are genetically similar, so variations are due to environment.

$$\frac{V_A - V_T}{V_A} \quad (V_A - variation apart
V_T - variations together)$$

Strong environment influence - coeff would be 1.
as V_A would be large.

Strong genetic influence, V_A would be small

CO-TWIN METHOD - The identical twin along with co-twin and fraternal twin - are investigated & compared.

- Used to understand abnormal behaviour.

FOSTER CHILD - Complimentary to twin studies [on nurture].

- Natural aspects / mental traits.

- Two group children -
| Good homes
| Poor homes

- Intelligence checked + environmental effect or genetic effect,
[four requirements] (Delorme):

- 1) No selective placement (random)
- 2) Placed in adoptive home unaffected by out of orig. home
- 3) Adequate sample from various social levels.
- 4) Sample should be from one population (to avoid ethnic issues)

b/2

CYTogenetic

Study of Chromosomes & related disease * States Caused by Abnormal Chromosome number / structure.

- Basic method is,
- * Sample login & initial setup
- * Tissue culture
- * Addition of mitotic inhibitor to arrest cells at metaphase.

CHROMOSOMAL & KARYOTYPE ANALYSIS

CBPN (Abbreviation for complete set of chromosomes in a species)

Karyotype: Is number & appearance of chromosomes in nucleus

f eukaryotic cell. Describes the number of chromosomes.

G Banding: Technique in cytogenetics to produce a nuclear karyotype by staining condensed chromosomes during Giemsa staining.

Idiogram: Diagrammatic representation of karyotype.

Staining shows four banding patterns represented by:

Q Banding - fluorescent bands - Quinacrine mustard / uranyl

G Banding - Giemsa stain

C Banding - Regions of heterochromatin

R Banding - Reverse banding - Acridine orange.

By this chromosomes are studies for abnormalities
Malformation & deformities, human diseases.

Chromosomal Abnormalities

Structural -

Numerical -

Numerical abnormality - loss or gain of chromosome(s) in both auto/sex some. Lost a chromosome - Monosomy

Extra chromosome - Trisomy

- Abnormal monosomy die after conception

Trisomy survive ex: Down syndrome or Trisomy 21.

TRIPLOIDY : extra copy of every chromosome (69)

② Chromosome loss has more effect than chromosome gain

Loss/gain of autosomes u more u in loss/gain of sex some

Monosomy of X chromosome - Turner syndrome

Structural Abnormality - Changes in structure of one/more chromosomes

1) Deletions - loss of material from one chromosome
Severe effects

2) Inversions - Broken segment flips 180° (Invert) & reattaches to form a chromosome structurally out of sequence

If it is hereditary no problem

3) Translocations - Exchange of materials b/w chromosomes

If it is reciprocal (balanced) - same impact as reversion

Mosaicism denotes presence of two or more populations of cells with different genotypes in one individual who has developed from single fertilized egg.

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NIR#5
- Determination of Zygosity - i) Placental method - Diagnostic placenta
- ii) Similarity method - morphology
 - iii) Statistical - Weinberg differential method.
 - iv) DNA finger printing
 - v) Dermatoglyphics
 - vi) Genetic markers : antigens / blood groups
 - vii) Skin Grafts

Uses: - Role of heredity & environment

- Heritability factor in formation of total character
- Therapeutic trials
- Mechanism of transmission of genetic disease
- Final phenotypic expression is result of Nature-Nurture interaction.
- Many inferences in behavioral genetics are based on twin studies.

Degree of Genetic determination (h^2) can be known by:

- 1) Mean pair difference for n pairs = $\frac{S(x - x')}{n}$ (x - value of 1 twin
Smaller value, greater similarity. x' - value of co-twin)

2) Variance :-

3) Concordance discordance study,

a) for qualitative characters (or) Discrete characters

i) High concordance rate for both MZT & DZT indicate Govt. determination

ii) High concordance rate for MZT & low concord. rate in DZT indicates environmental factors

b) Quantitative Traits

4) Crossing studies

9.2. MENDELIAN GENETICS

Mendel concentrated on a particular character at a time. Studied the pattern of inheritance of only one or two characters, instead of studying all variations in the hybrid at a time - mistake done by his predecessor hybridizer.

Considerations

- Organisms chosen should have only one single heritable character at a time.
- Short life cycles
- Sexually reproduction
- Should produce large offsprings
- Controlled mating
- Convenience in handling.

1) Law of Dominance - In crossing pure (Homozygous) organisms for contrasting character of pair, Only one character of pair appears in first filial generation.

Parent genet TT \times tt
↓ + ↓
Gamete T t

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(Hybrid) Tt - F_1 generation

$\text{Tt} \times \text{Tt}$ (Self fertilisation).

$\underline{\text{TT}}$ $\underline{\text{Tt}}$ $\underline{\text{tt}}$ (3:1).
from short

2) Law of Segregation : (Law of purity of gametes)

Hybrids or Heterozygotes of F_1 generation have two contrasting characters or allelomorphs of dominant & recessive nature. These characters though remain together for long time but don't contaminate or mix with each other & separate or segregate at time of gametogenesis, so that each gamete receives only one character (Dom or Reces).

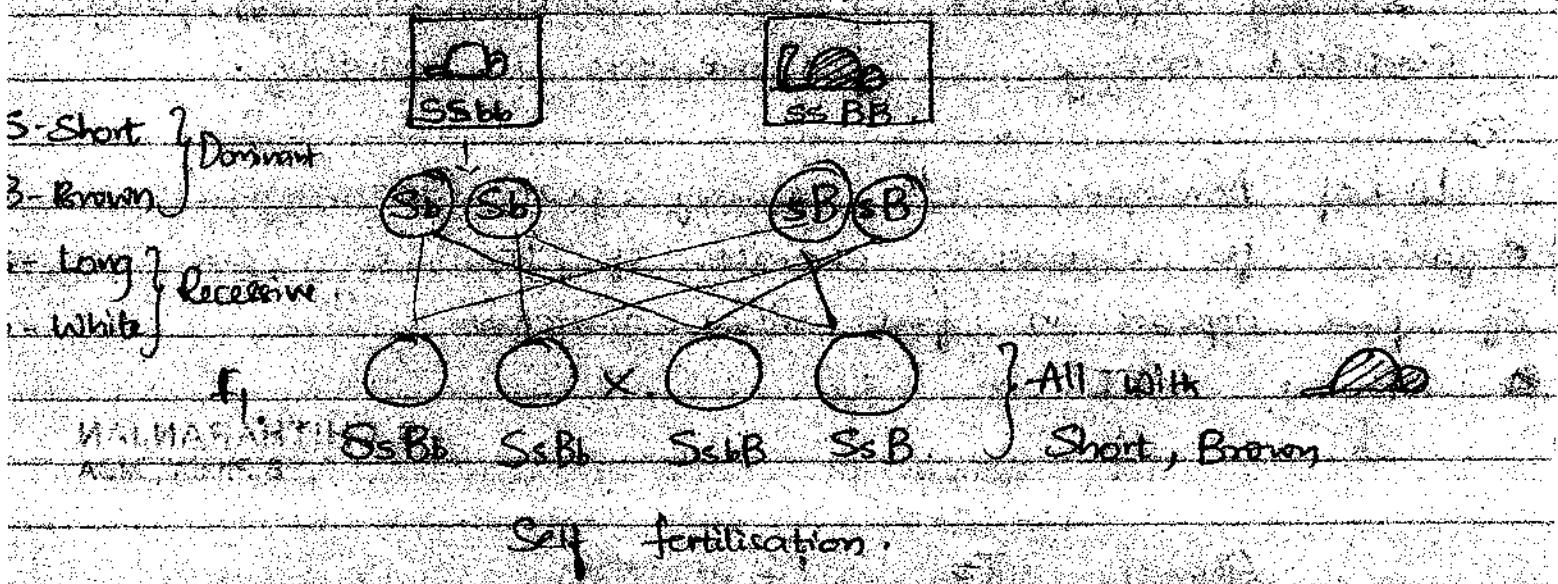
RR \rightarrow ~~Red~~ white

Rr (pink) - incomplete dominance.

rr \rightarrow ~~Red~~ white

IV LAW OF INDEPENDENT ASSORTMENT (Inheritance law)

- Separate genes for separate traits are passed independently of one another from parent to offspring.
- Alleles of different genes assort independently of one another during gamete formation.
- When Hybrid cross - mixing - F_2 generation - 9:3:3:1 (Only one trait)
- When Dihybrid Cross (two traits) - F_2 generation - 9:3:3:1.
- No relation between two traits Ex: Cat's Colour & tail length.



9:3:3:1

Brown/short White Brown White/long
 short long

V LAW OF UNIT CHARACTER

Existence of particular unit factor for each unit.

Basic units of heredity

- Each factor exists in two alternative forms (now called alleles)

Development Anthropology

It is totality of efforts by states to improve well-being of people in developing countries in areas as health care, education & agriculture.

- It is scientific process with significant applicability within short project cycle.
- Objective to enhance benefits & mitigate side consequences for human communities.

Branches

1) Aly of Planning - Deals with macroplanning, how planning can be improved, critical understanding of concept of dept & innovation for development planning.

Development Intervention Anthropology

- Deals with formulation & implementation of dept programme for target populations.
- Practical side of dept planning.

Aly of Sustainable dept

- Shift degradation from Industrial North, not agrarian South.

4) Resettlement Aly : Transfer of people from one area to another on a planned basis.

SINGLE FACTOR, MULTIFACTOR & POLYGENETIC INHERITANCE

Single factor - One character at one time - Monohybrid cross.

f₂ results - Phenotypic - 3:1 (tall : dwarf)

Genotype - 1:2:1 (DD: Dd: dd)

Multiple factor - Genotype - 9:3:3:1

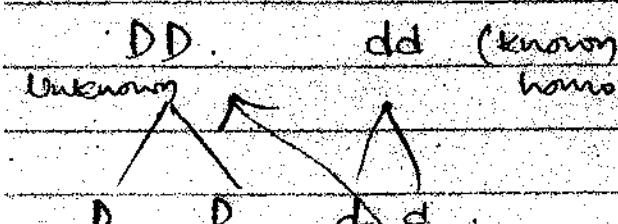
Biological Significance

- 1) Eugenics - betterment of human race.
- 2) Obtaining disease resistant varieties of grains.
- 3) New breeds of horses by cross breeding.
- 4) Explains inheritance pattern.
- 5) Emphasis of Standard breeding.

TEST CROSSES OR BACK CROSSES

To distinguish a homozygous tall plant from heterozygous tall plant (or any dominant), which express phenotypic dominance, but genotype is not known, Test cross used.

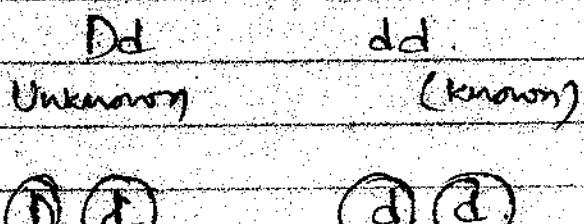
→ In this, the unknown dominant phenotype plant is crossed with known HOMOZYGOUS RECESSIVE INDIVIDUAL. If it is heterozygous all offspring are dominant, if homozygous all



D . Dd dd D D

Tall,

so Heterozygous



Dd dd Dd Dd

Recessive (short)

Tall.

1:1 so homozygous

MULTIFACTOR INHERITANCE IN MAN

In Single factor inheritance, Mendel emphasised that differences in phenotype (Physical) result from alternative genotype of single gene.

In humans many traits are influenced by multiple genes as well as environment. These traits are complex traits. Because of multiple genetic & environmental factors, they are said to show Complex Inheritance.

- Inheritance is complex -
 - Single genotype has many phenotypes (many)
 - Single phenotype has n Genotypes

Normally, Phenotypes influenced both by phenotype & genotype.
Complex traits - weight, BP, infant growth rate, Serum cholesterol.

Traits of three types are having complex inheritance:

- 1) Quantitative traits - Refers to phenotypes which vary in degree and can attributed to polygenic effects (two or more genes) & environment. Vary from one phenotypic extreme to other. Also called Continuous, as there is continuous gradation from one phenotype to next.
These are measured - like agricultural traits

→ Categorical traits:

3) Threshold traits:

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APPLICATION OF MENDEL LAW

1) Determination of Blood groups

ABO system is governed by three alleles, A, B & O found at ABO locus on ninth (9) chromosome.

— Three alleles are present in population, each individual can possess only two. These alleles determine which ABO blood type an individual has by producing **ANTIGENS** on cell coats of RBC.

→ A group — Antigen A.

B . - . B

AB " — Antigen A & B.

O group — No antigen.

2) Determination of sex of Offspring : Probability is 1:1

Parents have nothing to do with sex of child.

Parents [X Y] [XX]

Gametes X Y X X

XX XY XX X

1:1 ratio.

3) Determination of Rh Immunization : Rh factor.

- | | |
|----------------------|-----------------------------|
| 4) Pedigree analysis | 5) Medicolegal applications |
| 6) Hybrid varieties | 7) Genetic counselling |

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LETHAL & SUB-LETHAL INHERITANCE

Dominance - Inter-allelic interaction

Epistasis - Inter-allelic interaction

Pleiotropism - Single gene influencing multiple expressions.

- Alleles that cause organism to die only when present in homozygous condition - **LETHAL ALLEGES**

- Lethal gene causes death of all individuals carrying this gene

Classification of Lethals:

Based on nature - Gametic - Makes gamete inviable.

Lethal genes interfere with production of gene product.

Sub-lethal - kills before attaining reproductive age

Semi-lethal - kills after " "

↳ Ex: Huntington's disease (after 40 yrs)

Further classification

i) Incomplete Dominant: These are lethal in Homozygous condition

- In Heterozygous - produce some abnormal phenotypes
Has reduced expression - so express partially

Ex: Sickle cell anaemia

→ Homozygotes ($Hb^s Hb^s$) exhibits disease

- Heterozygotes ($Hb^s Hb^A$) Clinically normal.

ii) Dominant: a) Huntington disease - Semi-lethal. Can express itself even when a single dominant allele is present.

- Disease due to dominant autosomal allele H .

- If homozygous affected marrries normal individual, all progeny will get disease.

- If heterozygous affected marrries normal - 50% progeny gets

Female	Female	Hh	hh
HH	hh	Hh	$h h$
Affected	Normal	Hh	$h h$
Hh	$h h$	Hh	$h h$

(50%)
Infected

iii) Recessive - Death only in homozygous condition

Most of lethal genes are recessive. Don't survive, but heterozygotes are normal.

Ex: Hemophilia (sex-linked gene). - males ($X^L Y$) can never be heterozygous for lethal factor & hence all males who inherit the lethal factor will die.

- If normal male mated a carrier female, half of male progeny will die & 50% of female progeny will act as carriers.

$\text{♂ } X^L Y \text{ (Male)}$ $\text{♀ } X^L X^L \text{ (female)}$



$X^L X^L$

Normal female

$X^L X^L$

Carrier male

$X^L Y$

Normal male

$X^L Y$

Male lethal (die)

iv) Conditional lethals

Normal in particular environment, lethal in changed environment

Ex: C. foetus, Albinism (sex-linked) - females carriers, males affected

- Epistasis does not exert among genes at different loci
- There is no dominance involved
- Each contributing allele in a series produces an equal effect
- Effects of each contributing gene - additive

Characteristics

Negative Dom. ~~negative~~ Light weight

F₂ - 1 : 4 : 6 : 4 : 1

Mutants - F₁ AB

— flowers ab ab AB AB

— plants AB AB ab ab

- Number of nuclear production of number of genes.
- Two or more pairs of alleles work have cumulative effect
- More no. of genes - more expression - Quantitative inheritance
- And greater quantitative characters - longer
- Number of nuclear production of number of genes.

of genes on several characters or at several places

Some characters are determined by an interaction

Polygenic inheritance (PI)

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9.3.

POPULATION GENETICS

Three faces of research :

- 1) Investigation on Origin of Genetic diversity
- 2) Spread
- 3) Fixation

Genetic Polymorphism - Occurrence of two or more genetically determined forms in a population, each with such frequencies that most of them can't be maintained by mutation alone
 - Minimum frequency taken as 1%. (If more than 1% then only selection is operating).

Source of GP

- Mutation - ultimate source
- Selection - continuous process
- GP is product of mutation & flow of genetic info. from neighbouring populations (migrations)

Polymorphic traits are discrete and discontinuous genetic characters which are controlled by single genes and are less influenced by environmental factors.

Different from Phenotype traits.

- GP can be seen at various levels - Cellular, DNA, Protein

GP & selection

(also group)

- 1) Permanent polymorphisms & Stabilizing selection (only males & females)
- 2) Transient polymorphisms & Directional selection - Industrial melanism in moth.
- 3) Balanced polymorphisms & heterozygote Selection.
 ↳ Heterozygotes are favoured by homozygotes by selection
 Ex: Sickle cell gene in Africans.

Hb^C

Thalassaemia

40

MENDELIAN POPULATION

- A group of sexually interbreeding individuals

Gene pool - Sum of all genes possessed by a population.

Genotypic frequency is proportion of genotypes in population.

Gene frequency is proportion of an allele in gene pool
as compared with other alleles at same locus.

Mendelian population deals with properties & ways of
changing the composition of gene pool.

Study of genetic structure of Mendelian population is
Population Genetics.

- Dynamic, Continuity with time, Immortal (Carried by offspring)

Deme - a local population of interbreeding

Gamete frequency = Gene frequency

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Genotype - Combination of alleles

Gene - Single allele

HARDY - WEINBERG LAW

In large random mating population, in absence of migration, mutation & selection, the gene & genotypic frequencies remain constant from generation to generation.

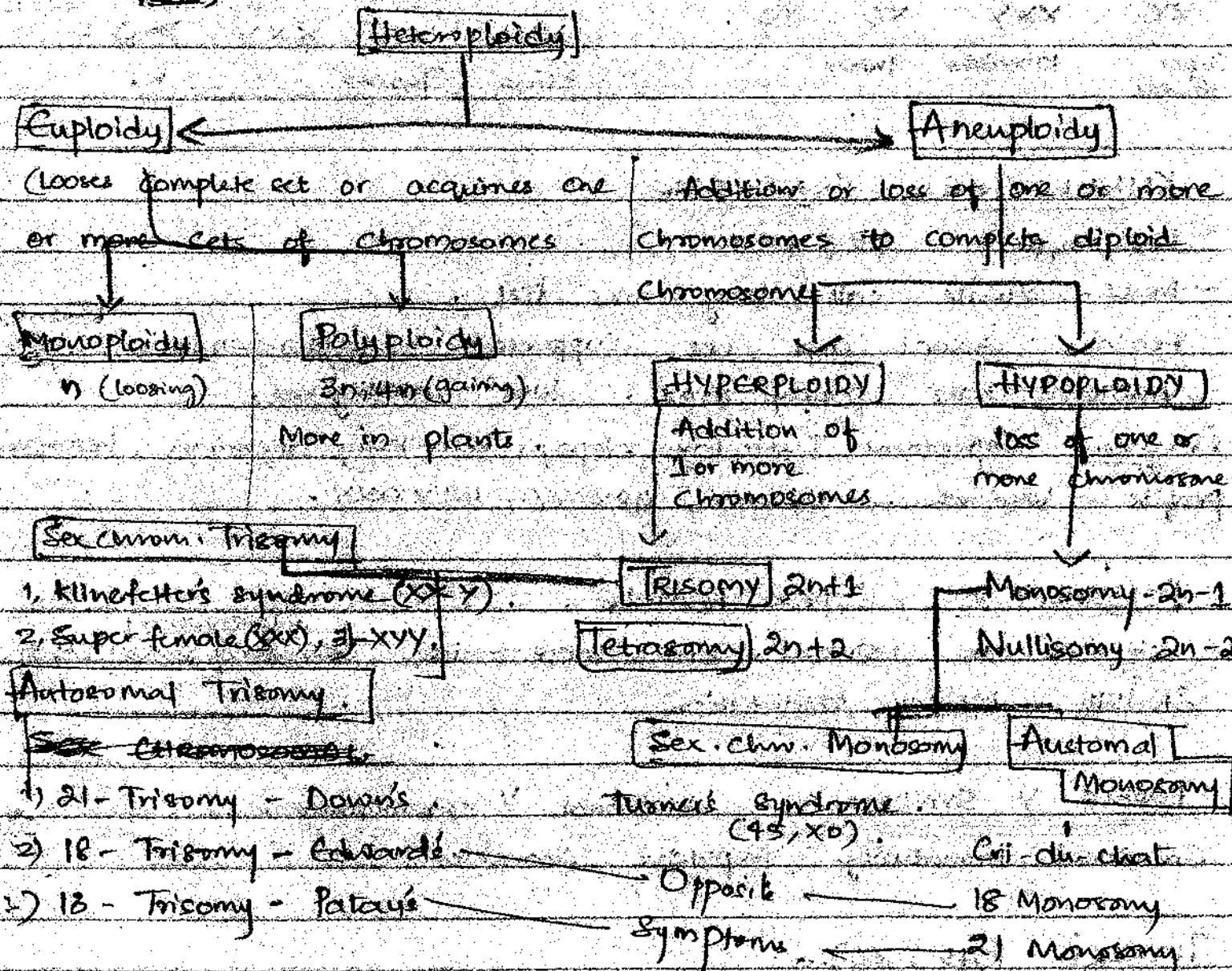
- Such populations said to be in H-W equilibrium (it's a relationship between Gene & Genotyp frequencies).

9.4. Chromosomal Aberrations in Man.

Numerical Aberrations (Disorders) (HETERO PLOIDY).

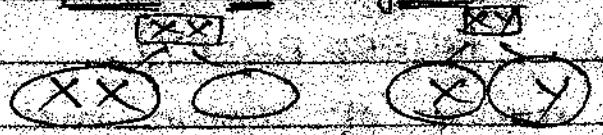
- Phenomenon of variations in number of chromosomes.

I) Cytology



Gain & loss of X Chromosome results in Klinefelter's syndrome & Turner's syndrome. Variations occur becoz of error during meiosis - NON-DISJUNCTION.

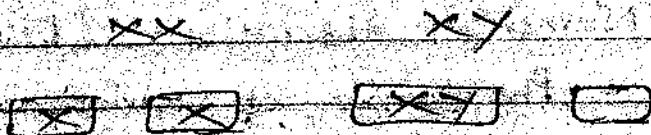
Non-disjunction in Oogenesis



XXX XXY XO YO

Super female Klinefelter Turner

Non-disjunction in Spermatogenesis



XXX XO XXY YO

Klinefelter Turner u u

KLINEFELTER'S SYNDROME

Karyotype - 47, XXY

- Male - sterile, tall, long arms, feet, rounded
- Feminine sexual chrt not suppressed - Gynaecomastia, hips.
- Auxiliary hair poorly devd., low Intelligence.

Diagnosis - Symptoms, Testicular biopsy, Bone body technique, hormone profile - Variants - 48XXYY, 48XXYY, 49XXXXY

POLYXY (Super female)

47 XXX like normal, but more raised secondary sexual chrt.
Underdeveloped
Sterility, Mental retardation

DOUBLE Y SYNDROME - Additional Y Chromosome

Emotional immaturity, Impulsive character

TURNER'S (45, XO)

- X monosomy
- Ovaries are rudimentary, short stature, webbing of neck, cubitus valgus, low posterior hairline, shield like chest, ventricular septal defect, renal hyperplasia.

Diagnosis - Symptoms, Bone body examm, dermatoglyphic study.

Stanol therapy to gain weight, Estrogen admin for ss ovaries
In vitro fertilisation possible.

Antenatal Trisomies

1) Down's Syndrome - Mongolian, Trisomy 21.

- Mostly (1 in 50) women pregnant in late years,

Symptoms: Epicanthic fold, round heads, mouth partially open,

Physical & mentally retarded, poor muscular tone,

Origin: Trisomy - non-disjunction of Chromosome 21 during meiosis

Diagnosis: Symptoms, Correlation with mother age, amniocentesis,

Chorionic villous Sampling

2) Edward Syndrome - T - 18

- Don't survive beyond few months, becoz of combined effects of aspiration pneumonia, apnoea, heart defects.

Symptoms - Small triangular mouths, flexed fingers, Preterm growth deficit

3) Patau Syndrome - T13

Lif span as T18.

Symptoms - Mentally retarded, sloping fore head, cleft palate,

Polydactyly, dermatoglyphic patterns unusual, Neutrophils show cereate projections.

STRUCTURAL ABERRATIONS

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GENETIC MARKERS IN HUMAN BLOOD

Genetic markers studied to understand - genetic variations among indigenous populations.

- Genetic Origin & affinities
- Genetic variations
- Genetic history

Defn: GM is a gene ^{or} DNA sequence with a known location on a chromosome that can be used to identify individuals or species. It can be described as variation.

- A trait can be used as GM in study of individuals, families, populations provided that the trait is genetically determined 2) has a simple pattern of inheritance 3) can be classified accurately as has variants common enough to permit it to be labelled as Genetic Polymorphism.

- GM in blood classified into following:-

- a) Red Cell Antigens → ABO
- b) HLA
- c) Serum proteins &
- d) Serum Enzymes.

 └ Rh Antigen.

- Blood polymorphism exists in population.

Blood groups & HLA are acting as genetic markers becoz of following criteria:-

- * Simple pattern of inheritance ✓
- * Different frequencies in different populations ✓
- * Not influenced by envt factors / age ✓

BLOOD GROUP POLYMORPHISM

- Landsteiner - 1900 - discovered ABO system.

- Understanding Genetic principles like - Multiple alleles

- Polymorphism.
- Immune reactions

- Blood group refers to RBC ANTIGEN.

Useful conditions

- 1) Blood transfusion 3) Parental determination
 2) Tissue transplantation 4) Haemolytic disease of new born.

ABO Blood Group System Multiple allelism

Two Antigens - A & B on RBC

Two Antibodies - a & b on in PLASMA

- Alleles are i^A, i^B & i^O genes located on ABO locus on long arm of Chromosome number 9.

'O' is recessive to A & B. i.e., A has A, A₂; B has B, B₂; O has O.

- A & B - codominant to each other. $A_1 > A_2 > O$.

Phenotype Genotype

1. A i^Ai^A or i^Ai^B
 2. B i^Bi^B or i^Ai^B
 3. AB i^Ai^B
 4. O i^Oi^O

1. A₁ i^Ai^A or i^Ai^B
 2. A₂ i^Ai^B
 3. A₁A₂ i^Ai^A
 4. B₁ i^Bi^B
 5. B₂ i^Ai^B
 6. A₁B₁ i^Ai^B

- Normally if a person has an Antigen in his RBC's, his plasma has natural antibodies against other antigen.

Ex: Antigen A - RBC ; Antibody b - Plasma.

- Reaction b/a \rightarrow Isoagglutination: This used for blood group testing.

'O' universal donor - Contains no A/B antigen.

'O' " recipient - " no a/b antibody

Distribution: O - 47%, A - 41%, B - 9%, AB - 3%.

A - Europe, Asia, central Australian tribes, American Indians.

B - North India, Central Asia (Absent in Australian tribes)
 Decreases from Asia to Europe. \leftarrow American Indians

AB - Absent in Amerindians.

- This shows blood groups affected by environmental selection

- Subject to natural selection.

Marriages ABO Incompatibility.

- Hemolytic disease in newborns from incompatibility b/w mother & child for ABO blood group antigens

two types:

- a) Compatible (Homospecific) - Father can transmit A or B gene to baby, only which is present in mother
- b) Incompatible (Heterospecific) - Can transmit A or B, not present in mother.

Rh Antigen :- Independent of other blood group.

- Depends on presence of antigen D or RhO antigen on Red cells.

- Tested by anti-D serum.
- Europeans 85% Rh+, Indians 93% Rh+.
- No natural anti-Rh antibodies in serum. Arise only at the time of Rh incompatible pregnancy / transfusion.

HUMAN LEUCOCYTE TRANSFUSION SYSTEM

Transplantation - Arranging foreign cells/tissues, organs with same histocompatibility of recipient.

Types:-

- Auto graft - same individual
- Iso graft - from genetically identical person (Monzygotic twin)
- Allo graft - One to another - same species
- Xeno graft - B/w different species

- Tissue rejection caused because of HLA (Closely associated with short arm of Chromosome 6).

- HLA antigens occur on WBC & tissue cells.

Therefore tissue typing for these antigens is done on membranes of lymphocytes.

Some antigens are not severely antigenic - so best possible match has to be chosen.

Like from Siblings, parent, child.

- Some HLA types have high risk disease chpt.

Prevention of Graft Rejection

- i) Gluco corticoid hormones - suppress growth of all lympho... tissues
- ii) Azathioprine - block formation of T-cells. formation
- iii) Cyclosporine - specific inhibitory effect on helper T cell

Gm Groups

- Antibodies are glycoprotein in nature.

① Morphological bases

A) MORPHOMETRIC (measured)

- i) Head form : - Cephalic Index - living - $\frac{\text{Breadth}}{\text{Length}} \times 100$
 - Cranial Index - Dead - (2 units down)
 - Doesn't give info about contour of skull.

Hyperdolicocephalic +

Envt factors affecting

Dolic Cephalic + - Negroid (predominant), Early man

Artificial deform?

Mesoccephalic +

Malnutrition

Brachycephalic + - Mongoloid (predominant)

Hypercephalic +

- ii) Face - Oval, round, square & pentagonal or by Facial Index. ^(F.I.)

$$F.I. = \frac{\text{Length}}{\text{Breadth}} \times 100$$

Very broad - Hyper eury prosopic

Vary with sex - Females - shorter & broader face

Broad - Eury prosopic

- Broad face - broad cranium - harmonic skull

Medium - Meso. prosopic.

Disharmonic face - Armenoids, French Basques

Narrow - Lepto prosopic

Prognathism - $\frac{\text{Alveolar}}{\text{facial}}$

Very narrow - Hyper lepto prosopic.

Orthopognathism.

iii) Nose: Root of Nose

\swarrow \downarrow
Broad Nasion

Nasal Bridge

\swarrow \downarrow \searrow
Low Medium Broad

Bridge profile

Convex
Straight concave.

Tip of Nose - Bluntly rounded / Sharply pointed

Thin / thick.

Nasal Index - proportion - $\frac{\text{Breadth}}{\text{Length}} \times 100$

Hyper Lepto - Very narrow

All children are platyrhine

Leucoderm, Eskimos - Leptorrhine - Narrow

Xanthoderm - Mesorrhine

heat adaptation, to Melanoderm, Negro, Australian Native - Platyrhine - Broad

inhale warm/moist air

Very Hyper platyrhine - broad

iv) Stature - Nutrition, environment, hereditary factors.

<129.9 - Pygmy

Above medium - Mediterranean

130-149.9 - Very short - Andamanese, Negritos

Above medium - Eskimo, Dravidian

160-163.9 - Below medium - Alpines, Ainu.

Tall - Caucasoid

Caucasian

B) MORPHOSCOPIC (Visually described).

Eye - Shape - i) Mongoloid.

ii) Non mongoloid.

- Colour - Amount of pigment - Caucasoid - Blue to brown

Mongoloid - Light Brown - ^{Dark} brown

Negroid - Dark brown - Black.

Hair
Form of Hair ↗
Smooth - Mongoloid
Wavy - Caucasoid
Woolly Negroid

Hair colour

Texture

Quantity = Scanty ↗ clockwise dominant
Medium ↗ Anticlockwise ~~dominant~~
Rich

Hair whorl - occiput of head

Cross section - Circular - Mongoloid (straight hair)
Oval - Negroids.

Skin colour - Leucoderms - White skin; North Africa, Europe, Polynesians

Xanthoderms - Mongoloids, Armenoids.

Melanoderms - Melanins, Dravidians, Negroes

► Francis Galton - scientific study

DERMATOGYPHICS :- Paternity diagnosis, Francis Galton - Scientific study
markings used. Twin diagnosis. - Study of ridge patterns of skin

→ fulfill conditions for a good racial criterion

i) Traits not modified by environment.

ii) Traits are non-adaptive.

iii) Not subjected to mutation.

iv) Can be identified without subjective bias.

②

Genetic Criteria of Races

→ Serological

Non serological - tasting ability - Secretor status.

Chromosomes

Dermatoglyphics.

Carlin &
Kokilashvili

Factors involved in Race formation:

- 1) Mutation - Provides raw material for forces of evolution.
- 2) Hybridisation & Gene flow - Genetic variation into a new population.
- 3) Genetic drift.
- 4) Selection - Races are nothing but Mendelian populations adapted to environment.
- 5) Isolation & Inbreeding.

Role of Env't influences on racial characteristics - 4 factors:

- 1) Climatic - body building & skin colour. (Bergmann, Allen rule).
- 2) Cultural - Inbreeding, Out breeding.
- 3) Nutritional & - Climatic - Availability of food
Cultural - Type of food cooked.
- 4) Genetic.

Gloger's rule - for skin colour

15. Race & Racism :- 1) Race is a group of individuals who share a common physical characteristics, history & geographic location. Race is conscious & biological phenomena. Ethnicity overlaps race & represents cultural & historical differences.

20. Racism is acting or making decisions or changing your attitude towards a person based on his race.

Race superiority & inferiority constitutes Racism. Leads to racial discrimination.

- It may be conscious or unconscious.

25. - Racism is a social phenomena.

- Refers to changes in size - (Birth)

Net Increase in size of mass of tissues & includes process of multiplication of cells, increase in intracellular substance + Involves replication of DNA - reflect **QUANTITY**, GROWTH

Indicators

	<u>Laws</u>	<u>Assessed by</u>
Weight for height	→ Continuous.	1) Body measurement
Weight for age	→ Unique to individual	2) Velocity of Growth.
Height for age.	→ Diff tissues/Diff growth rate	

STAGES OF GROWTH

1) PRENATAL (Before birth)

a) Germinal Stage

- Period of Ovum (14 days)
- Zygote - mitosis - Blastocyst → Blastula (uterine milk dependence)
↓
Trophoblast (Three germ layers)

b) Embryonic stage

- Period of Embryo (3-12 weeks)
- Formation of most of organs / body parts from germ layers.
- Regionalisation occurs, differentiation of cells.
- Morphogenesis - Child like appearance.
- Sexual determination
- Development of birth defects.

c) Foetal Stage (8-12 weeks to Birth).

18 weeks - peak velocity of length

34 weeks - peak velocity of weight

40 weeks - slow down of growth.

- Birth weight / size is general reflect of maternal envt more than genotype of child.
- Acquires antibodies from mother
- Vernix caseosa, Blue eyes.
- Birth at 280 days

→ Changes of form associated with acquisition of new functions during embryonic life.

DEVELOPMENT → Acquisition of variety of skills for optimum functioning

Assessed by of individuals - reflects **MATURATION** [Quality]

1) I.Q.

2) Mental age compared to Chronical age (DOB).

3) **POST NATALE**

Cephalocaudal (Growth head to foot)

a) Neonatal & Infancy (1yr): \rightarrow Proximodistal (Growth centre to periphery)
 (Imitates)

\rightarrow Differentiation (More controlled specific reaction)

- Puffy eyes, skull bones fusion (18 months)

- Girls mature faster. Motor control \rightarrow Prehensile

- Rapid brain deupt. Locomotion \downarrow Toes

- Perpetual deupt.

Physiological

functns

- Respiratory system - Highly irregular breathing - apnoea - stimuli

- Circul. system - Heart rate : 120-150/min, more RBC - Jaundice

- Dig. system - enzymes released.

- Temp. regulation - lacks layer of insulating fat - heat loss - instability

Reflexes - Sucking reflex, Rolling reflex, Moro reflex, Babinski, Babkin rfx

b) **Child hood** - Heredity & envt roles in growth.

c) **(11-18 yrs)**

Puberty & Adolescence - Capable of reproduction (2 yrs early in girls)

Changes - Increase in height, Change in body shape (Broad shoulders)

- Wider pelvis (women), muscles prominence.

- Voice change - larynx grows, Adam's apple boys.

- Boys deep voice, Mental, emotional maturity.

- Increased activity of sweat / sebaceous glands.

- Deupt of sex organs, great capacity of learning

- Deupt of secondary sexual characters.

d) **Maturity** - cessation of growth.

e) **Senility** - Senescence is setting in old age, degeneration.

I. Genetic factors

- 1) Genetic control of Growth & Development,
 - Result of coordinated events - different genes at diff. times.
 - Controlled by genes - regulation by INDUCTION.
 - In Embryonic Stage: greater order induces changes in order resulting fast growth.
- 2) Genes — House Keeping — Synthesize proteins for all cells.
 - Luxury genes - Proteins for specific function.

Gene Control → Cell division — $\frac{\text{Cell surface}}{\text{Volume}}$ — Nutritional factors.
 → Transcription/lation level — DNA → mRNA → Protein

- 2) Phenotype - Tall children of tall parents (influenced by genetic constitn)
- 3) Characteristics of parents - IQ of parents.
- 4) Race - Caucasoid fast growth, Mongoloid slow growth.
- 5) Sex - Boys longer by birth.
- 6) Biorhythm & maturation (regulation of hormones, attainment of puberty)
- 7) Genetic disorders → Chromosomes Autosomal Sex
 Gene mutations } influence negatively.
 (Metabolic disorders).
- 8) Children of multiple pregnancies,
- 9) Inbreeding (Consanguinity).

2) ENVIRONMENTAL FACTORS — Natural resources

— Climate — $\begin{cases} \text{Slow in summer} \\ \text{Fast in spring} \end{cases}$

Prenatal Period

- 1) Infections of mother (congenital anomalies)
- 2) Intra uterine growth retardation
- 3) Drugs - teratogenic
- 4) X-ray exposure
- 5) Hormonal influences

Post Natal Period

- 1) Nutrition - Nutritional Stress . 3) Trauma

GROWTH & UVPI (5 factors).

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- 3) Bio-chemical factors: Interplay of hormones - crucial - drpt.

Thyroxin -

HYROID

Calcitonin .

Adrenal gland

Adrenal medulla - Adrenaline .

Adrenal Cortex - Mineralocorticoids - Aldosterone

Disorders:

Addison disease (deficiency of M.c)

Glucocorticoids - Cortisone

Gonado corticoids - Sex hormones

Cushing syndrome (excess G.C.)

Aldosteronism (excess Aldo), Gynaecomastia

PANCREAS

Adrenal Virilism (excess sex hormones in females) : Inulin, GH, Glucagon

PITUITARY - Anterior - Prolactin - GH, Prolactin.

↓
Posterior Intermediate - Prolactin
 MSH - TSH.
↓
Vasopressin - ACTH.
↓
Oxytocin - TSH.

Disorders:
Hypo Hyper,
Dwarfism Gigantism
D. insipidus Acromegaly

4) SOCIO ECONOMIC FACTORS

- 1) Nutritional deficiency
- 2) Conditions at home
- 3) Economic deprivations & faulty family budgeting
- 4) Minor ill health
- 5) Habit of smoking
- 6) Depressive & grieving parents
- 7) Socio mobility

5) CULTURAL FACTORS - Polished rice, Improper hygiene,

6) EMOTIONAL FACTORS - Maternal / Paternal deprivations
- Orphans
- Anxiety, Panic, Stress.

AGEING & SENESCENCE

Ageing - is becoming chronologically older.

Senescence - is [changes] occurring [during later years] of life leading to FUNCTIONAL DECLINE, loss of cognitive abilities

- Ageing changes are related to changes with age.

Ex: Onset of puberty

- Senescence leads to decreasing survival changes.

HARMICS

- Changes are deleterious - lead to death.

- fundamental intrinsic property

- Process common to all members of a species.

STEPS

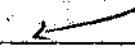
Accumulation of large number of cell molecules



molecular damage

↓
Decreased efficiency of subcellular fns.

Cell death



Impaired cellular fns.



↓
Impairment of tissue / organ fns.



↓
Defined functional capacities of tissues

↓
Deterioration of whole organisms

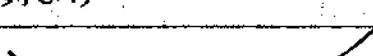


↓
lowered efficiency

Reduced

Immune System

Deterioration of Nervous system



↓
Increased probability

of Death

Theories of Ageing

Cellular

Extra cellular

Modern theories

I) Cellular Theories

- Defective intracellular process lead to ageing.
 - Assume there is limited frequency of error in biochemical operations of every cell.
 - These errors accumulate → cell death.
- a) Genetic blue print theory - [Hayflick]
- Senescence is due to loss of cell function that occurs before cells reach their max. division point.
 - There is a inbuilt biological clock - decides cells capacity to divide
 - Clock in nucleus of cell.

b) Theory of free Radicals

- Damage to cell by free radicals.
- Increase in Lipo fuscin - as grows older.
- Lester Packer & James R. Smith.

c) Error theories

- Errors at DNA level - Greater the efficiency of DNA repair - longer the longevity.
- Error catastrophe theory - Errors produce subsequent errors.
- Theory of missing factors.

II) Extra Cellular & Pace maker theories.

- Senescence due to alteration in Xtra cellular Substances

- a) Collagen theory - Collagen protein present in extra cellular spaces waste accumulated here as old age grows

b) Immunological theory

- c) Breath as pace maker

III

Modern theories...

- 1) Bernard L. Strohler theory - process programmed by the action of on-off switches that reside in genetic material.
- 2) Programmed ageing theory
- 3) Wear & Tear theory
- 4) Telomeric theory

All theories explain that ageing is important in developmental process.

- Ageing is genetically programmed.
- Heredity plays role in ageing.
- Old age can't be avoided.
- Stress, tension fastens the process of Ageing.

<u>CHRONOLOGICAL AGEING</u>	<u>BIOLOGICAL AGEING</u>
Based on DOB	Based on problems of old age symptoms
- No impairment of fns.	- Impairment of fns regardless of age
- Person may be old, but mayn't suffer - OLD AGE PROBLEMS	- Individual may be old but suffer from health issues
- Lifestyle factors - nutrition, food choices, exercise, nutritional supplementation, antioxidant status, stress	
- Longevity hotspots - Okinawa, Nicoya, Sardinia	

According to Sheldon

Somatotypes are morpho-phenotypic ranges along constantly recognisable characteristics and are function & products of whole genetic & envt. complex.

- Provides identification tag.

CLASSIFICATION

- Viola type (10 basic measures) Longotype
- Brachy type Branchy type
- Normotype Normotype
- Mixed type Mixed type
- Kretschmer System (on visual observations)
 - Asthenic
 - Athletic
 - Pyknic
- Pende's type
 - Sthenic slender
 - Asthenic slender
 - Sthenic broad
 - Asthenic broad
- Sheldon's type - (on embryonic germ layers)
 - Ectomorph 117
 - Endomorph 711
 - Mesomorph 171

GROWTH STUDIES

- Info of growth & envt gathered by
 - 1) Cross sectional
 - 2) Longitudinal studies
 - 3) Segmentation

Advantages: 1) Speed & economic
Disadvantages: 1) Cross sectional: - Different age groups are assessed in one occasion
No tracking of subject.

- Provide info about differences in envt. among age groups rather than changes in same person

Advantages: 2) Longitudinal: - Same people studied over time
Disadvantages: 1) Sensitivity to individual patterns
2) Cohort effects

- To find development in them over time.
- Measures characteristics like IQ, Vocabulary

Advantages: 3) Cross segmentation = Designed to overcome the back draws of 1 & 2.
Disadvantages: 1) Expensive
2) Practice effect.
3) Probable bias.

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GENETICS

Eukaryotic — Membrane bound nuclei, nuclear DNA.

Prokaryotic — Cell lacks a membrane bound nucleus.

- Lack organelles, plasmid DNA.

Ribosomes in ~~both~~ ↑ & in Chloroplast, Mitochondria Organell

Nucleus — Chromatin — DNA —

DNA — Genetic info stored.

Nucleic acids are macromolecules composed of subunits - Nucleotides

Nucleotide has a phosphate group, five carbon sugar,

Cyclic nitrogen — containing compound called a base.

Purines — Adenine, Guanine

Pyrimidines — Thymine, Cytosine] Bases

CHROMOSOMES

Has DNA + Histone + Non-histone proteins + RNA + some

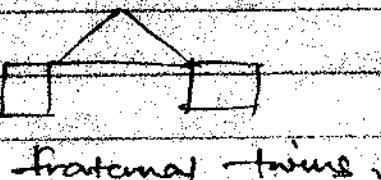
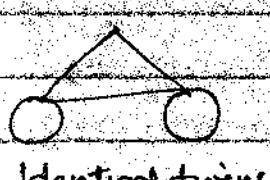
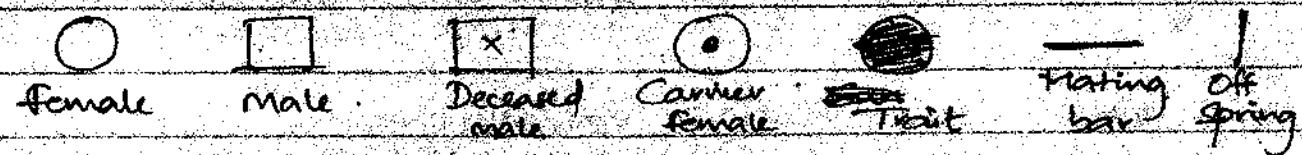
Human Chromosomes = 46 chromosomes = $22\text{ (Homo)} \times 2 + 2\text{ (Sex)}$ chromosomes

Cell division - Mitosis, Meiosis.

Pedigree Analysis: Establishing patterns of transmission traits.

Study previous generations — draw Pedigree Chart.

for study & representation of inheritance of human traits.



Probond or Propositus (male) - Trait brought

Proposita (female) - "

1) Autosomal Dominance:

Allele: either of a pair of alternative forms of a gene that can occupy the same locus on particular chromosome & that control some character.

- One of a number of alternative forms of same gene for a character producing different effects.

Zygoticity: Degree of similarity of the alleles for a trait in an organism.

Cukaryotes have matching sets of chromosomes - DIPLOID

LOCUS: Specific location of a gene or DNA sequence or position on a chromosome.

A variant of genetic DNA sequence located at given locus is called ALLELE.

GENE MAPPING is process of determining the locus for a particular biological trait.

Diploid cells whose chromosomes have same allele of a given gene at some locus are called - Homozygous.

Having different alleles of a given gene at locus called Heterozygous.

- If both alleles are same - Homozygous

" " " are different - Heterozygous

" One allele is missing - Hemizygous

" Both " are missing - Nullizygous

~~No dominant allele codes for a functional protein at same locus~~

1st allele is dominant.

2nd allele is recessive.

- Common basis of dominance & recessiveness is that the dominant allele codes for a functional protein and recessive allele does not.

- Genes have several alleles. If multiple dominant alleles exist, they may be designated with different superscripts over the upper case letter, A.

- If multiple recessive alleles exist, they are designated with different superscripts on lowercase a^x .

TWIN METHOD

~~Meiosis Mitosis~~
Sperm + Egg → Zygote →

Two types of twins:

- i) Monzygotic: from single zygote, since from single zygote they are genetically identical. So identical twins (same sex).
- ii) Dizygotic twins: formation of two eggs by two sperms. Called fraternal twins. May be of different sexes also.

Concordance & Discordance → i) only one member passes the trait (phenotypically similar) ii) Phenotypically dissimilar

Degree of Concordance: Extent to which identical or fraternal twins differ in their degree of concordance.

- To assess the role of genetic heredity.

Zygosity of twins (Diagnosis)

To know whether twins are from a zygote or two eggs.

Three methods:

- 1) Placental Method: Based on the layers (Inner amnion, Outer chorion & Placenta). Zygosity can be diagnosed.
- 2) Similarity method: Tissue antibodies & Skin graft refusal.
- 3) DNA fingerprinting: May be similar for monozygotic twins.

HERITABILITY ESTIMATES (HE)

Variations in Phenotypic variations are of

- 1) Genetic Variation
- 2) Environment
- 3) Interaction b/w Genetics & Env.

% of Concordance provides an estimate of degree to which a particular character is genetically influenced = Heritability estimate.

Two types of (HE).

- 1) HE on variance between MZ and DZ twins

Comparison of twins for degree of concordance & discordance.

- 2) Concordance rate for Polio high in MZ & low in DZ, so Polio has a strong genetic susceptibility.

$$V_{DZ} - V_{MZ}$$

$$\frac{V_{DZ}}{V_{DZ}}$$

- i) HE by variance between MZ twins reared apart & reared together $(V_A - V_P) / V_A$ (V_A - Variance reared apart)

COTTON METHOD: Comparison of cot-twins to understand abnormal behaviours (Schizophrenia).

FOSTER CHILD: Children randomly selected and put at different envt. conditions & later their intelligence tested after few time(s).

Cytogenetic Method - Cytogenetics \rightarrow study of Chromosomes & record disease states caused by abnormal chromosomes.

Chromosomal & Karyotype Analysis

Karyotype: A set of photographed, banded chromosomes arranged in order from large to smallest.

Karyotyping is a primary mechanism through which chromosomes are analysed.

Ideogram is diagrammatic representation of a karyotype.

Chromosomes stained and patterns are seen on it & abnormalities can be easily identified by comparison;

1) Q Banding: Fluorescent bands - Quinacrine mustard under UV light observatory.

2) G Banding: Giemsa Stain - NO fluorescence

3) C Banding: Regions of heterochromatin.

4) R Banding: Reverse banding - Btwn regions of chromosomes lying b/wn Q bands.

Chromosomal abnormalities are two types:

1) Numerical - loss or gain of a auto or allo chromosome.

Loss - Monosomy, Gain - Trisomy

Monosomy child die after conception.

Down's Syndrome: Autosomal numerical abnormality (Trisomy-21)

Turner's : Sexchromosome abnormality of X (monosomy).

Darker Chromosomes: Extra chromosomes, can't be identified by banding pattern.

Deletion

IV) Structural Abnormalities

Deletions: Loss of material from single chromosome (sense effect)

Inversions: Two breaks in a single Ch' & bringing one inverted (inv) & reattaches.

Translocations: Exchange of materials b/w two or more Ch.

Procedures for separation of biochemical substances & analysis

- 1) Separation & Identification of proteins: Two methods:
 - a) Gel-filtration: separation of basis of molecular weight.
 - b) Electrophoresis: Proteins based on charge.
- 2) Sequencing of DNA: Maxam-Gilbert method.

MENDELIAN GENETICS OF MAN

Considerations for suitable material:

Variation, sexually reproducing, controlled mating, short life cycle, produce large offsprings, easy handling.

→ So he chose Edible pea for hybridization experiments

PROCEDURE: ? + formulated three laws:

- i) Law of Dominance
- ii) Law of Segregation &
- iii) Law of Independent Assortment.

Monohybrid Cross:

Dihybrid Cross:

QUANTITATIVE GENETICS (QG)

Genetics is Study of Variation: QG deals with Complex traits

Quantitative traits

QG is based on measurements of individuals within a population of organisms.

- Most quantitative traits involve Contribution of many different genes
- Q.T are often influenced by Environ. factors.

QG is study of inheritance of continuously measured traits (i.e. height or weight) & their mechanisms.

- Its branch of population genetics dealing with phenotypes which vary Continuously.
- The phenotypic value of an individual is combined effect of genotypic value & Envrt. deviation.

MULTIFACTOR HYPOTHESIS

- Q.T were n't determined by single genes, but many and their alleles each had small & approx. additive effects.

GENETIC POLYMORPHISM & SELECTION

Not all genetic variations affect phenotype - morphological characters. Many genetic variations are concealed at DNA levels & this variation in a population in genetic material is termed as Genetic Polymorphism.

→ Poly. traits are discrete & discontinuous - controlled by single genes & less influence of envt.

- Individuals with discrete, discontinuous genetic traits are said to be polymorphic. People lacking called Monomorphic.

- Occurrence of one or more morph (gene) in population.

Source: It can be brought by many factors.

CULTURAL EVOLUTIONISM

S.CITHARANJAN

(seen physio, 1865-74)

biological aspects

Evolution: Simple to Complex form - both

Socio cultural aspect

(seen techy, economy,
social instns, art literature)

Difference of opinion, led to multiple theories →

all these theories related to cultural evolution collectively called CULTURAL EVOLUTIONISM in Ant'.

Cultural Evolution - A process by which different successive forms in socio cultural institutions / culture of human kind are developed over different periods of time.

E.B. Taylor | - 1) British, 2) Father of Modern Ant'.

3) Unilinear, 4) Classical evolutionalist 19th century Ant'ite.

→ Savagery - Barbarism - Civilisation

Says: 5) Culture is complex whole which includes knowledge, belief, art, morals, law, customs & any other capabilities and habits acquired by man as member of society.

- Basic Idea is - 6) Continuity of culture in process of devt.

- Origin of Animism → Polytheism → Monotheism

7) Stone → Bronze → Iron age.

JAMES FRAZER | - British - Social Ant's - His work - GOLDEN BOUGH (1890)
- All societies progress through successive stages of evolution → Magic → Religion → Science

L.H. MORGAN | → 1) American (studied Iroquois tribe).

2) Ancient Society (book) - 4) Cultural devt - three stages, Sav, Bar, Civ
5) Sub division into lower, middle, upper

6) Studied kinship terms:

i) Classificatory kinship system - Mother, Mother's sister also Mother - Iroquois, Tamils

ii) Descriptive System.

J.J. BACHOFEN

- Classical Continental evolutionist
- German

- Says matrilineality; early form of Greek society.
- Heterism → Matriarchy → Patriarchy (Book - Mother right)
- Sexual promiscuity

NEO EVOLUTIONISM

- 20th century guys.
 - Dupt. of culture not unilinear, but PARABOLIC CURVE.
 - A social instm - born in specific form in early stage
 - Develops into different form in different directions
 - Moves towards original form, but modified.
- Ex: No clothes - full clothes → Scanty dress style (Nudism)
 Promiscuity - Monogamy - freedom of sex.

JULIAN STEWARD

- American neo-evolutionist.
- Book - Theory of culture Change - gave three fold classification of cultural evolution - TYPOLOGY of Cultural evolution.
 - i) UNILINEAR : - Simple to complex
 - Taylor & Morgan.
 - ii) UNIVERSAL : - Evolution of culture as a whole culture of mankind instead of particular cultures.
 - Gordon Childe
 - Leslie A. White.
 - Evolution universal phenomena
 - Every culture subjected to ^{some} evolution process.
 - iii) MULTILINEAR - Evolutionist interested in particular culture
 - J. Steward
 - All cultures didn't went through same phases, becoz of environmental changes.
 - Proposed Cultural ecology
 - Not uniform throughout world.

LESLIE A WHITE

- Book - Evolution of Culture AIR#574

- American

Says - Culture developed as amount of energy utilised per capita per year increases.

- Dvpt of human being \propto amount energy utilised.
- Technology progress \rightarrow Culture progress.

$$\boxed{EXT = C}$$

For him

- Socio cultural system consists of
 - Techno-economic
 - Sociological - family, marriage, kinship
 - Ideological - Ideas, beliefs, values

V.GORDON CHILDE- Book - Social Evolution

- British Neo evolutionists - Proposed concept - Neolithic Revolution

- Says evolution of culture has three major events:

- i) Invention of food production
- ii) Urbanisation
- iii) Industrialisation.

Influenced by Morgan
Taylor.

- Discussed evolution of humanity as a whole, so he is called UNIVERSAL EVOLUTIONIST.

- At each stage of cultural dvept, humankind also dvept through technological change.

Savagery - Hunting / Gathering

Barbarism - Domestion / Agri

Higher Barbarism - Tools / Smelting

Civilisation - Cities / inventn / writing

- He relied more on archeological data to propose this universal scheme of cultural evolution.

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STRUCTURAL FUNCTIONALISM

- Radcliffe Brown proposed in his book - Structure & Function in Primitive societies.
- How functions could be analysed in context of structure.

Concept of social structure & its function.

↳ Refers to arrangements of parts or components related to one another.

- In S.S., ultimate components are human beings.
- Arrangement of persons in relation to each other.
- Within a society, individuals are grouped into social units and institutions.
- These are interrelated & interdependent - forming structure of society.

Ex: Village - Family → Father Mom
Son Daughter.

Types of S.S.:

S.S. is continuous arrangement of persons controlled by social institutions.

Constant & continuous change - affecting structure of society

Ex: Birth - death, Marriage - divorce.

Based on this:

i) Actual Structure: - Refers to internal structure of society
- It is relationship change with time.
- Birth, immigration, death, marriage.

ii) General Structure: Refers to external structure of society
- Constitutes Social Institutions, which remains constant even though internal changes occur. Ex: family.

SOCIAL STRUCTURE refers to arrangement of persons.

SOCIAL ORGANISATION refers to arrangement of activities of two or more persons.

STRUCTURALISM (Levi-Strauss)

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Strauss & Brown says - 1) Structure is an ordered arrangement
→ Believer of psychic unity of parts.

Levi's ^{marking} suggests that structure of human thought process is
same in all cultures - which are reflected in cultural institutions.

- [Hidden reality exists beneath all cultural expressions]
can be examined by studying known myth, ritual, history.

AIM: 2) To understand the underlying meaning involved in
human thought as expressed in cultural acts.

for him, study of language / formality of words was essential
to know the social structure.

PREMISE - Principles of thought are comparable for
cross cultural analysis.

- Here structure implies structure of human thought
process.

- Social structure is only a model to be
applied to any kind of social studies (has nothing to
do with empirical reality).

He is concerned with psychological factors
and processes in order to explain various cultural practices.

- Related Myths & legends as surface representations of
underlying structure of human mind.

- According to him, human mind undergoes Dualism.

Conscious Unconscious
levels.

Criticism:

1) Imprecise & dependent on observer.
2) Independent structural analyses may not arrive same conclusions.

3) It is ahistoric & static.

4) Lacks human individuality.

5) Doesn't account independent human acts.

6) Never proved - leading to theories of post-structuralism.

7) Not validated, so not scientific.

CULTURE / PERSONALITY SCHOOL OF SCHOOLS OF CULTURE AND PERSONALITY

AIR#574

Prime aim is to examine the relationship b/w culture and personality.

- Psychological Anthropology - ✓

Here - Culture is acquired }
imitated }
Learned } - Character formation | development of personality | Before adolescence traits

Personality refers to integrated & dynamic organisation of physical, mental & social qualities of an individual.

- is - acquired
- Unique
- influenced by social interaction
- Persistent qualities of an individual.

Not a mysterious phenomenon
Not related to body structure alone.

Determinants of personality - Environment, hereditary, cultural peculiar experiences.

Three approaches to study inter-relationship b/w Culture and Personality

- i) Personality builds Culture

Ruth Benedict - Culture is personality writ at large.
- Culture is not self created, but by personality.
- Humans create culture to fulfil their needs.
- Culture gift of personality. (Studies on Kwakiutl, Dobu, Pueblo Zuni).

Two types of personalities:

- i) Apollonian - kindness, humanity, peace in cultures. Ex: Pueblo Mexico
- ii) Dionysian - Dobu, Kwakiutl.
Conflict
Competitiveness
Violence.

Cultures of these groups differ becoz members have different characters, and accordingly they behave as cultural groups.

Gave concept of cultural pattern - ?

Studies on National Character

- Content analysis method to study culture at distance.
- Japanese POW, historical documents, Japanese immigrants.
- Book - Chrysanthemum & sword.
- Socialisation process of Japanese children (Apollonian).
Adult hood (Dionysian).

CULTURE DETERMINES PERSONALITY

Margaret Mead. - Individuals adopt material & non material aspects of culture.

- Culture teaches to behave in a particular way.
- She studied Mundugumor / Arapesh / Tschambuli societies of New Guinea common single peaceful.

Culture & personality influence each other - Ralph Linton
Abram Kardiner.

Clifford Geertz

Content :- Coined two main theoretical ideas:

- 1) Unintelligible beliefs can be understood as part of cultural systems.
 - 2) Actions are guided by interpretations.
- Main contribution was symbols are direct reflection of church.
He looked culture as social meaning, not as social structure.

Turner :- Symbols are mechanisms for maintenance of society

- Created symbolic analysis.
- Ritual symbolism is his main contribution.

Coined Multivocality - One symbol can mean many meanings.

Symbolism

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Interpretive study is study of symbols in their socio cultural context
AIR#574
they are vehicles of cultures.

- Symbol can be anything which has a meaning.
- Emerged in 20th century to study culture with symbols.
- → Representation of non material aspects such as values, idea

Three categories:

- 1) BRITISH Symbolism: Introduced by MARY DOUGLAS & MAUSES

Victor Turner Studied rituals of Zambia (Ndembu tribe).

Significance of Madyi tree - centre of all ceremonies & rituals

- Some kinmen are not allowed to participate - Social stratification (butchers, leather garments).

- Mother in law not allowed to participate.

- He considers Symbols as mechanisms of social processes, where rituals help individuals adapt to changing roles & status.

Ex: After puberty ceremony - given adult roles.

- 2) MARY DOUGLAS - Emphasise on rituals as purification of

physical body mechanisms & Child birth, excreta & menstruation

- These occasions are considered impure.

- 3) FRENCH Symbolism - Levi-Strauss (Binary mental structures).

- Attempted to identify human behaviour through "MENTAL STRUCTURE".

Study of Cuisines - symbolise relationship b/w Guest & Host.

kinmen served roasted food & non kinmen - cooked food.

He correlated it to cannibalism.

- 4) American - Clifford Geertz - based on studies of Bali Island.

Focus on meaning/significance of symbols & how they lost significance

COCK FIGHTS of Bali & Alor Island - participants/ audience has to follow etiquettes - masks, dress patterns according to social status.

- Winning results in elevation of social status.

- Currently they are just a social gathering.

- He extended his study to Religious Symbols.

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Human Chromosomes - Animals have fixed number.

Male - 23 pairs - 2^n

Female - 23 pairs - 2^n

Numerical Chromosomal Variation occurs as a result of an error during meiosis called NON-DISJUNCTION.

Numerical Aberrations (HETEROPOLOIDY) - phenomena in variations in number of chromosomes.

EUPLOIDY

Looses/acquires a set of Chromosomes

ANEUPLOIDY

Looses/acquires 1 or more Chromosome

MONOPOLOIDY (n)

- Whatever the condn of organism, only n no. of chr. present.

Postmenopausal.
(Haploid).

POLYPLOIDY ($3n, 4n \dots$)

In addition to diploid condition more haploid sets present.

In Haploid - Chromosome number becomes half.

HYPERTROPHY

Addition of one/more Chromosomes to $2n$

TRISOMY ($2n+1$)

1) Sex chromosomal
One chromosome added

2) Autosomal - 21-Trisomy (Down's)

18 - Trisomy (Edwards)
13 - Trisomy (Patau's)

TETRASOMY ($2n+2$)

Two Chromosomes added

Klinefelter's

Syndrome (47,XX)

Superfemale (47,XXX)

HYPOTROPHY

Loss of one or more Chromosomes from $2n$.

Monosomy ($2n-1$)

Double (Loose from another pair)
Triple

Sex chromosomal - TURNER'S SYNDROME (45,XX)

Autosomal - 18 monosomy

21 monosomy

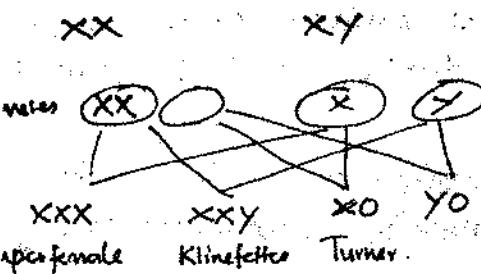
Cat eye syndrome

Nullisomy ($2n-2$)

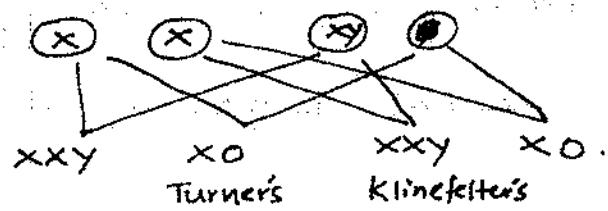
Loss of both Chromosomes of homologous pair.

SEX CHROSOMAL ABERRATIONS

Nondisjunction in Oogenesis.



Non Disjunction in Spermatogenesis (female) XX XY (Male)



KLINEFELTER'S SYNDROME

karyotype - 47, XXY

Clinical - Sterile (rudimentary testes)

- Tall, long limbs
- feminine features
- Enlarged breast (Gynaecomastia)
- Rounded type.
- Hair (secondary) absent.
- low intelligence.

SUPERFEMALE - 47, XXX (Trisomy).

- 1 in 1200 female birth
- 47,XXX women perfectly normal
- But in other polysomy -
 - Under devd secondary sex chw
 - Sterility
 - Mental retardation.

TURNER'S SYNDROME (X Monosomy) /45, XO

Frequency - 1 - 5000

Clinical Symptoms

Rudiment ovaries.

Short stature.

Webbing of neck.

↓ Carrying angle (cubitus valgus).

Shield like chest.

Under devd sexual characters.

Congenital malformations

Cardiovascular System - Ventricular septal defect.

Urinary System - renal

hyperplasia.

Duplicatus of uterus.

Mostly sterile females.

Diagnosis - Symptoms karyotype.

- Barr body

Dermatoglyphic Study,

AUTOSOMAL ABERRATIONS

DOWNS SYNDROME (Trisomy 21), Mongolism, 47, 21+.

frequency - Direct correlation b/w occurrence of syndrome / age of mother

Symptoms - resemble one another

- Epicanthic fold.
- Round heads / flat faces
- Mentally / physically retarded
- Shortened life expectancy
- Poor muscle tone
- Prone to respiratory disease
- Heart malformations.

ORIGIN - Non-disjunction of chromosome 21 during paternal meiosis.
Maternal

Diagnosis - Symptoms + Age of mother

- Amniocentesis / Chronic villous sampling

Prevention: Genetic counselling, prenatal diagnostic technique.

EDWARD SYNDROME - Trisomy 18.

Frequent in 4500 births.

- 95% abort, 1-2% (upto 10 yrs)

Combined effect of Aspiration pneumonia,

- Apnea, Congenital heart defects

PATAU SYNDROME

Trisomy - 13.

Mentally retarded

frequent cleft, harelip

Polydactyly

Sessile project - Neutrophils

CLINICAL FEATURES

- Diagnosis - Small triangular mouth
- Flexible fingers.
- Prenatal growth deficit
- Unable to walk.
- Mental retardation.
- Short / prominent sternum

CATCHY SYNDROME

- Autosomal monosity.
- Not reported beyond birth.

NONDISJUNCTION is failure of homologous chromosomes to separate properly during cell division. It results in daughter cells with abnormal chromosome numbers. There are three types of:

1) Failure in meiosis - I,

2) Failure in - II.

3) Mitosis.

STRUCTURAL ABERRATIONS

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Delete

Add portions.

Rearrange

- Chromosome alterations becoz of Structural changes -

Causes : 1) Ionizing radiation

2) Chemical Agents

3) Virus.

) CHANGES INVOLVING NUMBER OF GENE LOCI

- 1) Deficiency (or) Deletion: - Loss of genes , depends upon length of lost -
- Detached segment doesn't survive (no centromere)

- Types:
- a) Terminal deletion - single break (often termed Deficiency)
 - b) Intercalary deletion - two breaks (often termed deletion).

Detection: Phenotypic studies — Round moon face -
mewing of cat.
Philadelphia Chromosome syndrome.

Cytological studies -

Significance: Small genes behave recessive - used for chromosome maps
Small ones - not cause any detectable change.

Large - Detrimental

Homozygosity - deletion (consequence of size) - lethal.

Heterozygosity - Abnormal.

- 2) DUPLICATION - Presence of same block of genes more than once in a haploid complement -
- Additional blocks called REPEAT.

Origin: Unequal crossing over / replication error prior to meiosis.
Attachment of deleted piece.

Types:

1) Tandem - Added segment in close association with original segment
(ABC BBC DEF)

2) Reverse Tandem - aligned sequence but reverse (ABCCBA DEF)

3) Displaced duplication

- Attached to some non homologous

SIGNIFICANCE

- gene redundancy { may }
- Phenotypic Variation
- effect depends upon its presence & position.
- Important source of genetic variability

CHANGES INVOLVING

LOCATION ARRANGEMENT

S.CHITHARANJAN
OF GENES AIR#554

- a) **Translocation**: kind of Chromosomal rearrangement.
- movement to a new location in the genome.
- ORIGIN**: Result of interchange of chromosome segments between non homologous chromosomes.
- TYPES:**
- Simple translocation :- One way (rare type) - Single break
 - Shift translocation:- Three breaks
 - Reciprocal translocation:
 - Homozygous reciprocal
 - Heterozygous reciprocal
 - Multiple translocation
 - Robertsonian translocatn. - Common type = Breaks at extreme ends of short arms of 2 non-homologous acrocentric chromosomes. Small segments lost & large ones fuse producing Meta centric chromosome. (Refer WIKI).
- familial down's syndrome.

OCCURENCE

- Common occurrence
- Introduction of genetic polymorphism in populations
- Origin of new species (for).

SIGNIFICANCE

- Cause change in morphology
- Introduce genetic polymorphism.

b) **Inversion**

- Chromosomal segment turn around 180°.
- Doesn't involve loss of genetic information
- Require 2 break points.

TYPES

- Paracentric Inversion - Centromere not involved.

- Pericentric - " part of inversion.

CONSEQUENCES

- Not drastic
- Suppress Crossing over
- formation of new spaces by splitting parental std

Ring Chromosome - Pericentric inversion may lead to.
- Chromosomal mosaics.

Iso Chromosomes - Chromosome with two identical arms.
- Result of incorrect splitting of centromere.

MENDELIAN GENETICS

S.CHITHARANJAN
(Qualitative AIR#574
genetics)

Reasons for non-recognition

- 1) Mathematical analysis of probability events seemed foreign.
- 2) Conclusions didn't fit well with existing theories as everyone had preconceptions about causes of variation.

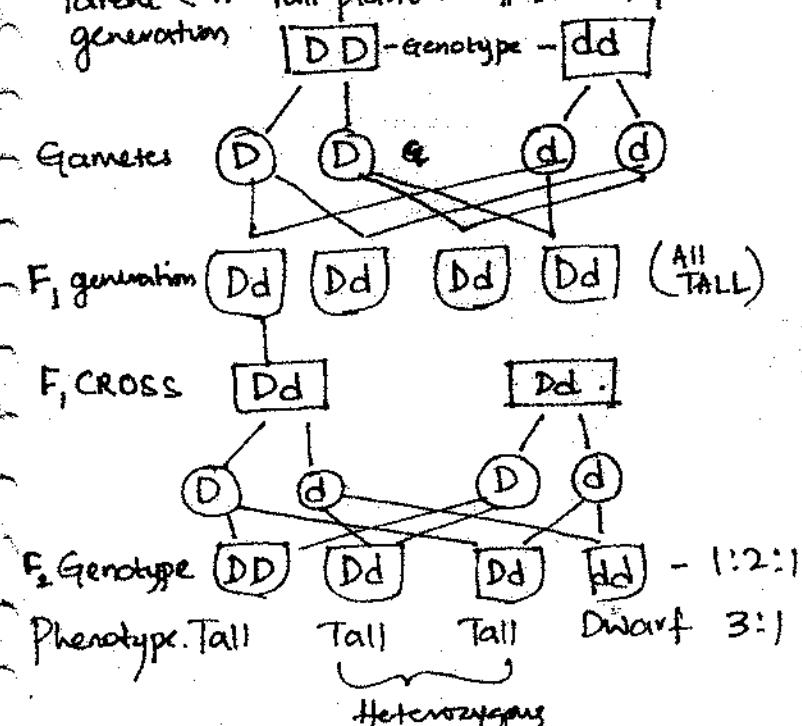
Reasons for success

- * Selection of pea plant.
- 2) Bisexual flowers - self fertilised
- 3) Contrasting characters.
- 4) Easy cross pollination.
- 5) Fertile hybrids.
- 6) easy to cultivate
- 7) short life cycle.
- * Studied inheritance of character one at a time
- * Maintained statistical records.
- * Chose seven contrasting colours.
- Character.

SINGLE FACTOR INHERITANCE IN MAN

MONOHYBRID CROSS : Cross involving two contrasting characters.

Parent (P₁) Tall plant-Phenotype-Dwarf plant generation



Based on this four postulates:
PRINCIPLES OF INHERITANCE

- 1) Law of Unit Character - particular unit for each trait - Unit factor/Gene serve as basic unit of heredity.
- Each factor has two forms (alleles) one from mother & father.
- Two alleles same character - HOMOZYGOUS
- Two alleles different character - HETEROZYGOUS
- 2) Law of Dominance / Recessiveness

Two unlike unit factors responsible for a single character are present at a locus in an individual, Dominant factor mask the recessive factor expression.

3) Law of Segregation - During production of gametes ~~the HITHARAN AIR#574~~
of each hereditary factor segregate so that offspring acquire one factor from each parent (equal ^{gene} numerosity), therefore gametes are pure (tall or dwarf) - So called LAW OF PURITY OF GAMETES.

MULTIFACTOR CROSS (DIHYBRID CROSS)

- Cross involving two types of contrasting traits.

P₁ cross
Phenotype - Yellow, Round × Green, Wrinkled

Genotype - GG WW gg ww

Gametes $\text{G} \text{W}$ $\text{g} \text{W}$ $\text{g} \text{w}$ $\text{G} \text{w}$

F₁ generation - Phenotypically Yellow & Round
Genotypically $\boxed{\text{Gg Ww}}$

cross - $\text{Gg Ww} \times \text{Gg Ww}$

9:3:3:1. - DIHYBRID RATIO

L.I.A - Genes for one trait are not inherited with another trait.

FOURTH POSTULATE

LAW OF INDEPENDENT ASSORTMENT

When two or more characters are inherited, individual hereditary factors ASSORT independently during gamete production, giving different traits an equal opportunity of occurring together.

- Linked factors don't show independent assortment.

BIOLOGICAL SIGNIFICANCE OF MENDEL'S LAWS

- 1) Eugenics.
- 2) Disease resistance variety of grains.
- 3) New breeds (Horse/Pugs)
- 4) fowl varieties.
- 5) Inheritance pattern.
- 6) Behaviour / functn of genes
- 7) Record Keeping emphasis.

TEST CROSS - also called Back Cross.

- For identification of plant DD or Dd (Homo or Heterozygous)
- The unknown genotype ^{animal} plant expressing dominant phenotype is crossed with HOMOZYGOUS RECESSIVE INDIVIDUAL.
- Two outputs of F_1 generation.
 - 1) All tall - shows unknown is Homozygous
 - 2) 50:50 (1:1) - Tall:Short - Heterozygous.

Crosses b/w F_1 offspring with either of two parents are known as BACK CROSS. When F_1 offsprings are crossed with dominant parents all the F_2 offsprings with dominant character & look like similar.

MULTIFACTOR INHERITANCE

Not as simple as single factor - Here humans influenced by (Phenotype)

- 1) multiple genes (Genetic factors)
- 2) Environmental factors

- 3) Variation

- Single phenotype result of many genotype.
- " Genotype result of many phenotype.

Complex traits are - Weight, B.P., Infant growth rate
Serum Cholesterol level,
Longevity, fitness.

Three categories of traits are frequently have COMPLEX INHERITANCE

- 1) Quantitative traits - Continuously vary one extreme to another
Ex: Height, weight, B.P.
- 2) Categorical traits -
- 3) Threshold traits -

APPLICATIONS OF MENDEL LAWS

- 1) Determination of blood groups
- 2) Determination of sex of offsprings
- 3) Determin of R^b immunisity
- 4) Pedigree analysis
- 5) Medico legal applications Histo compatibilities
Inborn errors of metabolism.
- 6) Genetic Counselling
- 7) Hybrid varieties
- 8) Understanding types of inheritance
- 9)

LIMITATIONS

- Human family small. - Can't study more than 4 or 5 generations
- Prolonged growth & sexual dupt - Experimental breeding not allowed.

THAI DEVIANCE

LETHAL & SUB-LETHAL INHERITANCE

S.CHITHARANJAN
IN MANR#574

- * Genes with regular fatal effect called - LETHAL GENES.
- * The phenomena of single gene influencing more than one character (multiple expression) is called PLEIOTROPISM.
 - Such genes called Pleiotropic genes.
- * The effect of lethal genes is due to pleiotropic effect.

DOMINANCE - Intra allelic gene suppression (Dd)

EPISTASIS - Inter allelic gene suppression ($Dd \swarrow \nwarrow Ww$)
different alleles

CLASSIFICATION :- Based on nature

Lethal genes interfere with production of gene product.

- 1) Gametic Lethals - Genes make gametes inviable.
Phenomena called Segregation distortion
- 2) Sub Lethals - Death infancy / childhood.
- 3) Semi Lethals - After reproductive age (Huntington's disease).

Another Classifn

- 1) Incomplete DOMINANT - Lethal in Homozygous condn (DD or dd)
Abnormal in Heterozygous " (Dd) ~~or~~ still die.

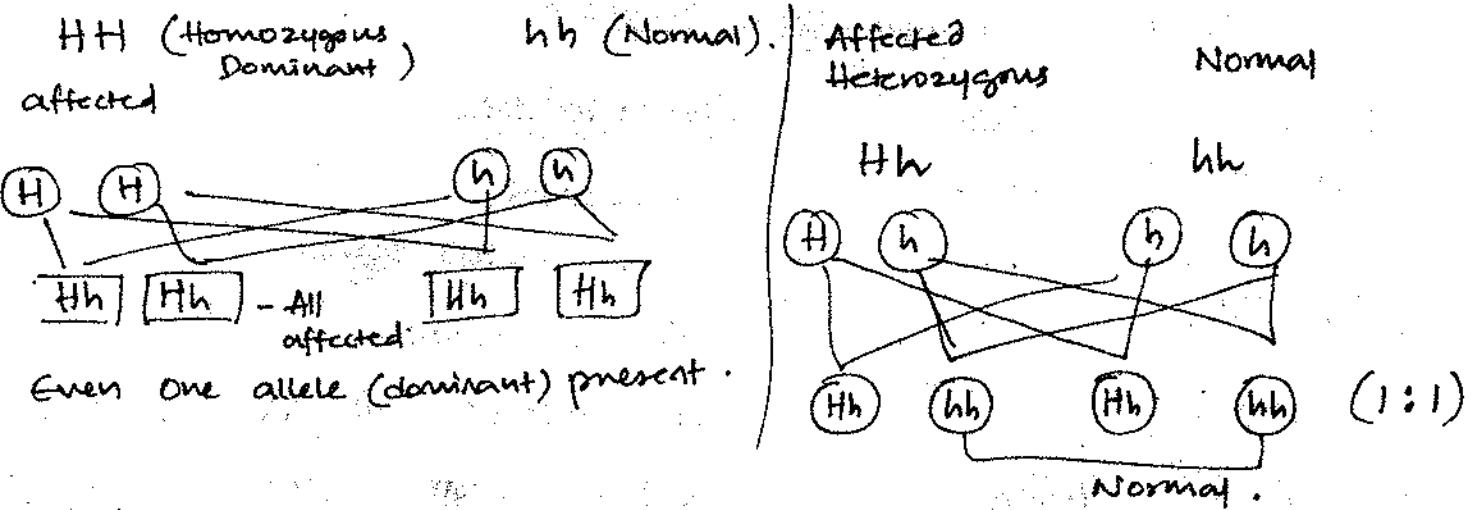
Ex: Sickle cell Anaemia (Genetic disorder).

- Caused by Hb^S gene - Lethal in Homozygous. ($Hb^S Hb^S$)
- Becoz of change in single nucleotide in a gene - amino acid 6 in β -globin from Glumatic acid to Valine - formation of Hb^S (not Hb^A)
- Mutant β -globulin cause RBC to polymerise - distort of shape.
Sickle shape block blood flow - heart attacks, anemia.
- Marriage b/w two carriers - 2 carriers : 1 normal : 1 dies.
($Hb^A Hb^S$),

2) COMPLETE DOMINANT

2) HUNTINGTON'S DISEASE

- Semi-lethal disease
- Due to DOMINANT autosomal allele H.
- Expressed even if a single dominant allele is present.
- Lethal gene will transmit to next generation also.
- Symptoms appear at age of 40 yrs.
- Muscular failure, mental retardation, Death.



b) EPILOIA LETHAL INHERITANCE

(Sub lethal).

- Phenotypic - mental defects, tumours, Abnormal skin growths.
- Death in early stages even in Heterozygous condition.

3) RECESSIVE LETHALS

- Death only in homozygous condition (don't survive)
- Most common among all.
- Heterozygotes normal (apparently)

? HEMOPHILIA (semi lethal) - As males can never be Heterozygous for lethal factor - So all males die. (Sex linked).

4) CONDITIONAL LETHALS - Genes differ - environment.

e. foetalis

Albinism - Lethal in plants.

- Humans not lethal.

- Females carriers

- Males get disease.

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POLYGENETIC INHERITANCE (quantitative genetics)

Some characteristics are determined by alleles (gene interaction) on several chromosomes or at several places of one chromosome - Polygenic inheritance.

Ex: Skin colour - quantitative character (more ↑ - more xpresn)
 - Cumulative effect (C.B. Davenport).

H. Nilson - Multiple gene hypothesis.

Negroes White
 AAB₁B₂ aabb



(4) AaBb (Mullatoes)

Cross AaBb AaBb

1 : 4 : 6 : 4 : 1

AABB Dark AAbb Light white

Negro Intermediate

Characteristics

- Cumulative
- Allele - equal effect
- NO DOMINANCE
- No epistasis at different loci.
- Traits overlap to form graded series called Continuous traits (Intermediate)
 - [In Mendel discontinuous - so no medium phenotypes]
- Influenced ^{by alleles at} general loci.
- Basis for racial classification.
- Continuous curve of Gaussian distribution in F₂ generation.
- Individuals with average phenotype more in number.

PENETRANCE - The % of individuals expressing the character for a particular genotype.

EXPRESSIVITY - The variation in degree of expression of a particular gene.

POPULATION GENETICS

- Mendel genetics based on Individual.
- Here we discuss gene(s) distribution in POPULATIONS.
- Many genotypes / populn. - from generation to generation.
- Structural & physiological changes are due to changes in types and frequencies of genes in population.

Three phases of research:

- | | |
|---------------------------------|------------------------|
| i) Origin of genetic diversity | - Mutation |
| ii) Spread of genetic diversity | - Migratn, G-drift |
| iii) fixation | - Race, species formn. |

CONTINUOUS VARIATION

- Variations fluctuate around an average or mean of species.
- Direction is predictable
- Already present in population
- Formed due to chance segregation of chromosomes during gamete formation, crossing over & chance pairing during fertilisation
- Can't form new species.
- Intermediate stages
- Called fluctuations.
- Smooth bell shaped curve
- Very common
- Don't disturb genetic system.
- NO LIMIT

Ex: Height, weight, leaf length.
Skin colour.

DISCONTINUOUS VARIATION

- Mean absent
- Unpredictable
- new to populations.
- due to changes in genome/genes
- ~~the fountain head of evolution~~
- Not connected by intermd stag
- Called MUTATIONS / SPORTS.
- No curve
- Occasionally
- Disturb genetic system.

Ex: finger prints

Eye colour

Blood groups.

GENETIC POLYMORPHISM

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- Occurrence of two or more genetically determined forms
 - in a population
 - with frequencies that rarest of them can't be maintained by mutation alone.
 - By examining discrete, discontinuous traits variations we can study genetic polymorphism existing in population.
 - Population consisting of discrete & discontinuous traits are said to be polymorphic.
- SOURCE
- 1) Mutation
 - 2) On this selection operates
 - 3) Product of mutation & flow of genetic information
- frequency must be $> 1\%$ to confirm involvement of selection.

GENETIC MARKERS — Segments of DNA which have been traced to specific location on chromosome & associated with particular traits.

Alphical studies carried out based on GM to understand

1) GENETIC VARIATIONS among indigenous Populns.

- 1) Gene history
- 2) Origin & affinities (inheritance)

DEFN:- A trait that is 1) genetically determined

2) Simple ^(independent) pattern of inheritance

3) Classified accurately

4) Variants enough to label as G. Polym

BLOOD GROUP POLYM: (Red cell Antigens).

BG & HLA as genetic markers because:

- 1) Not same in all.
- 2) Simple pattern.
- 3) Different frequency in individuals.
- 4) Not influenced by environt.

Important in following condns:- 1) Blood transfusion

2) Tissue transplants

3) Hemolytic diseases

4) Parentage determin.

ABO Blood group System:

Lud. Steiner discovered

→ A & B antigens on RBC

→ a & b antibody in plasma.

- ABO example for multiple alleles.

- Alleles are A, B, O genes located at ABO locus on long arm of Chromosome no. 9.

- 'O' is recessive

→ If A has two genotypes → A₁, A₂

- A & B are codominant.

Domination: $A_1 > A_2 > O$

||

B.

- Ten Genotypes found & 6 phenotypes (O, A, A_2, B, A_1B, A_2B) (by taking 4 alleles A, A_2, B, O).

→ Blood group Antigens are structures protruding from outer surface of RBC membrane.

- If RBC has Antigen A, then plasma has Antibody 'B' and vice versa.

Ex: A blood group — A antigen on RBC b in plasma.

'O' universal donor - as no antigens.

'AB' universal Recipient - contains no antibodies.

Distribution: 'O' - 47%, 'A' -

'A' - 41% — Europe Asia, Australian tribes

Absent in Australia tribes 'B' - 9% — North India, Central Asia.

'AB' - 3%.

- A increases & B decreases as one proceeds from Asia to Europe (\leftarrow).

- Amer Indians — A & B genes are absent.
(South & Central)

→ In N.American Indians — Only 'A' gene, No 'B' gene even.

This shows blood groups are subjected to

NATURAL SELECTION.

Boyd says Bg used for racial criteria, because of advantages:

- 1) Inherited in known way (Mendelian)
- 2) Sharply distinguishable.
- 3) Not altered by food, climate
- 4) frequency stable.
- 5) Correlate w/ Geography

ABO Incompatibility - Hemolytic diseases (incompatibility b/w Mom / child)
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- Results in still birth or infant death.

Two types of incompatibilities:

1) Compatible: - Homospecific - father can transmit A & B gene to baby, which is present in mother.

2) Incompatible Heterospecific

- Father can transmit A or B gene, but not to be present in mother.

R^h Blood group System

→ Landsteiner & Wiener.

- Persons possessing this factor are Rh⁺.

- Rh system is independent of other blood groups.

- There are three Rh factors - RhO, Rh^I; Rh^{II} (Genotypes).

- RhO is most powerful & clinically significant.

- 8 phenotypes are distinguishable.

- Rh+ve is Antigen D ion RhO is present.

- Rh+ve differ as per races. European descent are 85% Rh⁺. Indians - 93%.

- There are no natural Anti-Rh antibodies in serum.

They arise only as incompatibility / pregnancy / transfusion Erythro-fetalis.

HLA & Transplantation

Arranging foreign cells, tissues, organs into body of a recipient - Transplantation.

Types: - Auto, Allo, Iso, Xeno.
(Same sps) (twin)

Genetic basis for Rejection

- Tissue antigens for graft rejection are HLA.
- HLA system consists of 5 closely linked loci associated with short arm of Chromosome 6.
- Arranged as A, B, C, D & DR. (various alleles on these loci).
- There can be trillion combinations of these alleles possible so matching impossible (except twins mono - same loci & alleles)
- HLA antigens are present on WBC & tissue cells.
- Best possible match found among siblings, parent/child.

HLA disease - Certain Antigen (HLA) high risk for diseases like Ankylosing Spondylitis (B_{27}), D. mellitus (DR_3, B_8)
(mention dpt)
Rheumatoid Arthritis (DR_4).

Prevention of Graft Rejection

'T' cells are responsible, so suppress these.

- 1) Gluco corticoid hormones
- 2) Azathioprine
- 3) Cyclosporine

BLOOD PROTEIN POLYMORPHISM

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Blood proteins as EPM are:

- 1) Haptoglobin
- 2) Transferrins

HAPTOGLOBIN — Globin class of proteins

Two alleles: — Binds with free Oxy hemoglobin

- 1) Hp¹ - Tropical Africa — Helps in conserving Iron from RBC destroyed by transporting free hemoglobin to liver
- 2) Hp² - throughout world (suggest present in ^{comby} ancestors)

TRANSFERRINS (TF)

The Iron is transferred by Transferrins to:

- i) Bone marrow — new RBC
- ii) Liver — Storage as ferritin
- TF is Iron binding globulin of blood plasma.
- Physiological fn - to act as a medium for distribution of Fe.
- Five alleles found - Tf^{A, B, C, D, E}
 - ↓ East Asia
 - ↓ most common.
 - Noraj.

BLOOD ENZYMES — all are not same, blood enzyme p.morph exists.
— Act as genetic markers:

Glucose 6 phosphate dehydrogenase

Adenyl kinase

Physiological Characteristics

- Variations related to age and sex.

i) Hb level - Iron containing porphyrin ring + protein (globin).

Two types: 1) Adult Hb

2) Fetal Hb (greater affinity to O₂).

Mutant forms: 1) Hbs 2) HbC 3) HbE

Hbs - Sickle cell haem - Valine replaces Glutamic acid at 6th position
- Mutation.

- Hbs allele in Tropical Africa - cultural & envt changes.

Person with HbA & Hbs - Heterozygous - low O₂ tension } African
- Resist Malaria } Negroes

HbE - S.E. Asia, India.

- Haem variation with Age, sex. (Normal - 14.5 gm/100ml)

- High altitudes high.

Verma (1976) studied GREAT ANDAMANESE - 30% Anemic.

BP - Lateral pressure exerted by blood on walls of blood vessels while blood flowing through them.

<u>Systolic</u>	120	- vessels contract.	Infancy - 70 mm Hg
Diastric	80	- " release.	Old age - 140 mm Hg.

Obese patients - high BP,

Body condn - Emotion - Increase BP.

- Diet and strain in life are more important for high BP other than heredity.

- Nutritional factors - Absence of green veg / fruits.
→ Incusion of fats.

$$\text{BODY FAT} - \text{Body fat \%} = \frac{\text{fat weight}}{\text{Total weight}} \times 100 \quad \text{S.CHITHARANJAN AIR#574}$$

- 1) Essential fat - maintains life / reproductive func. (high in women)
- 2) Storage fat - fat in adipose tissue
protects internal organs.
- Brown Adipose Tissue - In mammals - Infants & hibernators.
 - 5% of body fat in infants - To generate body heat in animals
 - to avoid lethal cold so that they don't shiver.
 - Infants more susceptible - high mitochondria, iron, capillaries
 - becoz: 1) High body surface 4) Lack of thermal insulation
 - 2) High surface - head 5) Inability to use shivering
 - 3) Inability to shiver 6) Underdeveloped nervous system
- Rose cases - Brown fat - tumour - HIBERNOMA.
- Body fat composed of Glycerides of various fatty acids

Sensory perceptions

- Eye - Green-Blue / Black - Brown - Mendel - Photoreception.
- Touch - Melanin - race - skin sensitivity - Mechano
- Tongue - Cuisine - dishes - Cultural - Tango
 - different food habit
- Smell - ~~Hunger~~ Continuous - brain ignores - Chemical factors - Olfactory
- Ear - factory - Occupational adaptions - Phono.
- External ear - Race
- Fundamentally all same, but some variations in form / function

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GENE IMPRINTING

Differential expression of genetic material

- Differential inheritance of genetic material from mother vs father
- Ex: DNA Methylation - Genes coming from mother are more methylated. This brings qualitative / quantitative differences.
- Excessive Methyl - disorders.
- Characters:
 - 1) Imprinted genes express variably
 - 2) Erasable.
 - 3) Not a rule (not found on all genes, so can't differentiate b/w male & female)
 - 4) Species specific.

- Significant in studying differential inheritance.

- Helps us to know effects of deletions in different sexes

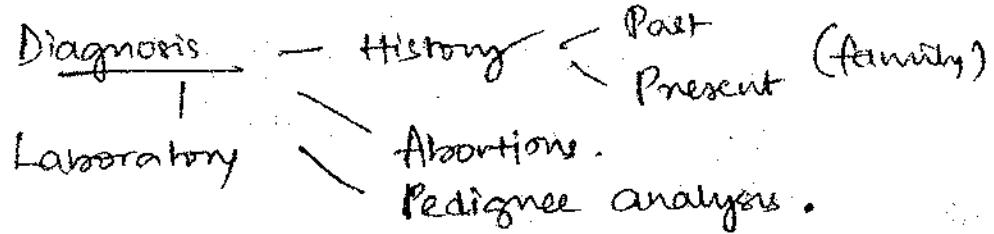
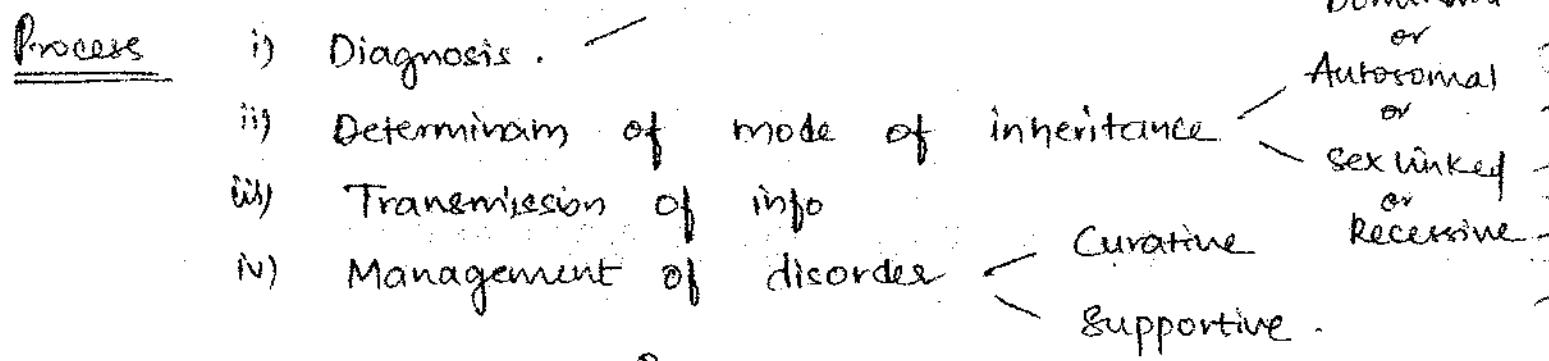
GENETIC SCREENING

- Analysis of chromosomes, proteins and certain metabolites in order to detect heritable disease.
- Used in persons at risk for particular genetic disorder.
- Appropriate when natural history of disease is understood
- Screening test are valid & reliable.
- i) Heterozygote screening - can determine if person is a carrier for specific disorder.
 - Can inform reproductive choices
- ii) Presymptomatic screening - for persons with family history
- iii) Prenatal diagnosis - Amniocentesis, Chorionic villus sampling
- iv) Newborn Screening - Phenylketonuria, galactosemia, hypothyroid so that prophylaxis to be initiated early

GENETIC COUNSELLING

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- Process in which relatives / patients at risk of genetic disorder are made aware of consequences of disorder.
- Its transmission, prevention, mitigation.



- Transmission of Info:
- 1) Psychology
 - 2) Emotional stress
 - 3) Attitude of family members
 - 4) Educational background
 - 5) Communication skills

Management

- Prenatal treatment - termination of pregnancy
 - CAH - Dexamethasone
 - Transfusion of stem cells

- Postnatal treatment - Recombinant drugs -
 - suproph
 - Inulin
 - Growth hormone
- Dietary restrictions
- Drugs
- Factor VIII

GENE THERAPY

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- Replacing defective gene with normal gene.
- To restore lost gene function in patient body.

Two kinds:

- i) Germiline gene therapy - Introduction of gene into
 - Will eliminate defect in future genz.
 - Ethical issues
- ii) Somatic Cell gene therapy - alters fns of somatic cells
 - Not transmitted.

Methods → [1) Micro injection 2) Electroporation 3) Calcium phosphate precipitation.
↓
Physical / Chem

~~Chemical~~ methods → Viral vectors - gene delivery into target cell
Biological

- Human DNA profiling - DNA fingerprinting, DNA typing
 - forensic technique used to identify individuals using DNA.
 - DNA profile is a small set of DNA variants that are very likely different in unrelated individuals
 - Parentage testing, criminal investigation.
- Certain areas on DNA are polymorphic - different in people. Each of us inherit unique combinations from our parents. These DNA polymorphisms are studied by DNA profile.

GENE MAPPING - Method used to identify the locus of gene and distances b/w genes.

To place a collection of molecular markers onto their suspective positions on genome.

GENOME STUDY - Genome is Organism's complete set of DNA, (all genes)

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MEIOSIS

- 1) Type of Reproduction - SEXUAL
- 2) Occurs in Humans, animals, plants, fungi
- 3) Genetically different.
- Mixing of Chromosomes occur
- Definition: A type of cellular reproduction in which the number of chromosomes are reduced by half through separation of homologous chromosomes, producing two haploid cells.
- Genetic diversity through sexual reproduction.
- No. of divisions - 2
- Cells produced - 4 haploid
- Chromosome number reduced by half.
- Stages - PMAT - I → PMAT - II
- Karyokinesis occurs in Interphase I
- CYTOKINESIS - T-1 & T-2.
- Centromeres split during Anaphase II (not A-I)
- Sex cells only - Egg cell, sperm
- Oscar Hertwieg (discovered by)

MITOSIS

- ASEXUAL
- All organisms.
- Identical
- Crossing over cannot occur
- A process of ASEXUAL reproduction in which the cell divides in two producing a replica, with an equal number of chromosomes in each resulting diploid cell.
- Cellular reproduction and general growth & repair of body
- Divisions - 1.
- 2 Diploid.
- Chromosome no. Remains same
- Stages - P M A T .
 - Karyokinesis occurs in Interphase
 - Cytokinesis is Telophase.
 - Centromeres split during Anaphase.
 - Other than sex cells.
- Walther Flemming

STRUCTURE OF DNA

- Consists of 2 polynucleotide strands in a double helix pattern.
- Nucleotide has three components: 1) Nitrogenous base
2) Deoxy ribose (Pentose sugar)
3) Phosphate group
- 1) Two types of Nitrogenous bases:

Purines - Adenine, Guanine (Double ring)

Pyrimidine - Cytosine, Thymine. (Single ring structure)

[Hydrogen bonds between Polynucleotides]

- A bonds (complementary) with T.
- G bonds u with C.
- Diameter of Helix is. 20 \AA .

functions of DNA

- Stores an organism's genetic material in nuclei.
- Protein synthesis.
- Transfers information.
- Information storage - sequence of bases in form of codes
 - ↑ to build proteins.
- Molecules are long enough to
- Base pairing means complementary strands can be replicated.
- Double helix gives molecule stability
- Hydrogen bonds allow for easy unzipping.

Personal Reconstruction / Identification

1) Identification of Sex

a) sexual dimorphism in pelvic girdle of female

- Pubic shape, Triangular in male, Rectangular in female
- Sacrum - Small / curved | Large / straighter.
- Subpubic angle - $< 90^\circ$ | $> 90^\circ$.

b) Cranial dimorphism -

- Palate - ~~Round~~
Deep
- ~~Sharp~~ Shallow.

Muscle attachment areas are more pronounced less pronounced

2) Determinants of Age

Skeletal & Dental changes during growth.

- a) Dental Eruption: Permanent / milk teeth.
Wisdom teeth after 15 yrs. } not so reliable.

3) Bone Growth - Basis of fusion of Epiphyses at different ages / time.

females mature more quickly, so (1 or 2) years subtract.
Once person reaches physiological maturity, age determination becomes more difficult.

- c) Degenerative Changes - Arthritis / Osteoporosis.

- d) Progressive changes in pubic symphyseal face.

- e) Ectocranial / endocranial Sutures closures.

Photo Superimposition

Facial Reconstruction

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