

BIO120: DARWIN

LECTURE 2

THEORY OF EVOLUTION

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LIVING THINGS CHANGE
GRADUALLY FROM ONE
FORM INTO ANOTHER OVER
TIME;

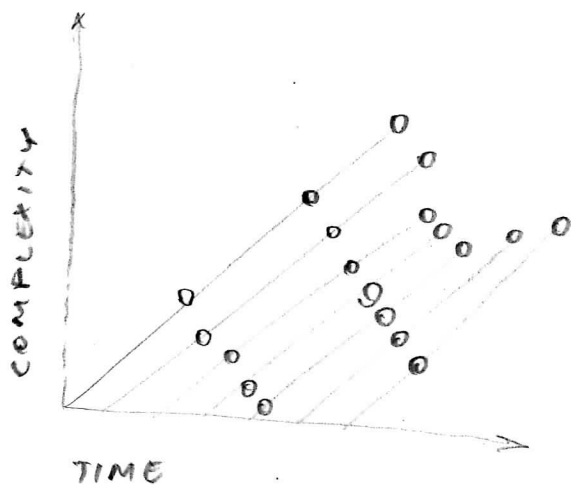
- CONCEPT OF A CHANGING UNIVERSE

- A PHENOMENON WITH NO PURPOSE
BLIND, MECHANISTIC PURPOSE
GIVEN APPROPRIATE CONDITIONS

CONTEMPORARY EVOLUTION
MOST PROMINENT IN:

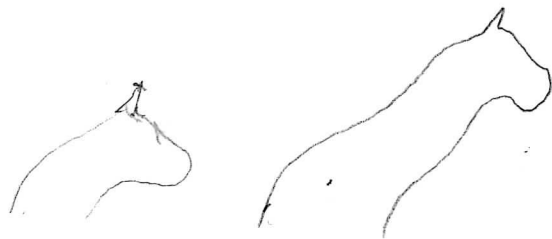
- HOSPITALS
- AGRICULTURE

de LAMARCKE
WAS WRONG



- FIRST TO USE THE TERM EVOLUTION
- LINEAR RATHER THAN BRANCHING VIEW OF EVOLUTION
- FIRST TO PROVIDE A CAUSAL MECHANISM:
THE INHERITANCE OF ACQUIRED CHARACTERS

eg. GIRAFFE



DARWIN & WALLACE

CO-DISCOVERED THE
CHIEF MECHANISM OF EVOLUTION:

"VOYAGE ON THE BEAGLE"

NATURAL SELECTION

- COLLECT BUTTERFLIES
AND SELL TO BUSINESSMEN
IN LONDON
- FORAND HIS
NICHE IN
INDONESIA & MALAYSIA

THE ORIGIN OF EVOLUTION

20 YEARS AFTER BEAGLE

1844: WROTE BUT
DID NOT PUBLISH
AN ESSAY

1856: START OF THE WORK

1858: "ON THE TENDENCY
OF VARIETIES..."
BY A.R. WALLACE

1858: LINNEAN SOCIETY
PRESENTATION
IN LONDON OF
DARWIN-WALLACE
PAPER

1859: PUBLICATION OF
"THE ORIGIN OF
SPECIES"

2 IDEAS:

- MICROEVOLUTION
NATURAL SELECTION
- MACROEVOLUTION
TREE OF LIFE

SELECTION

- SEP, 1882 DARWIN READS MALTHUS' ESSAY ON THE PRINCIPLE OF POPULATION
- 1842 - 1882 LIVED AT DOWN HOUSE AND CONDUCTED HIS RESEARCH AND WRITING THERE
? SHAGA'S DISEASE?

DARWINIAN WORLD-VIEW

- VARIATION IS NOT AN IMPERFECTION, BUT THE MATERIAL FROM WHICH NATURAL SELECTION DRAWS THE BEST TRAITS
- MOVING FROM TYPOLOGY TO POPULATION THINKING

REQUIREMENTS:

- VARIATION - VARIATION AMONG INDIVIDUALS IN A POPULATION
- HEREDITY - PROGENY RESEMBLE THEIR PARENTS MORE THAN UNRELATED INDIVIDUALS
- SELECTION - SOME FORMS ARE BETTER AT SURVIVING AND BREEDING THAN OTHERS IN A GIVEN ENVIRONMENT

DEVELOPMENT OF DARWIN'S IDEAS

- DARWIN INFLUENCED BY THE BOTANIST JOHN S. HENSLAW AT CAMBRIDGE
- VOYAGE ON H.M.S BEAGLE AROUND THE WORLD (1831-1836) AS SHIP'S NATURALIST THROUGH 'PULLING STRINGS'
- MADE NUMEROUS OBSERVATIONS AND COLLECTIONS OF PLANTS, ANIMALS & FOSSILS.

GRADUALISM

- 1830 DARWIN READS LYELL'S BOOK "PRINCIPLES OF GEOLOGY"
- NOTION OF DYNAMIC RATHER THAN A STATIC WORLD

SPECIATION

- MARCH, 1837 DOUBTING THE FIXITY OF SPECIES
- 4 SIMILAR SPECIES ENDEMIC TO THE ISLANDS DESCENDED FROM A SOUTH AMERICAN MAINLAND ANCESTOR
- 'BLURRING OF THE BOUNDARIES BETWEEN SPECIES'



DOUGLAS J. FUTUYAMA "SCIENCE ON TRIAL"