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Charles Darwin and the Evolution of Beauty
M-W 4-6:45

Fall 2020
Dr. Charissa N. Terranova
University of Texas at Dallas
Arts & Humanities

Office Hours: Online by appointment
Contact: terranova@utdallas.edu
www.charissaterranova.com

Monday September 21
Sexual Selection



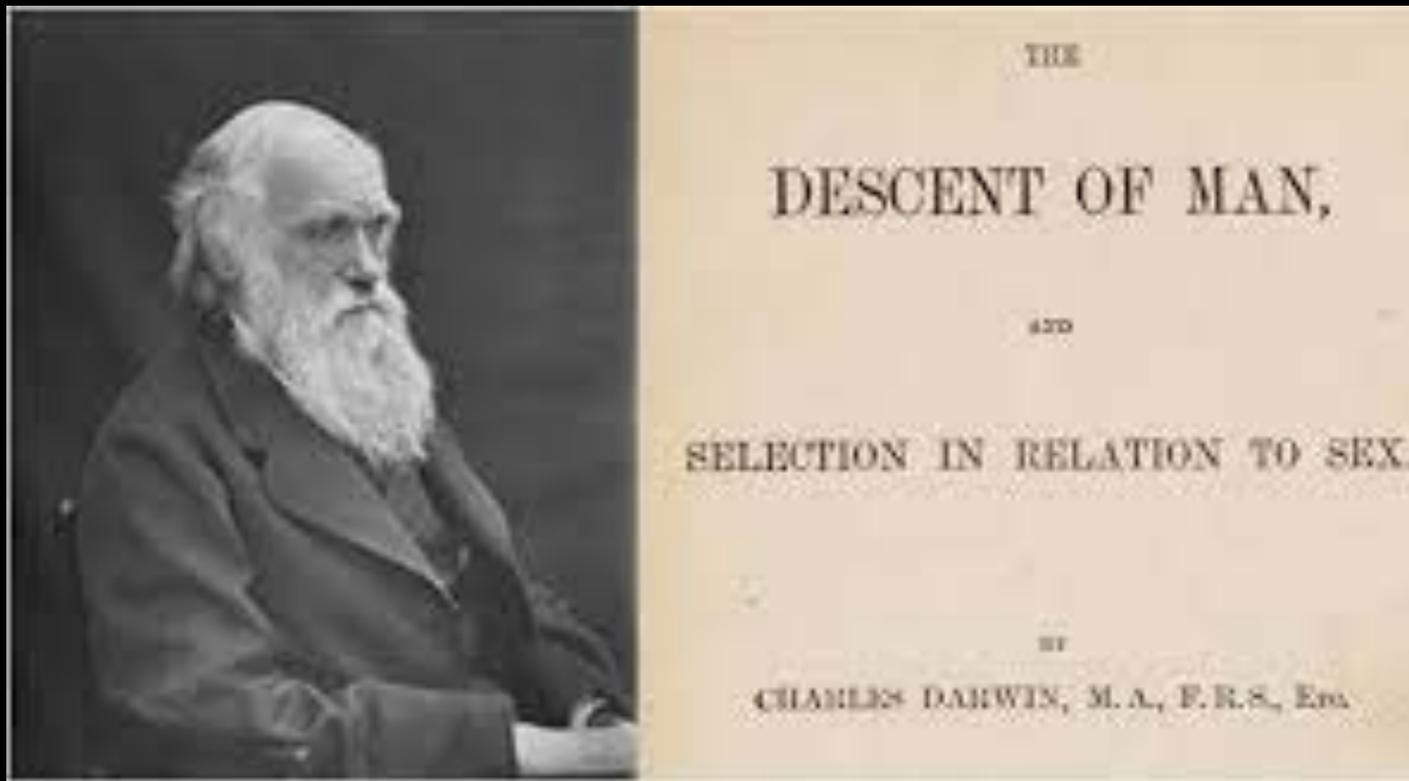
Monday September 21 Sexual Selection

Charles Darwin, *The Descent of Man, and Selection in Relation to Sex* (1871)

- Chapter I The Evidence of the Descent of Man from Some Lower Form
- Chapter VII On the Races of Man
- Chapter VIII Principles of Sexual Selection
- Chapter XIII Secondary Sexual Characteristics of Birds
- Chapter XIV Birds – Continued
- Chapter XIX Secondary Sexual Characters of Man
- Chapter XX Secondary Sexual Characters of Man – Continued

Meeting Schedule Wednesday September 23

- 2:00 Meagan Severson
- 2:30 Sara Scherper
- 3:00 Damian Enyasoah
- 3:30 Mya Adams
- 4:00 Kevin Johnson
- 4:30 Nick Payne
- 5:00 Eric Sampson

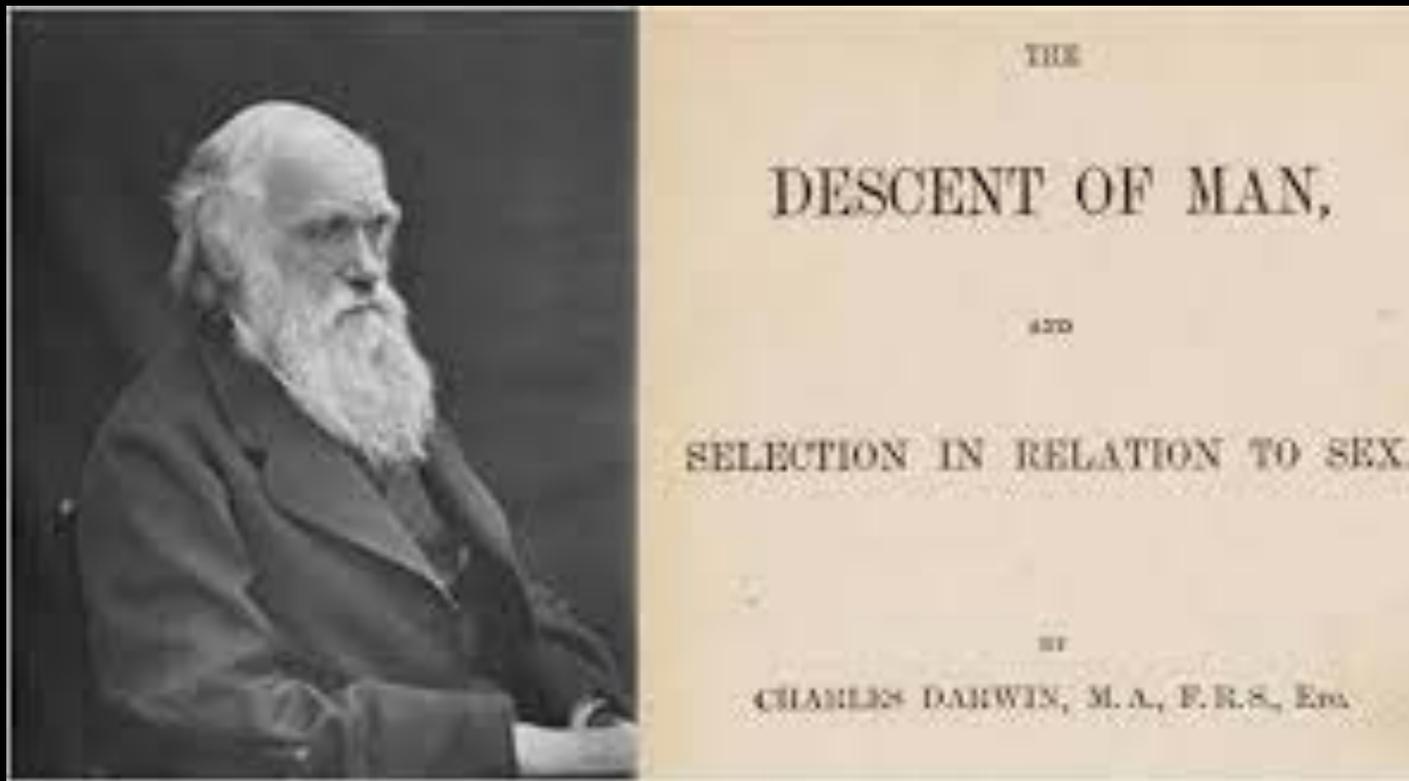


1.) Monogeny versus polygeny

2.) Female choice and aesthetic judgement in sexual selection

3.) Organization of book: Two volumes in one

https://assets.cambridge.org/97811080/05098/toc/9781108005098_toc.pdf



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One Species, or Two?

- Monogeny
 - The belief that all humans belong to a single species
 - Difference such as skin color, size, culture are superficial.
- Polygeny
 - The belief that what we perceive as racial differences are in fact different species of human.

Types of mankind - or ethnological researches, based upon the ancient monuments, paintings, sculptures, and crania of races and upon their natural, geographical, philological, and biblical history by Josiah Nott, et. al., 1857





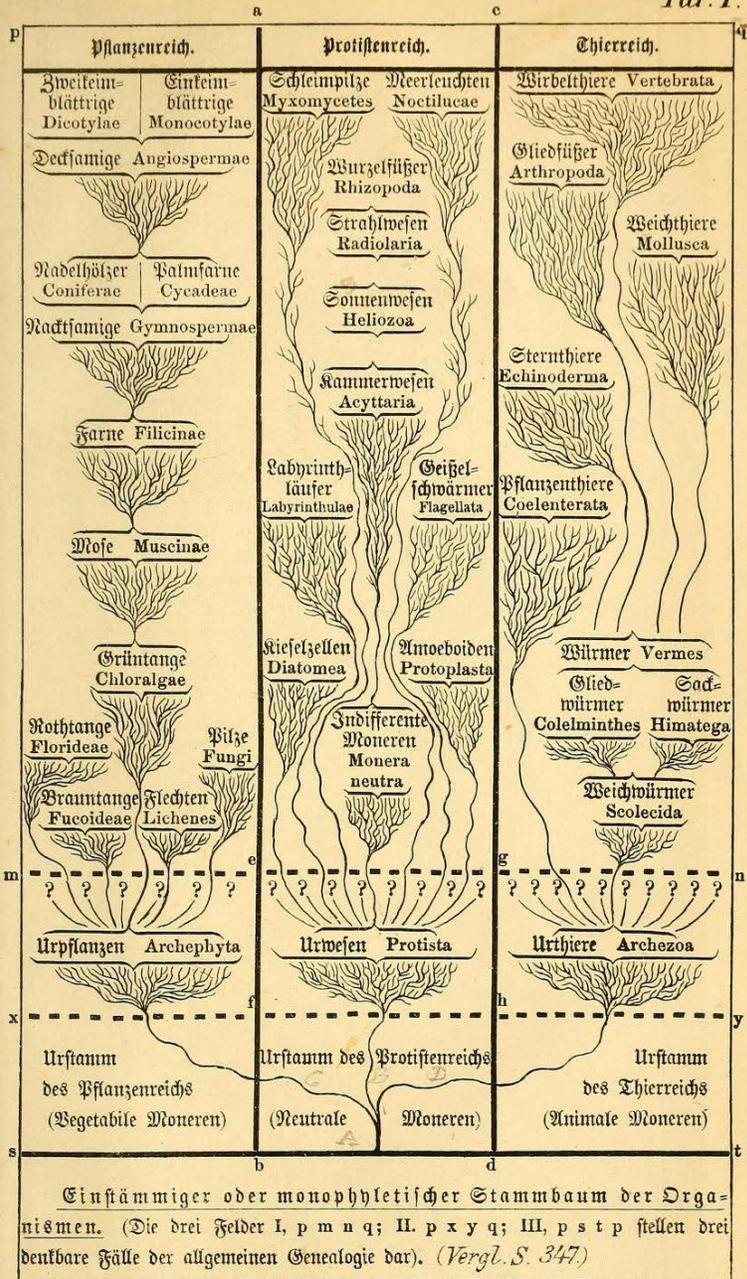
Agassiz's map of the "Realms of Mankind" from Nott and Gliddon's *Types of Mankind*.

Naturalist Louis Agassiz (1807-1873) became a professor at Harvard's Lawrence Scientific School in 1847 and remained at the university in Cambridge for the rest of his life. He became convinced of the validity of the theory of polygenism--that there was a plurality of origins of the human races. Defenders of slavery used polygenism to maintain that the different races were completely and genetically distinct and that slavery was a natural condition for an inferior race. <https://collections.countway.harvard.edu/onview/exhibits/show/this-abominable-traffic/agassiz-and-polygenism>

The End of Polygeny

- Darwin's theory of evolution posits a common ancestor for all humans, thus eliminating the possibility of claiming that different races are separate species.

Taf. I.

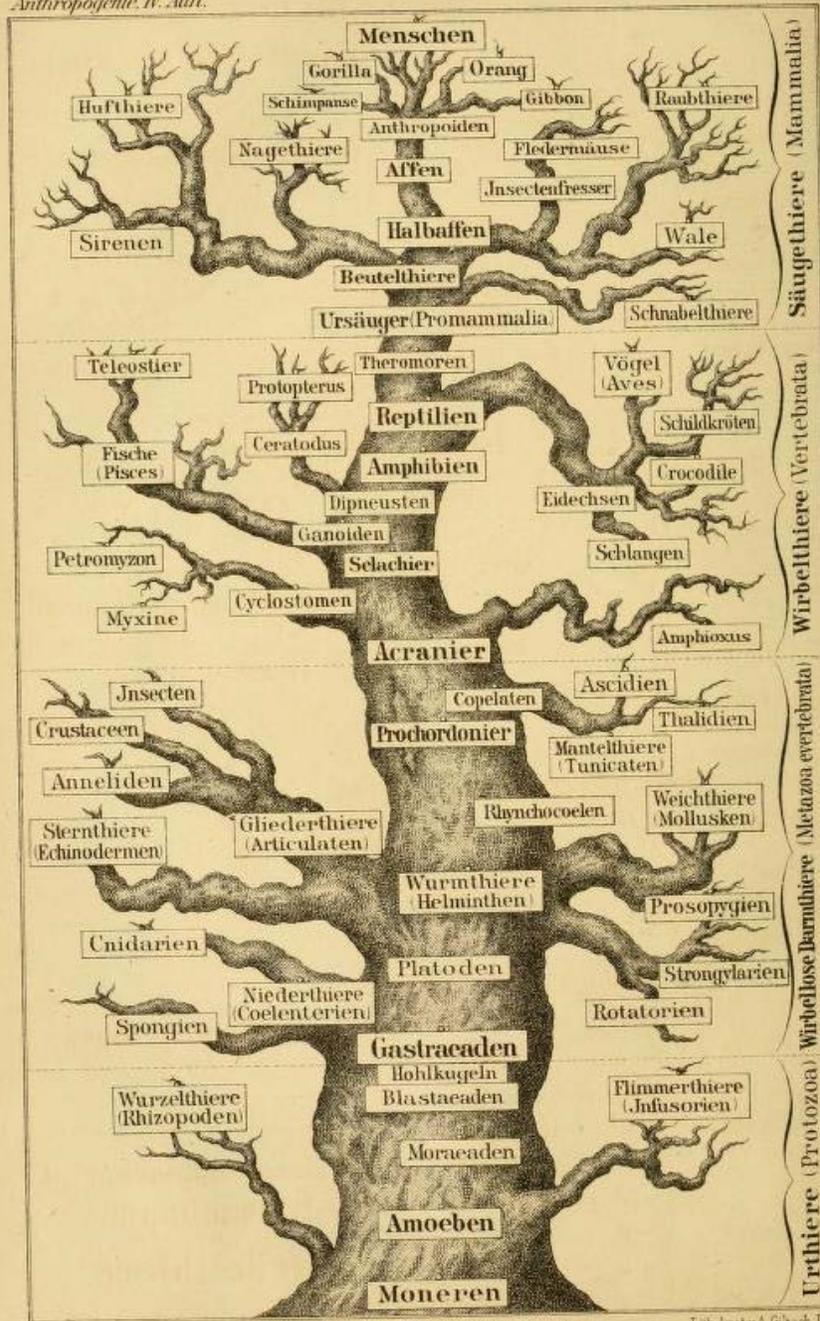


Einstämmiger oder monophyletischer Stammbaum der Organismen. (Die drei Felder I, p m n q; II. p x y q; III, p s t p stellen drei denkbare Fälle der allgemeinen Genealogie dar). (Vergl. S. 347.)

Systematischer Stammbaum des Menschen.

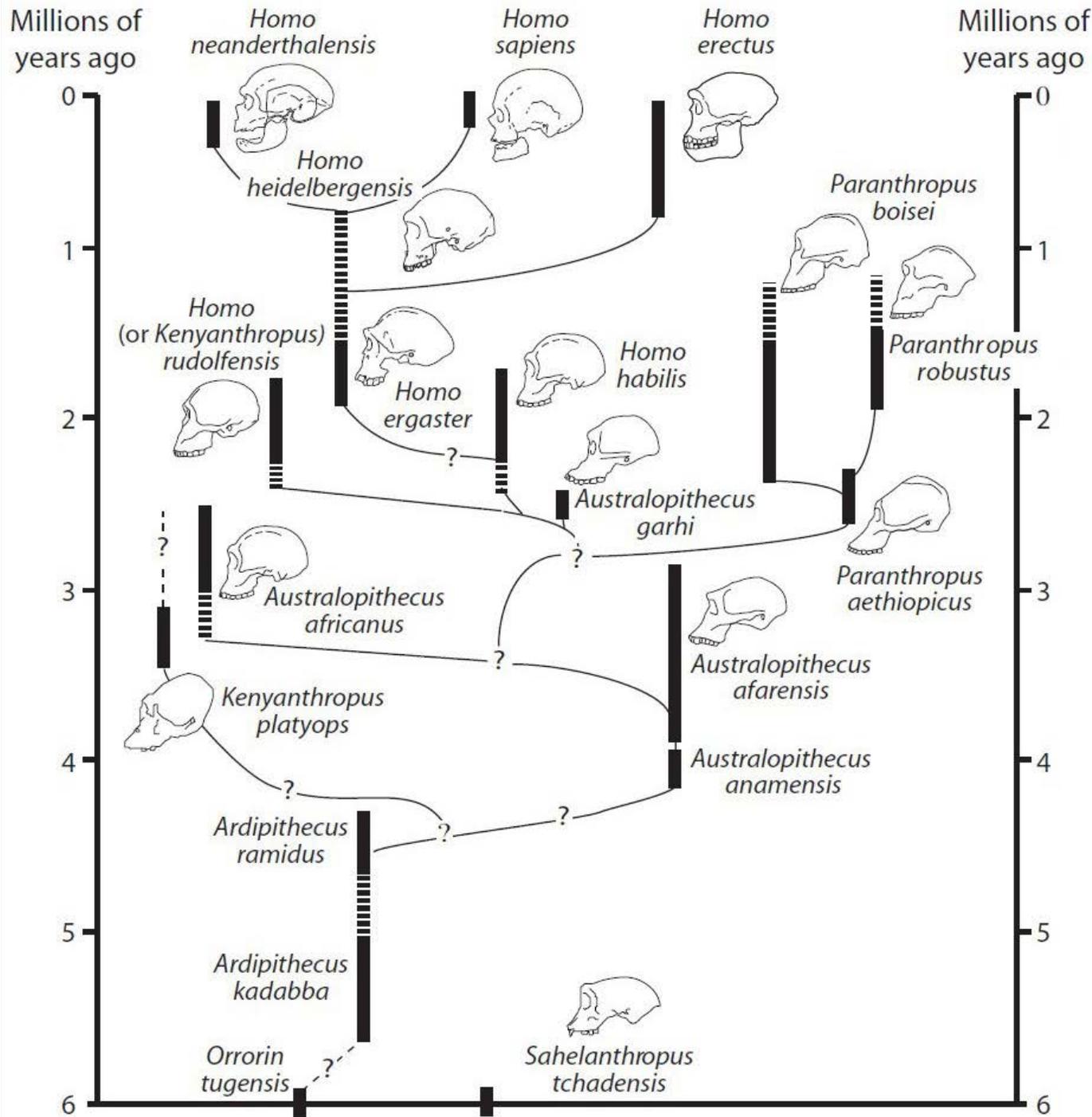
Anthropogenie, IV. Aufl.

Taf. XV



Left: Tree of animal evolution from Haeckel's *Natürliche Schöpfungsgeschichte* (1868) translated into English as *The History of Creation* in 1876. Humans would be somewhere in the tuft of vertebrates at the upper right

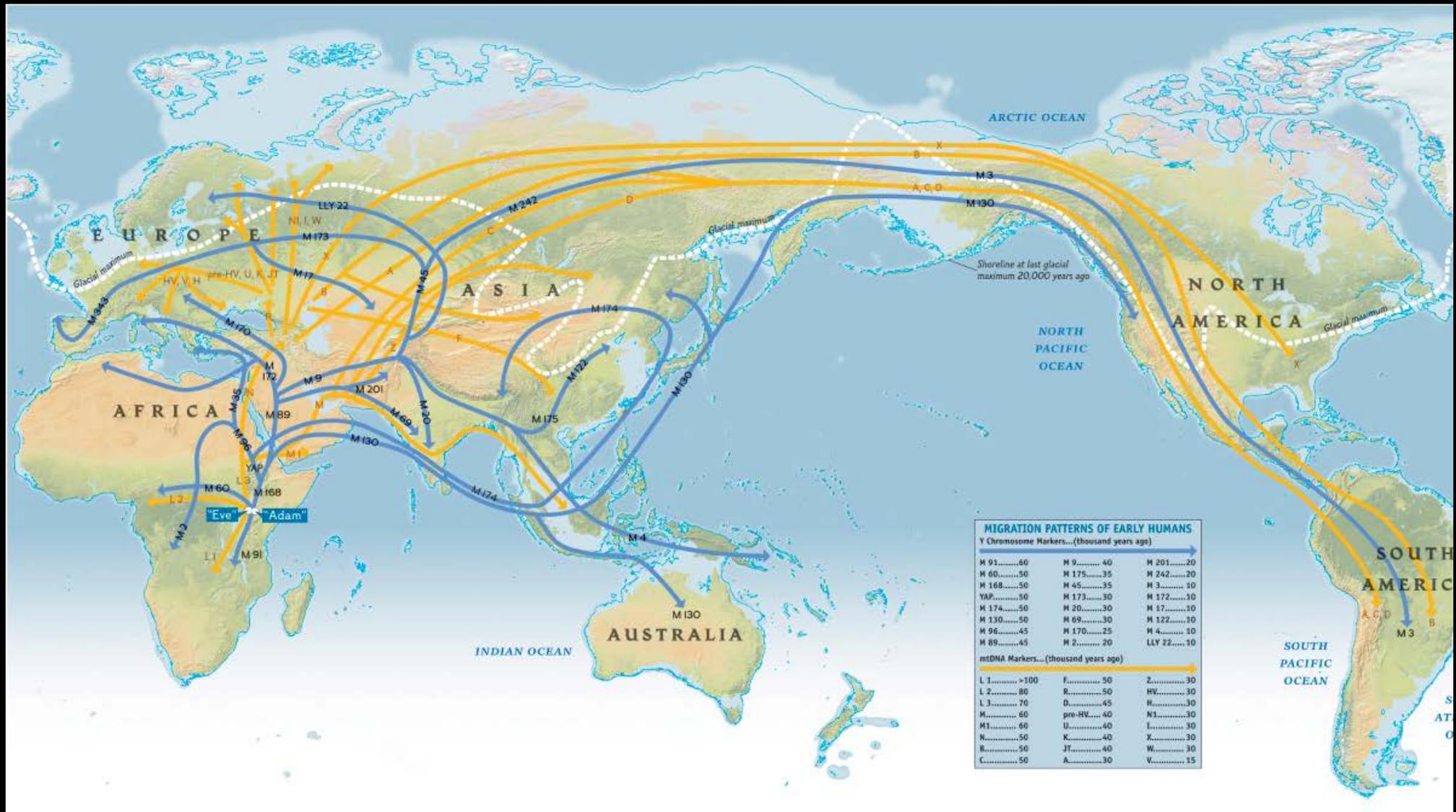
Right: Tree of human evolution from Ernst Haeckel's *Anthropogenie* (1874) with distinct main trunk



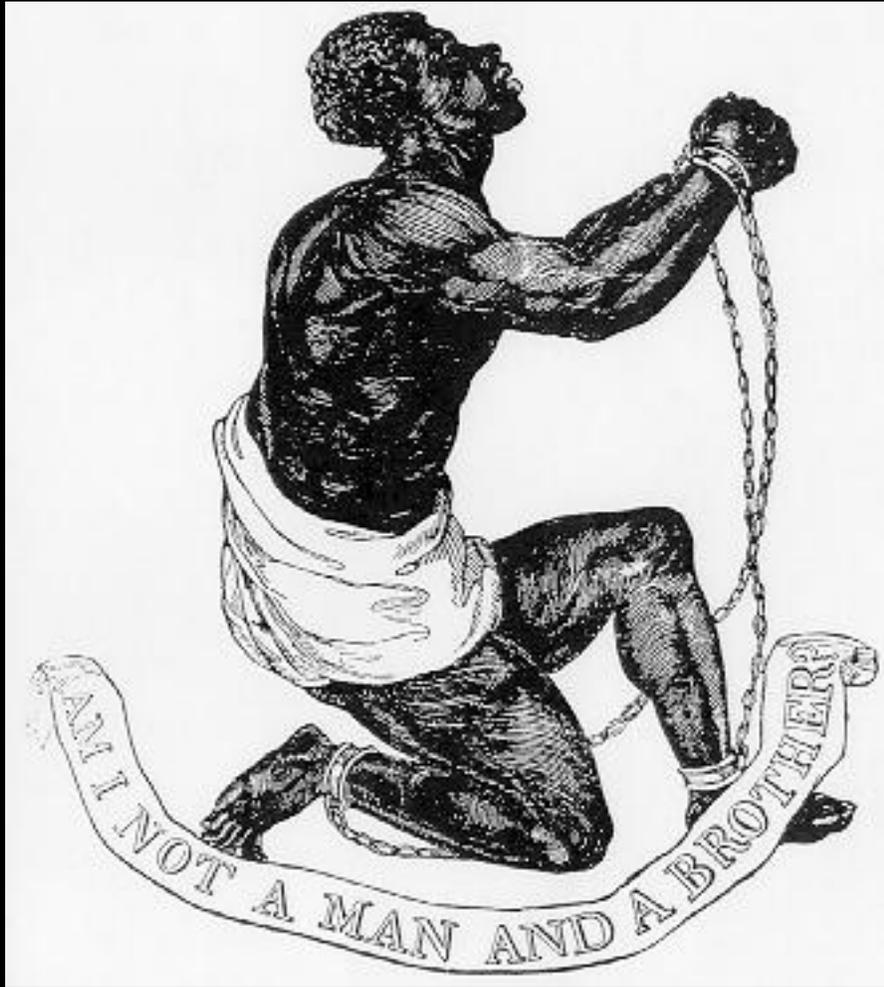
Hominin diversity. Adapted from Klein, 2009. The original included images of stone artifacts associated with different periods.

Any theory of human evolution has to explain some basic facts: 1) Archaic humans left Africa and spread through Eurasia about 1.8 million years ago, 2) All modern humans are genetically very similar to each other, 3) African populations are more genetically diverse than populations in other parts of the world, and 4) Modern humans in Europe share some features with archaic humans who lived there, and modern humans in Asia share some features with archaic humans who lived there, while these features are not shared by modern humans in Africa.

<https://raceandgenetics.wordpress.com/2017/07/17/380/>



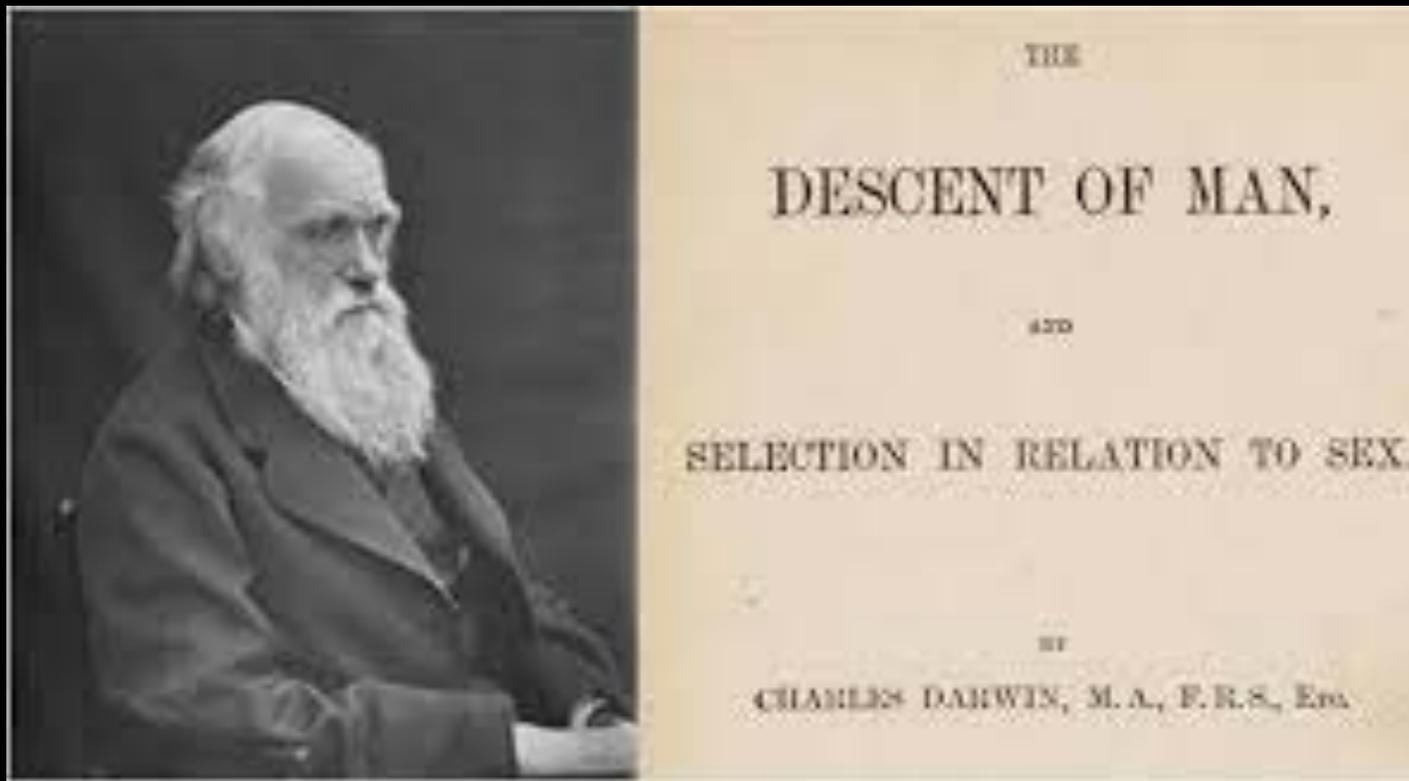
Global migration of Homo sapiens. Blue arrows indicate genetic markers from paternally-inherited Y chromosomes, and orange arrows indicate genetic markers from maternally-inherited mitochondrial DNA. From National Geographic Maps.



Henry Webber, sculptor working for Josiah Wedgwood, Darwin's grandfather; design created as part of anti-slavery campaign by Wedgwood, 1787



William Hackwood, modeller working for Josiah Wedgwood, 1787



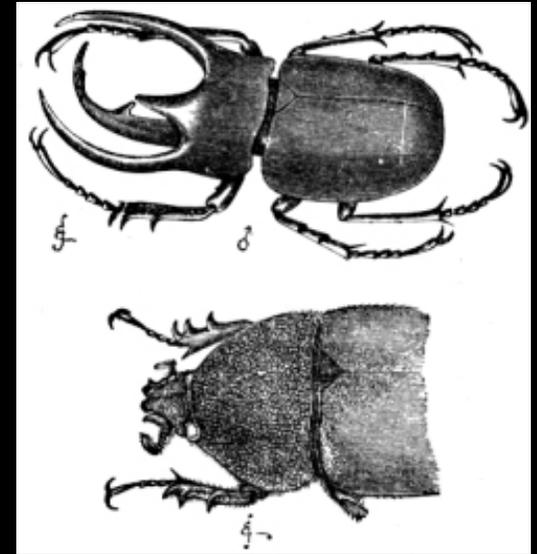
1.) Monogeny versus polygeny

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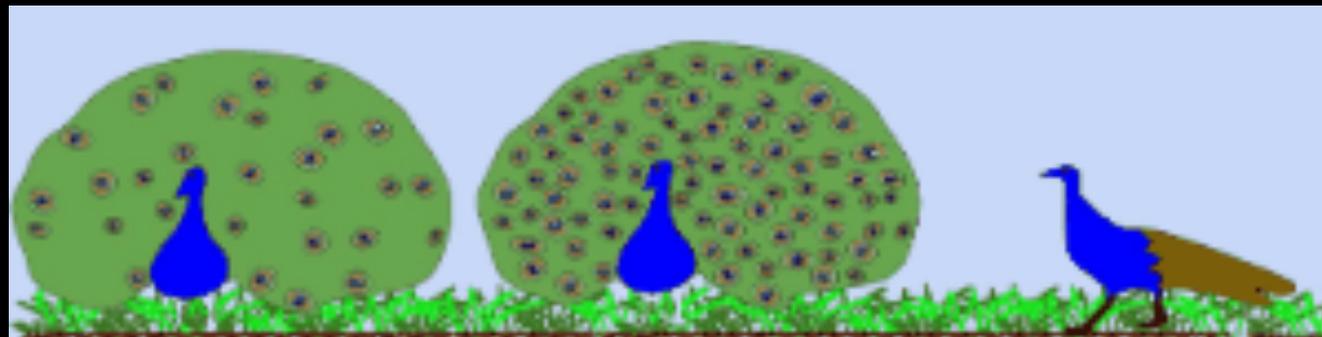
Sexual selection creates colorful differences between sexes, which is called "sexual dimorphism." Here we see two images each showing a male bird-of-paradise above and female below. Painting by John Gerrard Keulemans (d. 1912).



The rhinoceros beetle offers another instance of sexual dimorphism. Plate from Darwin's *Descent of Man* (male above)

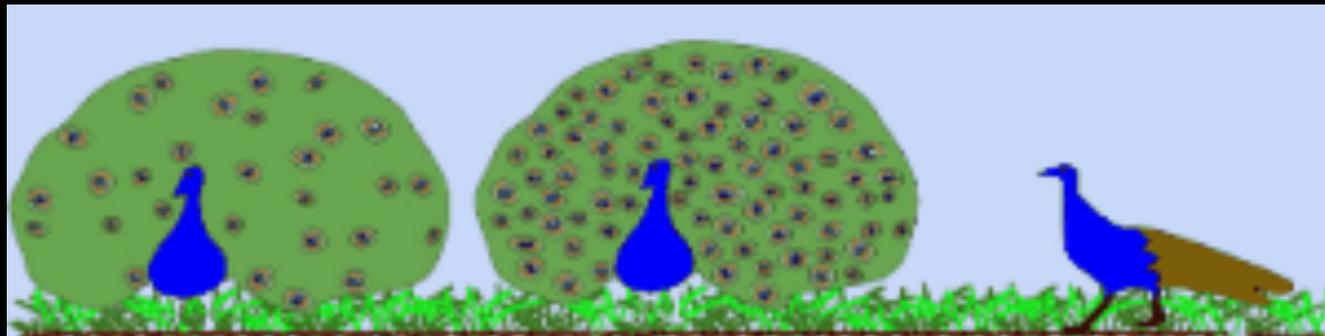


Also from Wiki, "Sexual selection is a form of natural selection where one sex prefers a specific characteristic in an individual of the other sex. Peafowls exhibit sexual selection in that peahens look for peacocks with more "eyes" on their tail feathers. This results in the peacocks with more eyes reproducing more, leading to peacocks with more eyes becoming more common in subsequent generations."





Also from sexual selection, a form of natural selection where one sex prefers a specific characteristic in an individual of the other sex. Peafowl is an example of sexual selection in that peahens look for males with more "eyes" on their tails. This results in the peacocks with more eyes reproducing more, leading to more eyes becoming more common in subsequent generations.





Autonomy
of
aesthetic judgement
in
sexual selection



With respect to animals very low in the scale, I shall give some additional facts under Sexual Selection, shewing that their mental powers are higher than might be expected. (Darwin, *Descent*, 798)

Birds possess acute powers of observation. Every mated bird, of course, recognizes its fellow...Birds under confinement distinguish different persons, as is proved by the strong and permanent antipathy or affection they shew, without any apparent cause, towards certain individuals...As male birds display with so much care their fine plumage and other ornaments in the presence of females, it is obviously probable that these appreciate the beauty of their suitors. (Darwin, *Descent*, 1083-84)

The perception, if not the enjoyment, of musical cadences and of rhythm is probably common to all animals, and no doubt depends on the common physiological nature of their nervous systems. Even Crustaceans, which are not capable of producing any voluntary sound, possess certain auditory hairs, which have been seen to vibrate when the proper musical notes are struck. It is well known that some dogs howl when hearing particular notes. Seals apparently appreciate music, their fondness for it “was well known to the ancients, and is often taken advantage of by the hunters at the present day. With all those animals, namely insects, amphibians, and birds, the males of which during the season of courtship incessantly produce musical notes or rhythmical sounds, we must believe that the females are able to appreciate them, and are thus excited or charmed; otherwise the incessant efforts of the males and the complex structures often possessed exclusively by them would be useless.

(Darwin, *Descent*, 1207)



Victorian cartoonists quickly picked up on Darwin's ideas about display in sexual selection. Here to the left he is fascinated by the apparent steatopygia in the latest fashion (Wiki) This connects to the earlier story of Sarah Baartman (1789 – 1815), aka the Hottentot Venus. Two centuries ago Baartman died after years spent in European "freak shows".

Questions and Discussion

Since *The Descent of Man* functioned in part as an argument for the abolition of slavery, was Darwin a progressive humanist in every way? Was he bigoted in any way against other humans?



FUCOTA BASKET 1833.



JENNY'S WIFE 1834.



JENNY IN 1834.



JENNY BUTTON IN 1833.



YORK NINSTER IN 1835.



YORK IN 1835.

FUGIANS.

Published by Henry Colburn, Great Marlborough Street, 1838.

© The Complete Work of Charles Darwin Online

No. 337

THE DESCENT OF MAN,

SELECTION IN RELATION TO SEX.

BY CHARLES DARWIN, M. A.,

FELLOW OF THE ROYAL SOCIETY, ETC.

With Illustrations.

NEW EDITION, REVISED AND AUGMENTED.

COMPLETE IN ONE VOLUME.

NEW YORK:
D. APPLETON AND COMPANY,
1880.

BY THE SAME AUTHOR.

Origin of Species by Means of Natural Selection; or, The Preservation of Favored Races in the Struggle for Life. From sixth and last London edition. 2 vols. 12mo. Cloth, \$4.00.

Descent of Man, and Selection in Relation to Sex. With many Illustrations. A new edition. 12mo. Cloth, \$3.00.

Journal of Researches into the Natural History and Geology of the Countries visited during the Voyage of H. M. S. Beagle round the World. A new edition. 12mo. Cloth, \$2.00.

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The Power of Movement in Plants. By CHARLES DARWIN, LL.D., F.R.S., assisted by FRANCIS DARWIN. With Illustrations. 72mo. Cloth, \$2.00.

The Formation of Vegetable Mould, through the Action of Worms. With Observations on their Habits. With Illustrations. 12mo. Cloth, \$1.50.

NEW YORK: D. APPLETON & CO., PUBLISHERS.

Left: Illustrations of Fugians -- Jimmy Button and other Yamana captives taken by Fitzroy to England -- from the Narrative of the surveying voyages of His Majesty's ships Adventure and Beagle, between the years 1826 and 1836, describing their examination of the Southern shores of South America, and the Beagle's circumnavigation of the globe. Wellcomecollection.org

While observing the barbarous inhabitants of Tierra del Fuego, it struck me that the possession of some property, a fixed abode, and the union of many families under a chief, were the indispensable requisites of civilization. (Darwin, *Descent*, 872)

The Fuegians rank amongst the lowest barbarians; but I was continually struck with surprise how closely the three natives on board HMS Beagle, who had lived some years in England and could talk a little English, resembled us in disposition and in most of our mental faculties. If no organic being excepting man had possessed any mental power, or if his powers had been of a wholly different nature from those of the lower animals, then we should never have been able to convince ourselves that our high faculties had been gradually developed. But it can be clearly shewn that there is no fundamental difference of this kind. We must also admit that there is no fundamental difference of this kind. We must also admit that there is as much wider interval in mental power between one of the lowest fishes, as a lamprey or lancelet, and one of the higher apes, than between an ape and man; yet this immense interval is filled up by a numberless gradations. (Darwin, *Descent*, 798)



FUEGIA BASKET 1833.



JENNY'S WIFE 1834.



JENNY IN 1834.



JENNY BUTTON IN 1833.



YORK NINSTER IN 1835.



YORK IN 1835.

FUEGIANS.

Let's discuss Darwin's many types of scientific evidence. How does he prove his many points in *The Descent of Man*?

“Race”

- How does Darwin define “race”? (899-900)
- How does Darwin identify “race”? (914; 917)
- How does Darwin deal with ‘mongrel populations’? (904-05)
- Single origin (907)

Sexual Selection and Laws of Inheritance

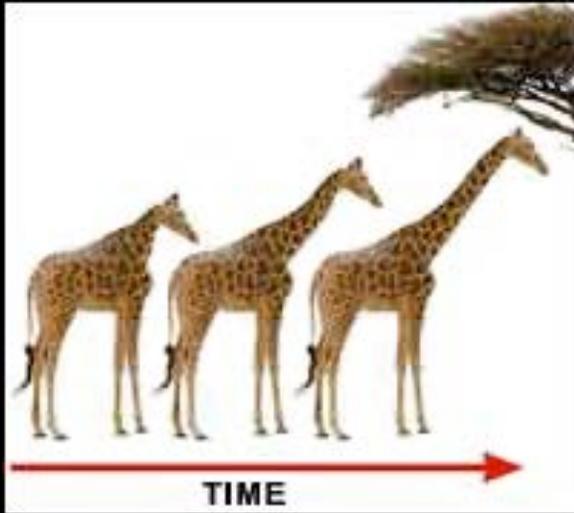
- Why does sexual dimorphism exist according to Darwin? (922-923)
- What is “pangenesis”? (937)
- What are “gemmules”? (937)
- **Darwin’s Lamarckism (945-46)**

	Lamarck	Darwin
Origin of life	Permanent spontaneous generation	Derived from an ancestral form
'Driver' for evolution	Complexification over time	Natural selection
Modifications	Adaptation to the environment	Spontaneous variations transmitted to the progeny
Species extinction	No, unless due to humans	Yes

Jean-Baptiste Lamarck [1744-1829]

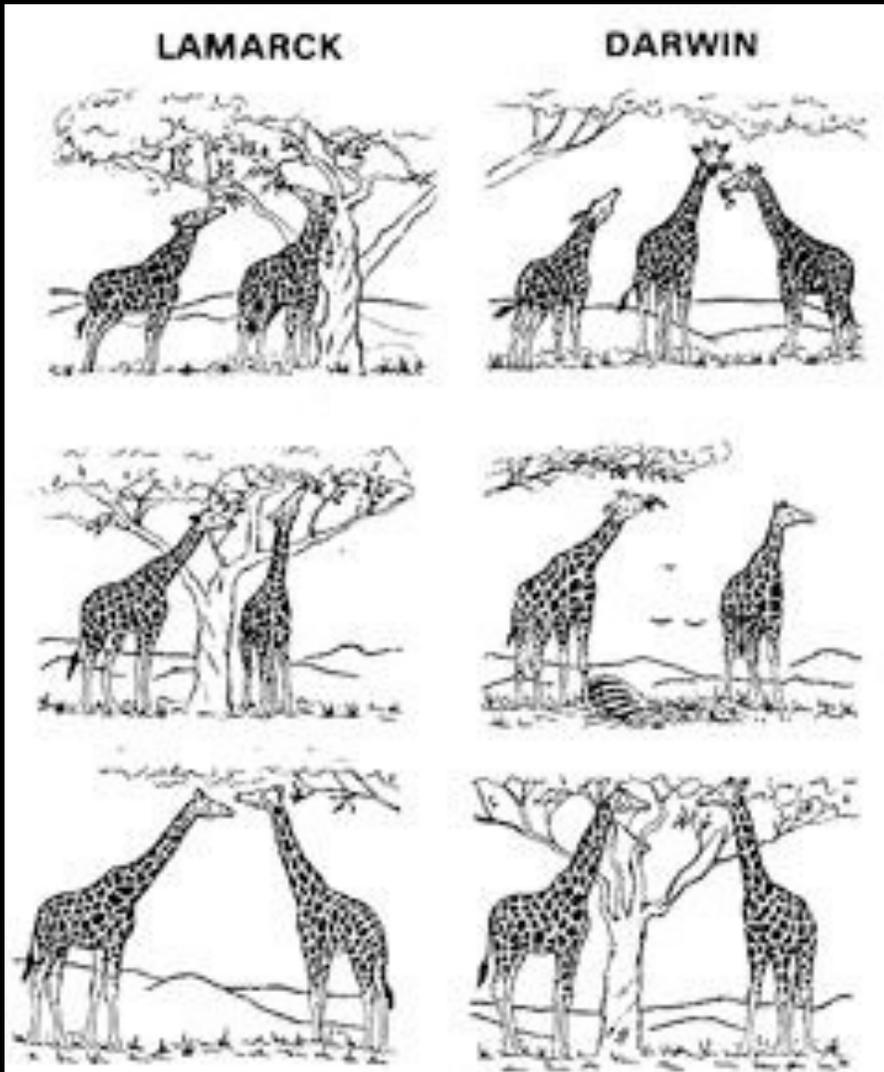


- French naturalist
- Biologist
- The first to develop a truly coherent evolutionary theory
- The environment gives rise to changes in animals.
- Inheritance of acquired characteristics
 - aka soft inheritance
 - aka Lamarckism use/disuse theory
 - The force that perpetually tends to make order.
 - The adaptation of organisms to their environment.

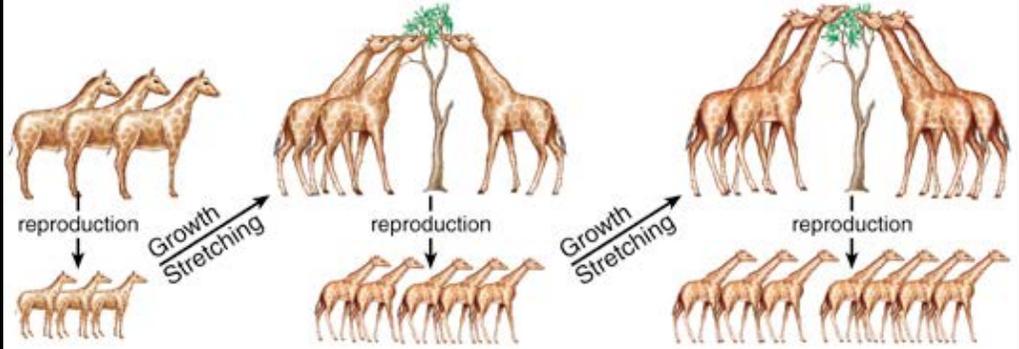


Lamarck believed that the long necks of giraffes evolved as generations of giraffes reached for ever higher leaves.





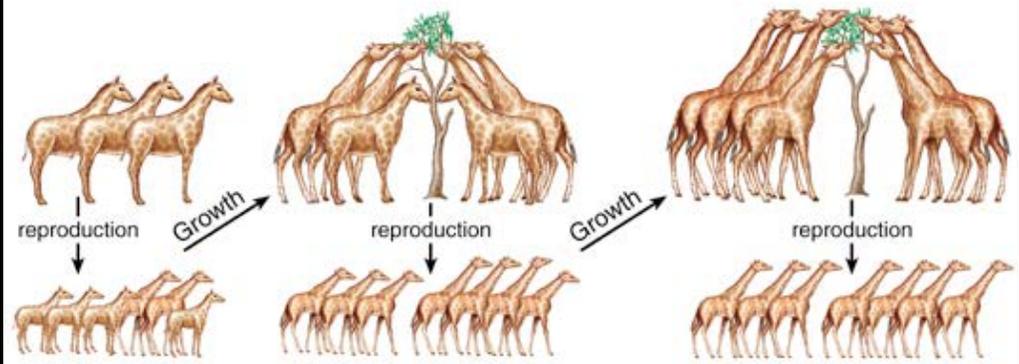
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Proposed ancestor of giraffes has characteristics of modern-day okapi.

The giraffe ancestor lengthened its neck by stretching to reach tree leaves, then passed the change on to offspring.

(a) Lamarck's theory: variation is acquired.



Some individuals born happen to have longer necks.

Over many generations, longer-necked individuals are more successful, perhaps because they can feed on taller trees. These successful individuals have more offspring and pass the long-neck trait on to them.

(b) Darwin's theory: variation is inherited.

From the foregoing discussion on the various laws of inheritance, we learn that the characters of the parents often, or even generally, tend to become developed in the offspring of the same sex, at the same age, and periodically at the same season of the year, in which they first appeared in the parents. But these rules, owing to unknown causes, are far from being fixed. Hence during the modification of a species, the successive changes may readily be transmitted in different ways; some to one sex, and some to both; some to the offspring at one age, and some to the offspring at all ages. Not only are the laws of inheritance extremely complex, but so are the causes which induce and govern variability. The variations thus induced are preserved and accumulated by sexual selection, which is in itself an extremely complex affair, depending, as it does, on the ardour in love, the courage, and the rivalry of the males, as well as on the powers of perception, the taste, and will of the female. Sexual selection will also be largely dominated by natural selection tending towards the general welfare of the species. Hence the manner in which the individuals of either or both sexes have been affected through sexual selection cannot fail to be complex in the highest degree.

When variations occur late in life in one sex, and are transmitted to the same sex at the same age, the other sex and the young are left unmodified. When they occur late in life, but are transmitted to both sexes at the same age, the young alone are left unmodified. Variations, however, may occur at any period of life in one sex or in both, and be transmitted to both sexes at all ages, and then all the individuals of the species are similarly modified. In the following chapters it will be seen that all these cases frequently occur in nature.

(Darwin, *Descent of Man*, 945-946)

Humans

- What are the “differences in mental powers of the two sexes” according to Darwin? (1203-04)
- Darwin on music (1208)
- Darwin on universal beauty (1217-18)
- ‘Man versus woman’ (1228-29)
- What is the relationship between variation of the “races” and sexual selection? (1235)

We see that the musical faculties, which are not wholly deficient in any race, are capable of prompt and high development, for Hottentots and Negroes have become excellent musicians, although in their native countries they rarely practise anything that we should consider music. Schweinfurth, however, was pleased with some of the simple melodies which he heard in the interior of Africa. But there is nothing anomalous in the musical faculties lying dormant in man: some species of birds which never naturally sing, can without much difficulty be taught to do so; thus a house-sparrow has learnt the song of a linnet. As these two species are closely allied, and belong to the order of Insectores, which includes nearly all the singing-birds in the world, it is possible that a progenitor of the sparrow may have been a songster. It is more remarkable that parrots, belonging to a group distinct from the Insectores, and having differently constructed vocal organs, can be taught not only to speak, but to pipe or whistle tunes invented by man, so that they must have some musical capacity. Nevertheless it would be very rash to assume that parrots are descended from some ancient form which was a songster. Many cases could be advanced of organs and instincts originally adapted for one purpose, having been utilised for some distinct purpose. (36. Since this chapter was printed, I have seen a valuable article by Mr. Chauncey Wright ('North American Review,' Oct. 1870, page 293), who, in discussing the above subject, remarks, "There are many consequences of the ultimate laws or uniformities of nature, through which the acquisition of one useful power will bring with it many resulting advantages as well as limiting disadvantages, actual or possible, which the principle of utility may not have comprehended in its action." As I have attempted to shew in an early chapter of this work, this principle has an important bearing on the acquisition by man of some of his mental characteristics.) Hence the capacity for high musical development which the savage races of man possess, may be due either to the practice by our semi-human progenitors of some rude form of music, or simply to their having acquired the proper vocal organs for a different purpose. But in this latter case we must assume, as in the above instance of parrots, and as seems to occur with many animals, that they already possessed some sense of melody. (Darwin, *Descent of Man*, 1208)

The senses of man and of the lower animals seem to be so constituted that brilliant colours and certain forms, as well as harmonious and rhythmical sounds, give pleasure and are called beautiful; but why this should be so we know not. It is certainly not true that there is in the mind of man any universal standard of beauty with respect to the human body. It is, however, possible that certain tastes may in the course of time become inherited, though there is no evidence in favour of this belief: and if so, each race would possess its own innate ideal standard of beauty. It has been argued (75. Schaaffhausen, 'Archiv. für Anthropologie,' 1866, s. 164.) that ugliness consists in an approach to the structure of the lower animals, and no doubt this is partly true with the more civilised nations, in which intellect is highly appreciated; but this explanation will hardly apply to all forms of ugliness. The men of each race prefer what they are accustomed to; they cannot endure any great change; but they like variety, and admire each characteristic carried to a moderate extreme. (76. Mr. Bain has collected ('Mental and Moral Science,' 1868, pp. 304-314) about a dozen more or less different theories of the idea of beauty; but none is quite the same as that here given.) Men accustomed to a nearly oval face, to straight and regular features, and to bright colours, admire, as we Europeans know, these points when strongly developed. On the other hand, men accustomed to a broad face, with high cheek-bones, a depressed nose, and a black skin, admire these peculiarities when strongly marked. No doubt characters of all kinds may be too much developed for beauty. Hence a perfect beauty, which implies many characters modified in a particular manner, will be in every race a prodigy. As the great anatomist Bichat long ago said, if every one were cast in the same mould, there would be no such thing as beauty. If all our women were to become as beautiful as the Venus de' Medici, we should for a time be charmed; but we should soon wish for variety; and as soon as we had obtained variety, we should wish to see certain characters a little exaggerated beyond the then existing common standard. (Darwin, *Descent*, 1217-18)

Man is more powerful in body and mind than woman, and in the savage state he keeps her in a far more abject state of bondage than does the male of any other animal; therefore it is not surprising that he should have gained the power of selection. Women are everywhere conscious of the value of their own beauty; and when they have the means, they take more delight in decorating themselves with all sorts of ornaments than do men. They borrow the plumes of male birds, with which nature has decked this sex, in order to charm the females. As women have long been selected for beauty, it is not surprising that some of their successive variations should have been transmitted exclusively to the same sex; consequently that they should have transmitted beauty in a somewhat higher degree to their female than to their male offspring, and thus have become more beautiful, according to general opinion, than men. Women, however, certainly transmit most of their characters, including some beauty, to their offspring of both sexes; so that the continued preference by the men of each race for the more attractive women, according to their standard of taste, will have tended to modify in the same manner all the individuals of both sexes belonging to the race.

With respect to the other form of sexual selection (which with the lower animals is much the more common), namely, when the females are the selectors, and accept only those males which excite or charm them most, we have reason to believe that it formerly acted on our progenitors. Man in all probability owes his beard, and perhaps some other characters, to inheritance from an ancient progenitor who thus gained his ornaments. But this form of selection may have occasionally acted during later times; for in utterly barbarous tribes the women have more power in choosing, rejecting, and tempting their lovers, or of afterwards changing their husbands, than might have been expected.

(Darwin, *Descent*, 1228)

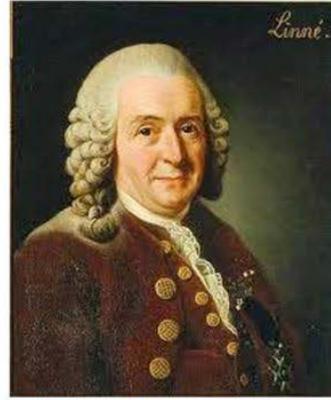
The views here advanced, on the part which sexual selection has played in the history of man, want scientific precision. He who does not admit this agency in the case of the lower animals, will disregard all that I have written in the later chapters on man. We cannot positively say that this character, but not that, has been thus modified; it has, however, been shewn that the races of man differ from each other and from their nearest allies, in certain characters which are of no service to them in their daily habits of life, and which it is extremely probable would have been modified through sexual selection. We have seen that with the lowest savages the people of each tribe admire their own characteristic qualities,—the shape of the head and face, the squareness of the cheek-bones, the prominence or depression of the nose, the colour of the skin, the length of the hair on the head, the absence of hair on the face and body, or the presence of a great beard, and so forth. Hence these and other such points could hardly fail to be slowly and gradually exaggerated, from the more powerful and able men in each tribe, who would succeed in rearing the largest number of offspring, having selected during many generations for their wives the most strongly characterised and therefore most attractive women. For my own part I conclude that of all the causes which have led to the differences in external appearance between the races of man, and to a certain extent between man and the lower animals, sexual selection has been the most efficient. (Darwin, *Descent*, 1235)

Typology Revisited



Carolus Linnaeus 1707-1778

- Linnaeus was the first person to propose an orderly system for classifying organisms.
- He developed the Binomial System of Naming Plants in 1753
 - Bi= 2
 - Nomial= name
 - All plants have a scientific name composed of two Latin names known as a **genus** and **specie**
- His system is still used today and his called the Father of Taxonomy!

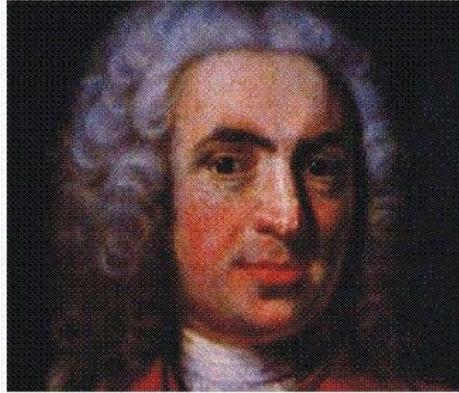


CAROLUS LINNAEUS

1707 - 1778 *Sequoia gigantea*

Taxonomy • Botany • Medicine

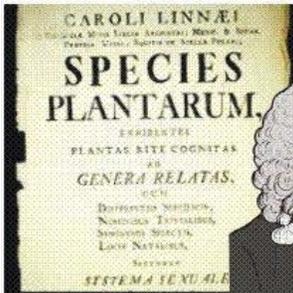
- **“Father of Taxonomy”** – developed binomial name system still in use today
- **Originator of modern classification system for plants and animals**
- **Author of 180 works, including classifications of plants and diseases**



POLYGALA floribus imberbibus, pedunculis squar-
 roli, caule herbaceo ramoso erecto.
 Habitat in Virginia Kalm. ☉
 Caulis spithameus f. pedalis, firmus, angulatus, rami-
 fus, erectus, ramis caule altioribus. Folia alterna, an-
 gusta-lanceolata. Spica terminalis, laxa, sanguinea, o-
 vata, deciduus enim bifidus inferiori maturi, dum
 novelli accrescent unde, Pedunculis lateris f. Squar-
 rajas.

“He was a man of great piety and respect for the Scriptures. One of his main goals in systematizing the tremendous varieties of living creatures was to attempt to delineate the original Genesis ‘kinds’.”

– Dr. Henry M. Morris

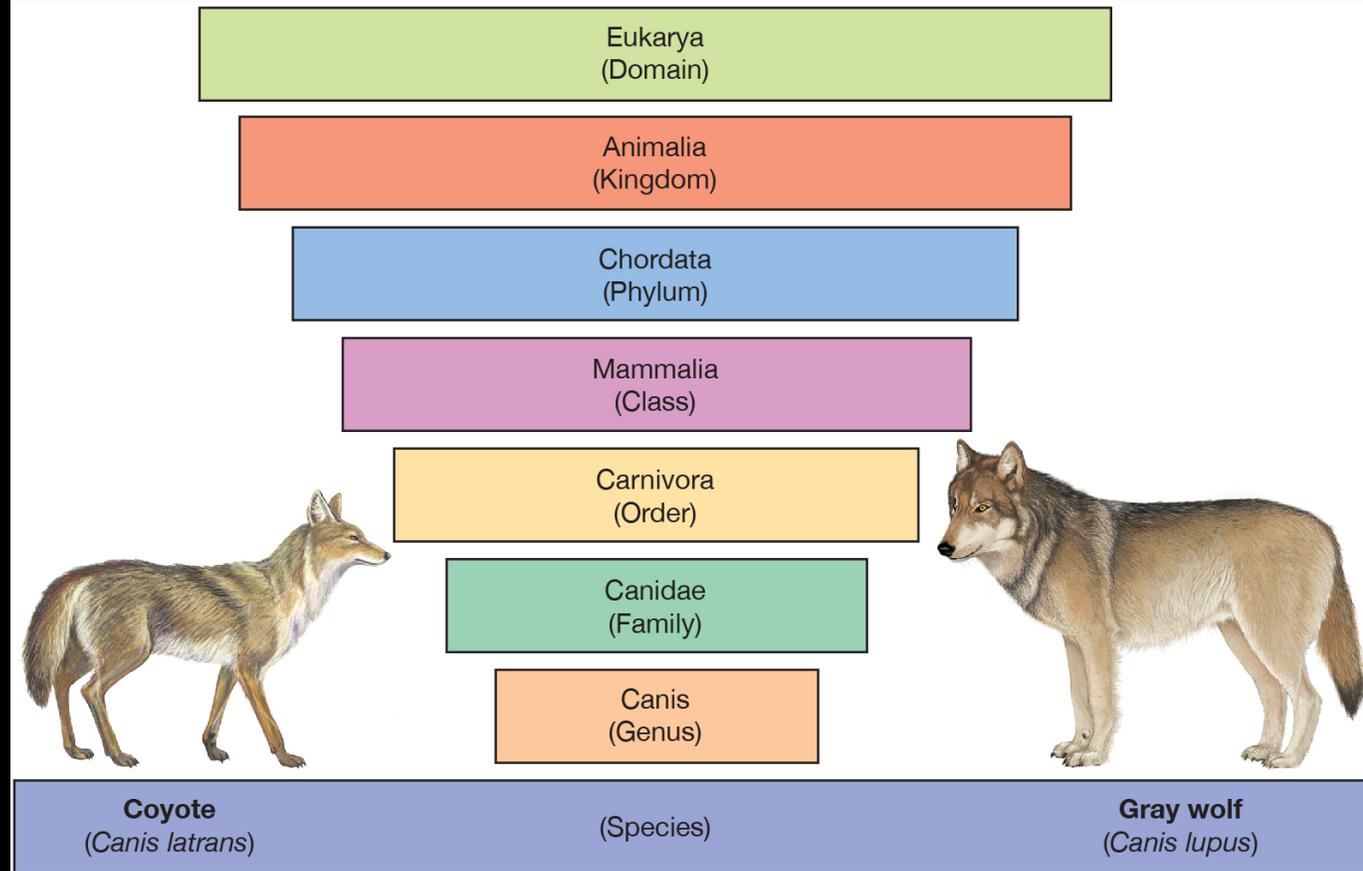
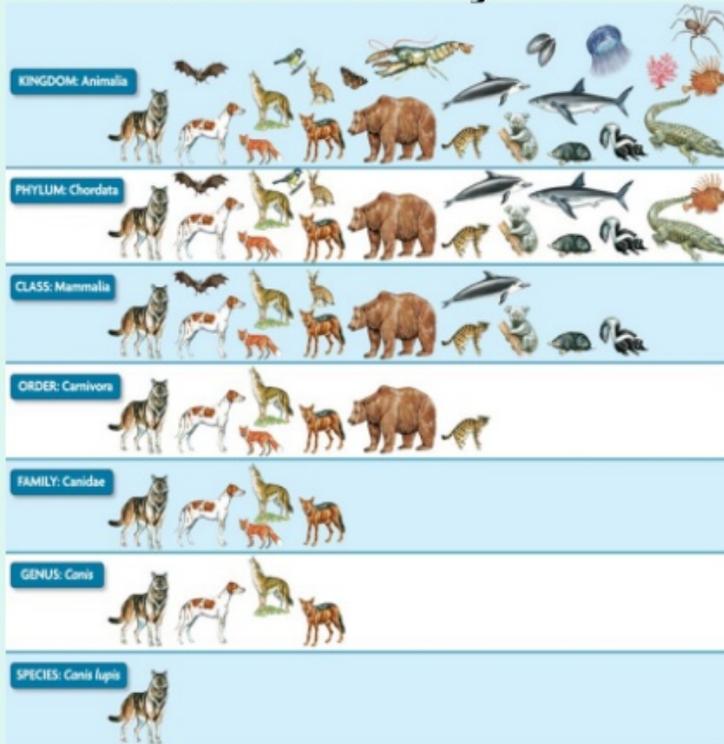


“The flowers’ leaves... serve as bridal beds which the Creator has so gloriously arranged, adorned with such noble bed curtains, and perfumed with so many soft scents that the bridegroom with his bride might there celebrate their nuptials with so much the greater solemnity...”

– Carolus Linnaeus

Linnaeus' classification system

- Each level is included in the level above it.
- Levels get increasingly specific from kingdom to species.



The bad science of types and typology...

and the resonances in art, architecture, and aesthetics...

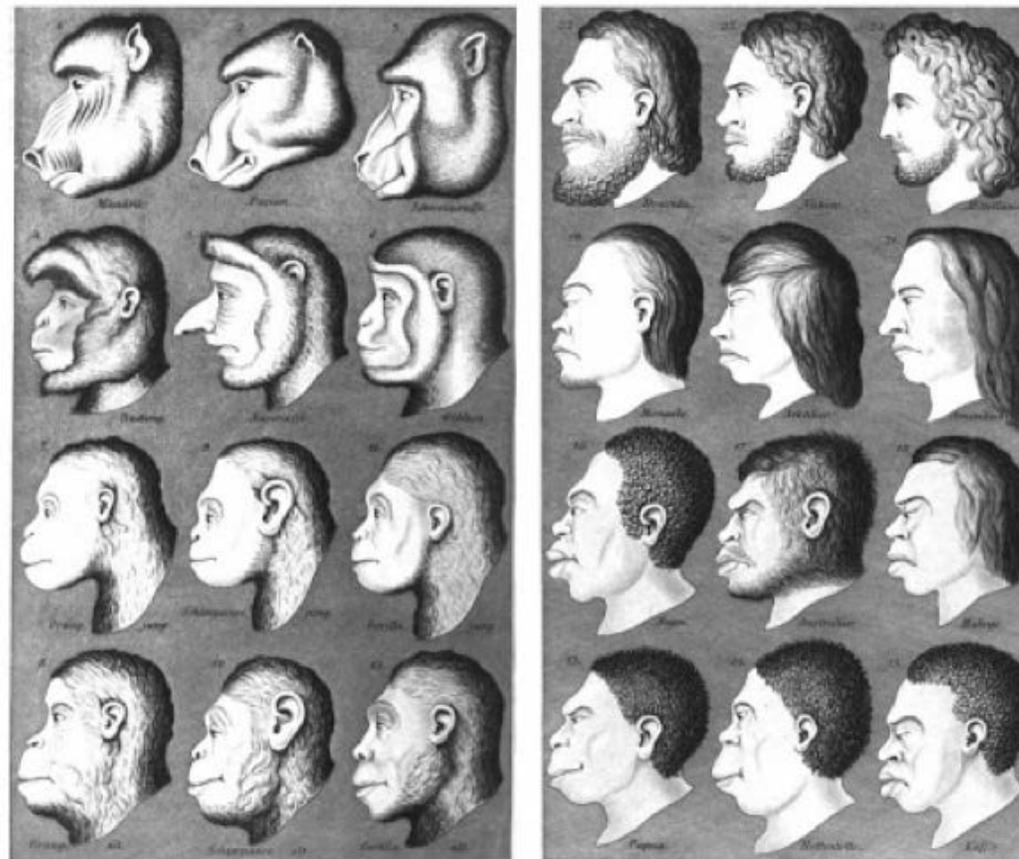
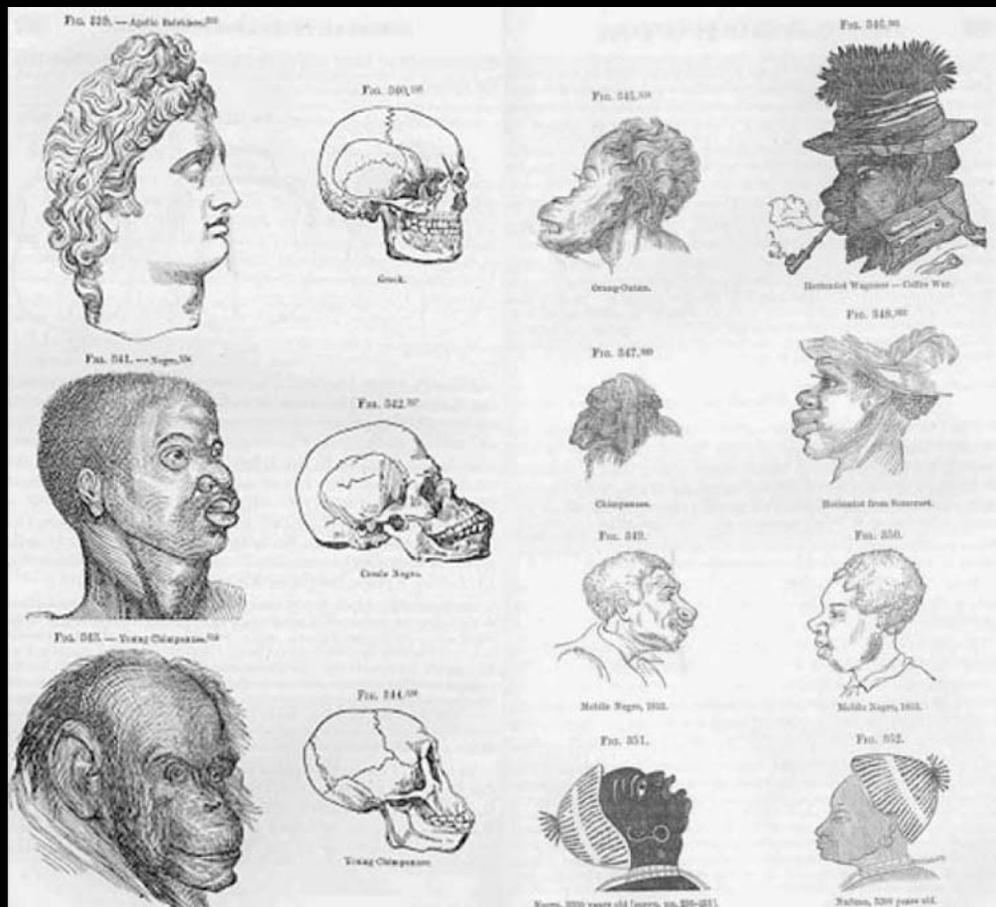


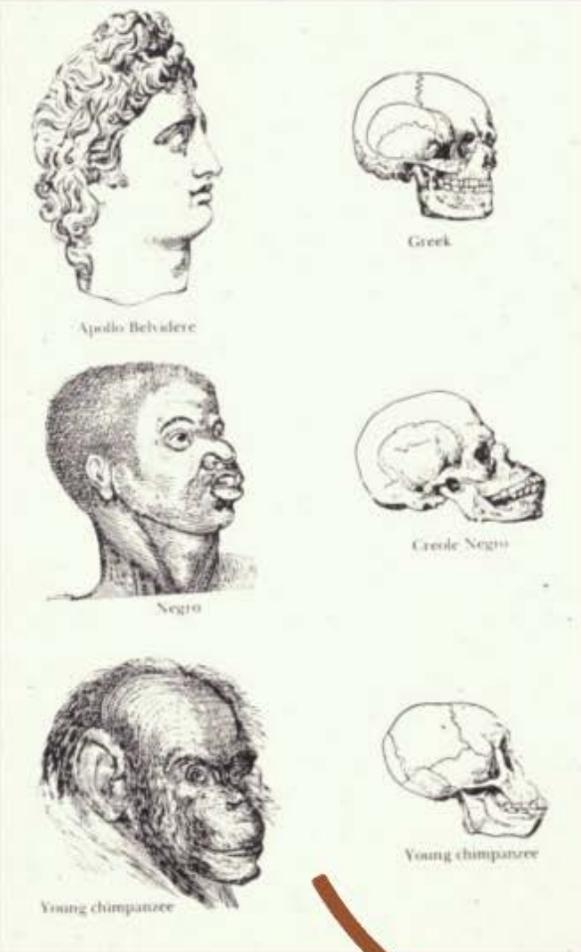
Fig. 2. Plates 13 and 14, from the second German edition of Ernst Haeckel's *Natürliche Schöpfungsgeschichte* (1870). Haeckel modified it from an even more offensive illustration in the first German edition of 1868, but neither figure appeared in the English translation (Public Domain).

Left: Excerpt from “Crania Americana” by Samuel George Morton showing supposed differences between the skulls of different races. Imagery taken from *Indigenous Races of the Earth* (1857), whose authors Nott and George Glidden implied that "Negroes" were a creational rank between "Greeks" and chimpanzees.

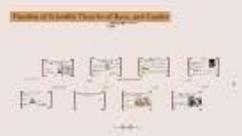
<https://pages.vassar.edu/realarchaeology/2017/03/05/phrenology-and-scientific-racism-in-the-19th-century/>

Right: Ernst Haeckel (1870)

Specters of the Human: Scientific Theories of Race, Sex, and Civilization from Typology through Eugenics



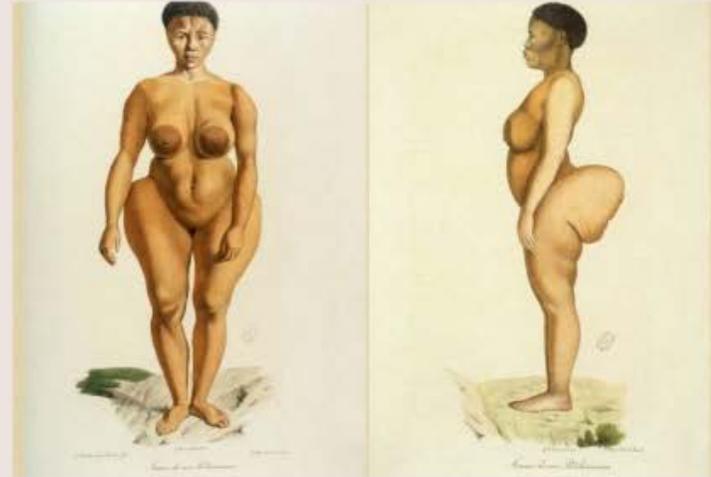
Dorothy Roberts:
"Race is not a biological category that is politically charged. It is a political category that has been disguised as a biological one" (Fatal Invention: How Science, Politics, and Big Business Re-create Race in the Twenty-first Century, 4, 2012)



"The Hottentot Venus": Bartman on Display in Europe

-During tours of Europe, Bartman was exhibited as a semi-naked carnival attraction standing in a bamboo cage, sometimes accompanied by an elephant. Along with being ordered to walk, stand, or sit for audience amusement, audiences could pay to poke or touch Bartman's body.

In 1815, Bartman was studied by naturalist George Cuvier who claimed that she was a link between animals and humans. French anatomists, zoologists, and physiologists also studied Bartman and claimed that her body parts were proof that Africans were a parahuman race whose sexuality was exaggerated and whose intelligency was less than their white counterparts.





Recapitulation Theory

Phylogeny recapitulates ontogeny

Drawings of Vertebrate Embryos (1874) by Ernst Haeckel [1834-1919]

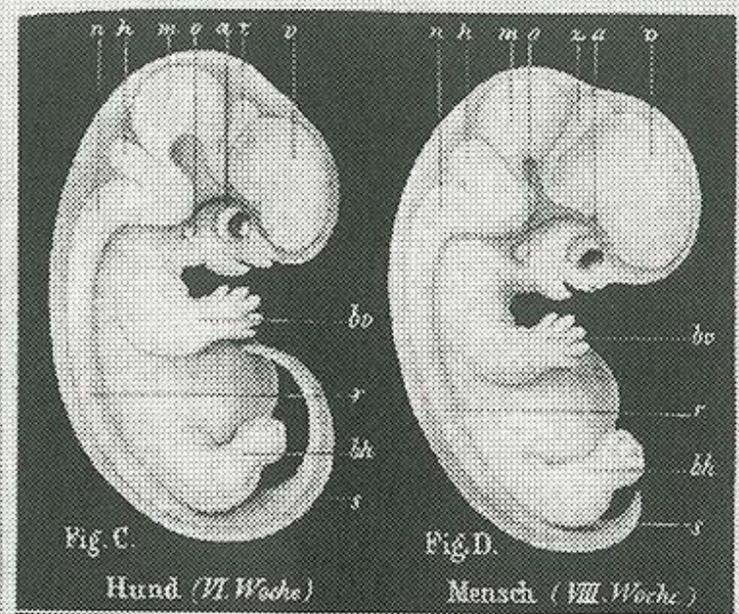
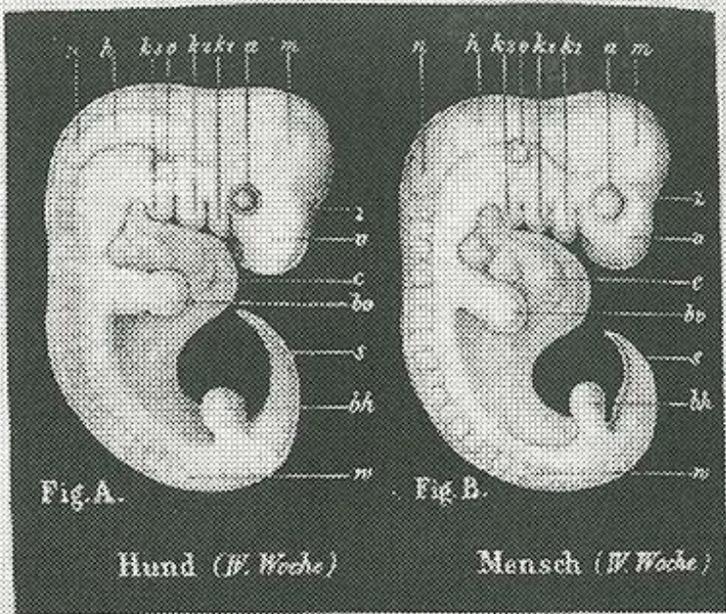
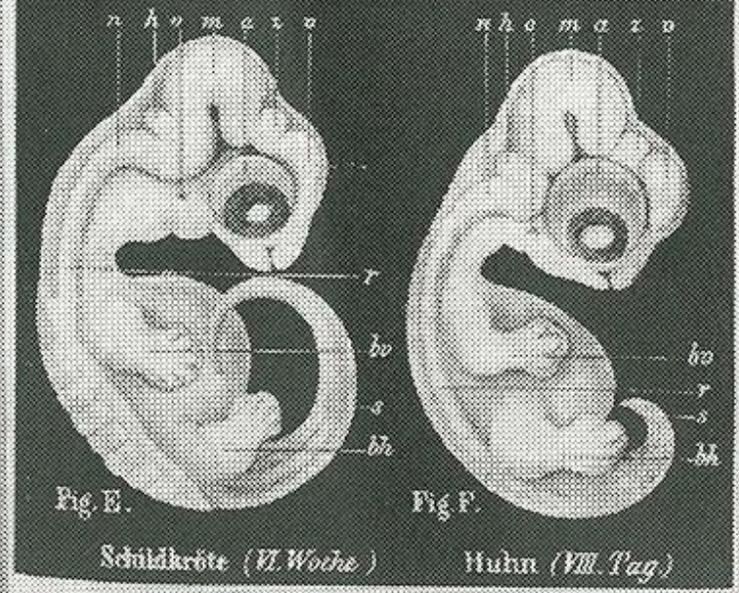
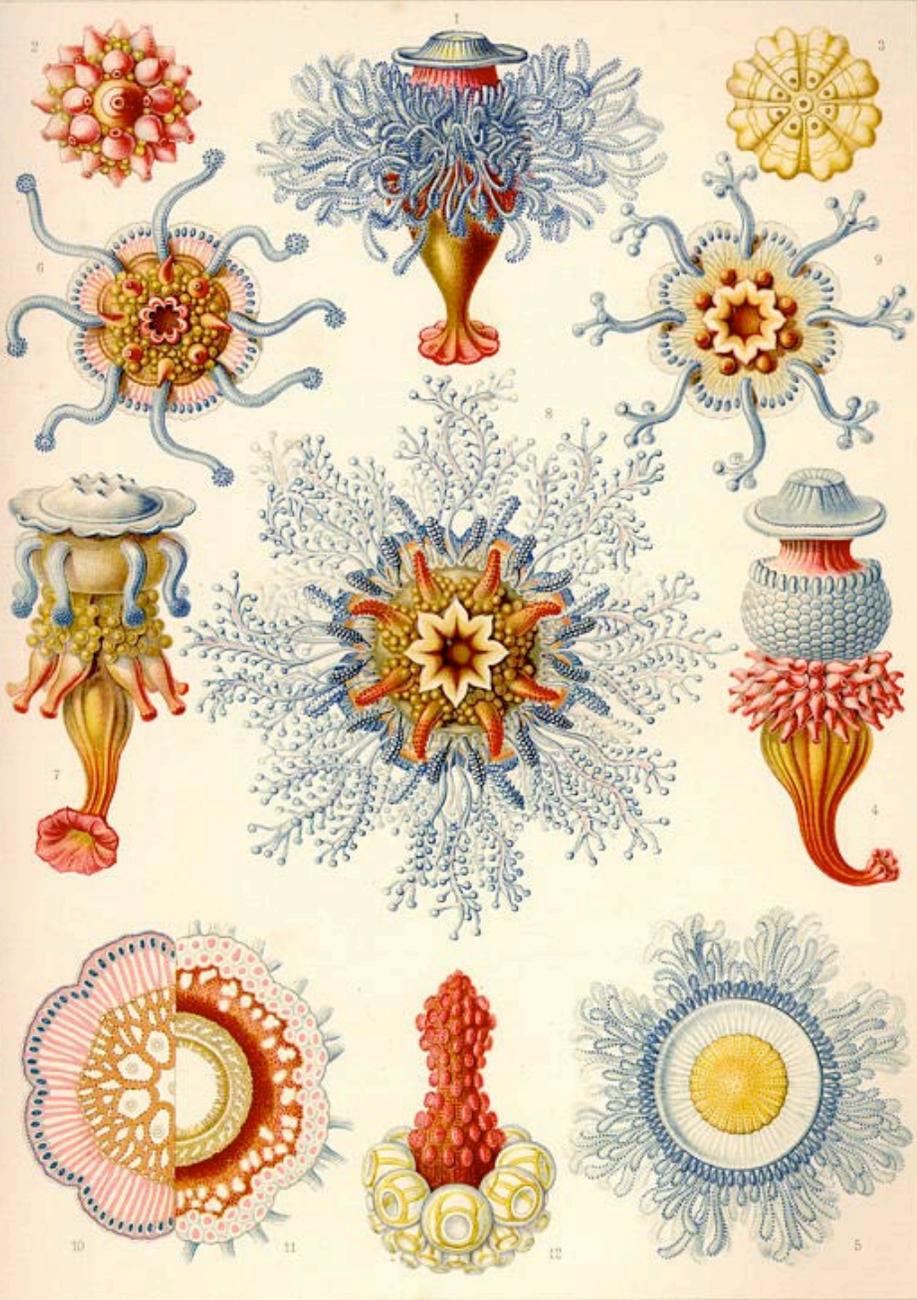


Fig. A. Keim des Hundes, 5'' lang (aus der vierten Woche). Fig. B. Keim des Menschen, 5'' lang (aus der vierten Woche). Fig. C. Keim des Hundes, 8½'' lang (aus der sechsten Woche). Fig. D. Keim des Menschen, 8½'' lang (aus der achten Woche). Fig. E. Keim der Schildkröte, 7'' lang (aus der sechsten Woche). Fig. F. Keim des Huhns, 7'' lang (acht Tage alt). Fig. A und B sind 5mal, Fig. C—F 4mal vergrössert. Die Buchstaben haben in allen sechs Figuren dieselbe Bedeutung: r Vorderhirn, z Zwischenhirn, m Mittelhirn, k Hinterhirn, a Nachhirn, v Rückenmark, a Auge, e Ohr, k1, k2, k3 erster, zweiter und dritter Kiemenbogen, a Wirbel, c Herz, bo Vorderbein, bh Hinterbein, s Schwanz.



Dog and human embryos, looking almost identical at 4 weeks then differing at 6 weeks. Lower right corner shows a 6-week turtle embryo and 8-day hen embryo. Ernst Haeckel (1868)



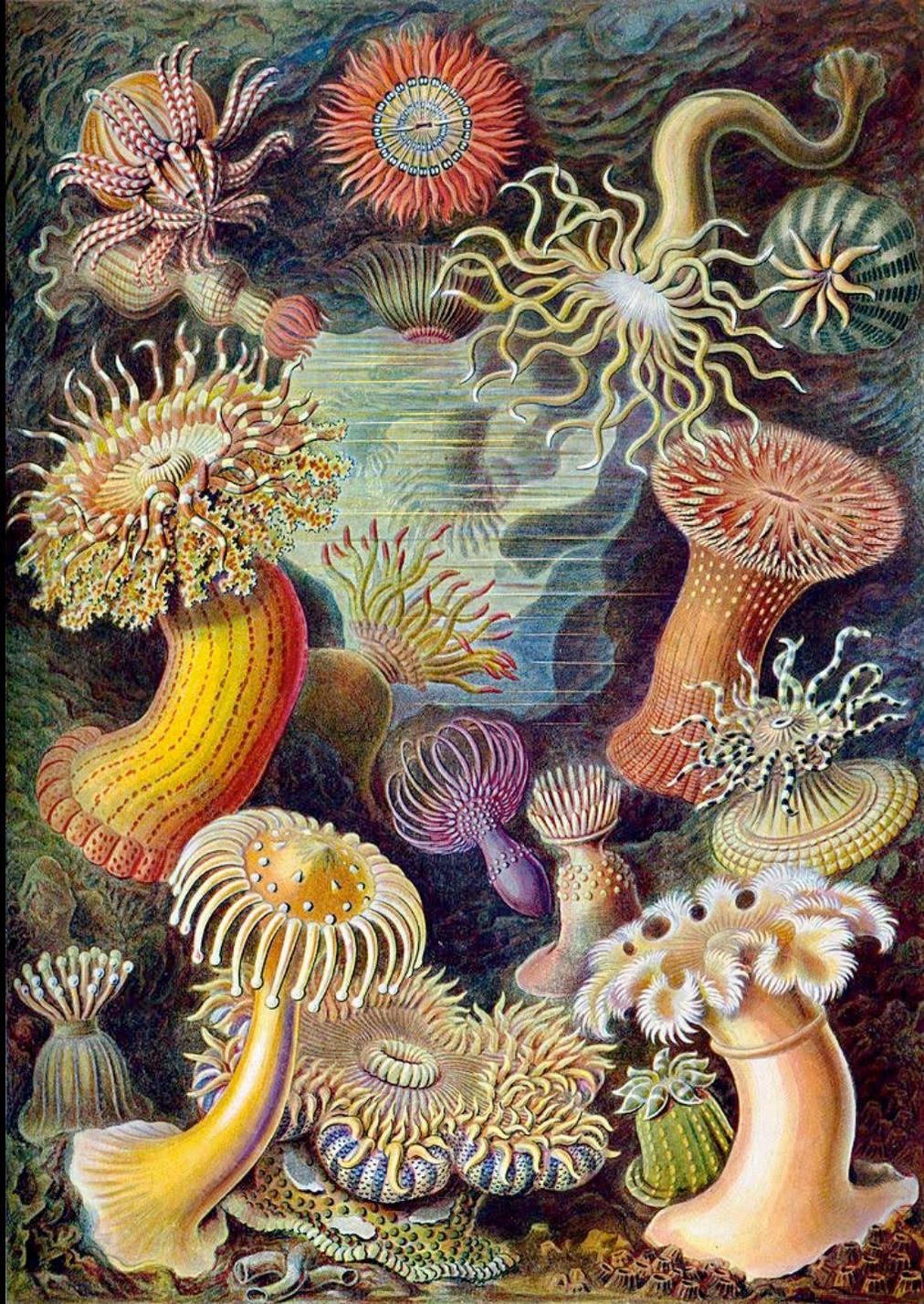
Siphonophorae. — Staatsquallen.

ecology

From the Greek “oikos” meaning house or environment and “logos” knowledge or study of

Coined by Haeckel in 1866, ecology means the scientific study of the interaction of organisms and their environment.

Ernst Haeckel's Radiolaria (1862)



Actiniae, plate 49 from Ernst Haeckel's *Kunstformen der Natur* (1904)



FUEOTA BASKET 1833.



JENNY'S WIFE 1834.



JENNY IN 1834.



JENNY BUTTON IN 1835.



YORK NINSTER IN 1835.



YORK IN 1835.

FUECIANS.

Published by Henry Colburn, Great Marlborough Street, 1838.

© The Complete Work of Charles Darwin Online

No. 337

THE
DESCENT OF MAN,

AND
SELECTION IN RELATION TO SEX.

BY
CHARLES DARWIN, M. A.,
FELLOW OF THE ROYAL SOCIETY, ETC.

With Illustrations.

NEW EDITION, REVISED AND AUGMENTED.

COMPLETE IN ONE VOLUME.

NEW YORK:
D. APPLETON AND COMPANY,
1880.

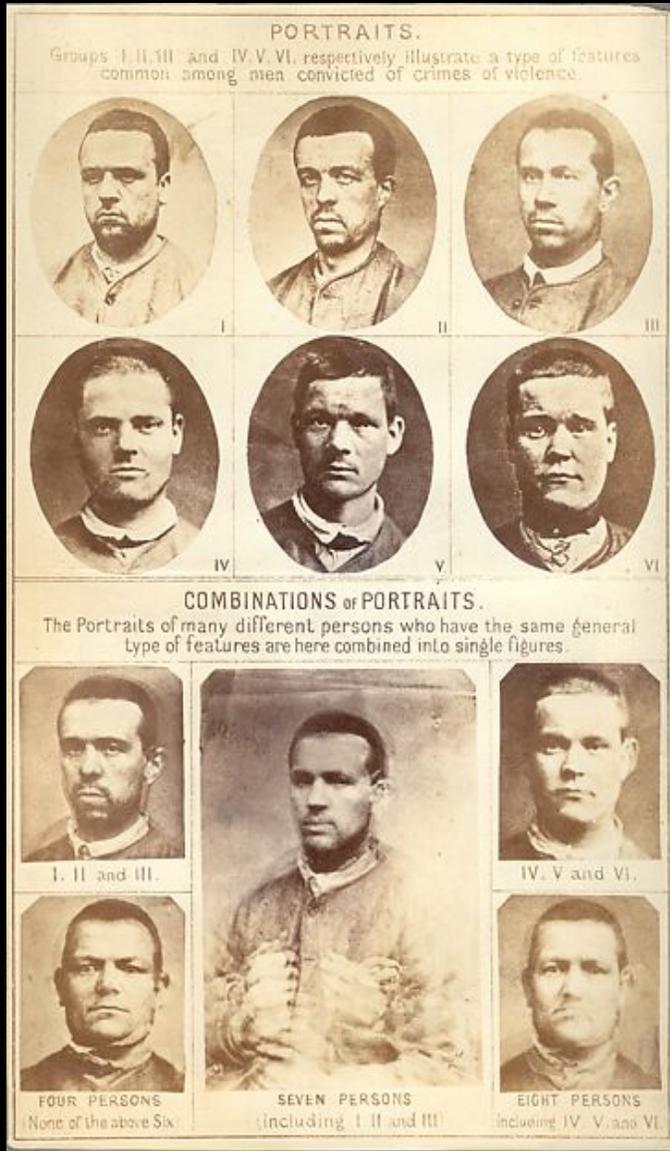
BY THE SAME AUTHOR.

- Origin of Species by Means of Natural Selection; or, The Preservation of Favored Races in the Struggle for Life. From sixth and last London edition. 2 vols. 12mo. Cloth, \$4.00.
- Descent of Man, and Selection in Relation to Sex. With many Illustrations. A new edition. 12mo. Cloth, \$3.00.
- Journal of Researches into the Natural History and Geology of the Countries visited during the Voyage of H. M. S. Beagle round the World. A new edition. 12mo. Cloth, \$2.00.
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- The Formation of Vegetable Mould, through the Action of Worms. With Observations on their Habits. With Illustrations. 12mo. Cloth, \$1.50.

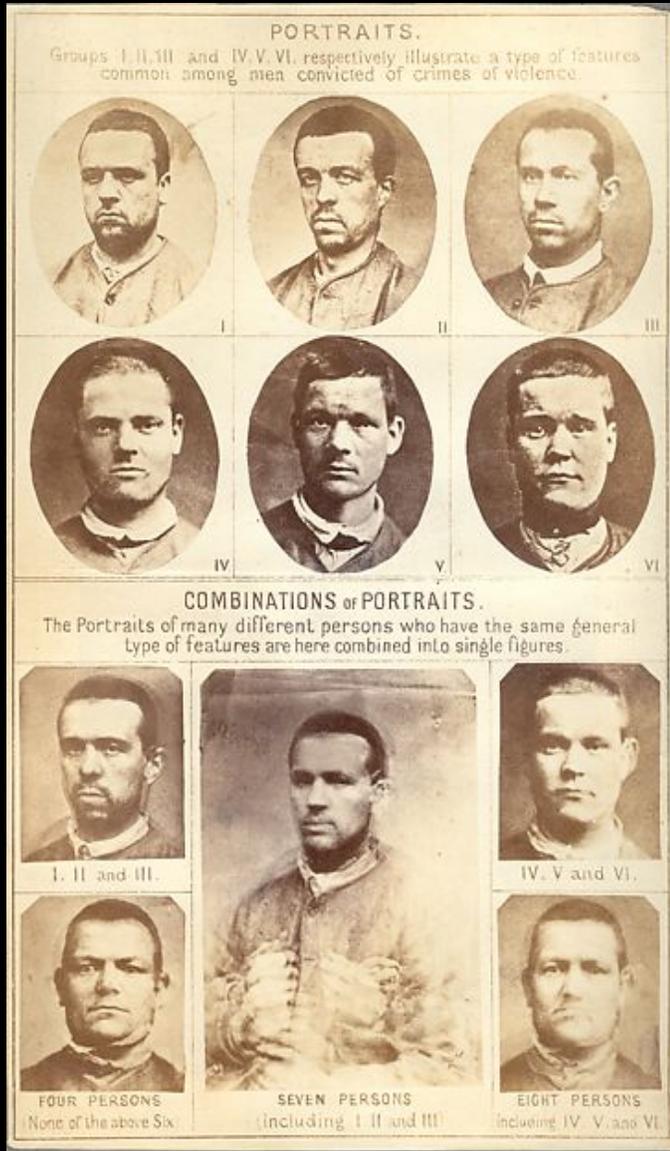
NEW YORK: D. APPLETON & CO., PUBLISHERS.

Left: Illustrations of Fuegians -- Jimmy Button and other Yamana captives taken by Fitzroy to England -- from the Narrative of the surveying voyages of His Majesty's ships Adventure and Beagle, between the years 1826 and 1836, describing their examination of the Southern shores of South America, and the Beagle's circumnavigation of the globe. Wellcomecollection.org

Francis Galton and Composite Photography



Francis Galton and Composite Photography



Notorious for his ideas about improving the genetic composition of the human population—a field of study he called “eugenics”—Galton devised the technique of composite portraiture as a tool for visualizing different human “types.” He first applied the method to portraits of convicts to determine whether specific facial features could be associated with distinct types of criminality. He later went on to create composite photographs of other segments of the population whose members were considered feeble or socially inferior, including the mentally ill, tuberculosis patients, and Jews. Later, he turned to the “healthy and talented” classes—Anglican ministers, Westminster schoolboys, doctors, scientists, and Royal Engineers.

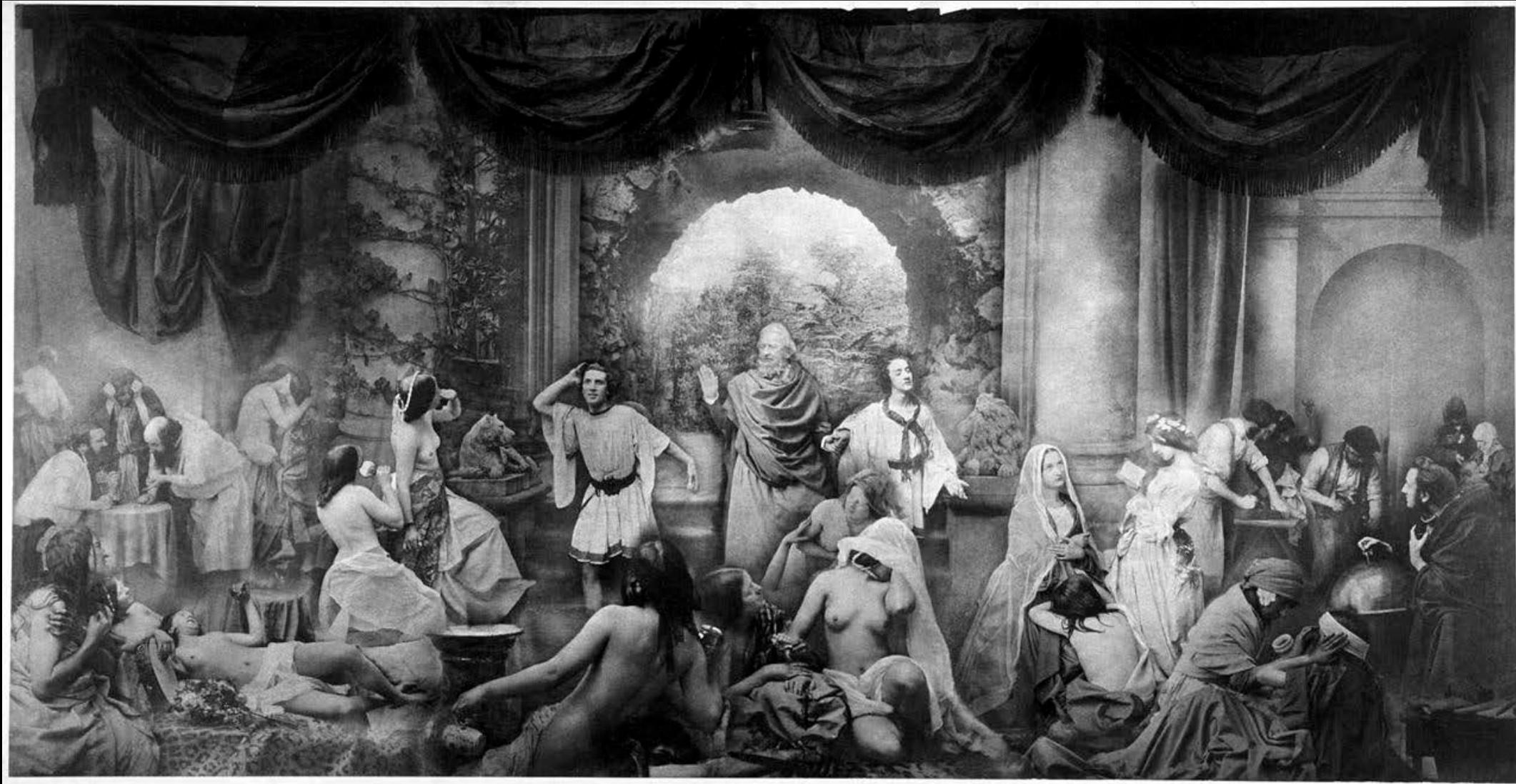
<https://www.metmuseum.org/art/collection/search/301897>

Francis Galton, Composite Portraits of Criminal Types, 1877

Victorian Composite Photography

Oscar Gustave Rejlander, *Two Ways of Life*, 1857

In 1857 he made his best-known allegorical work, *The Two Ways of Life*. This was a seamlessly montaged combination print made of thirty-two images in about six weeks. First exhibited at the Manchester Art Treasures Exhibition of 1857, the work shows two youths being offered guidance by a patriarch. Each youth looks toward a section of a stage-like tableaux vivant - one youth is shown the virtuous pleasures and the other the sinful pleasures.

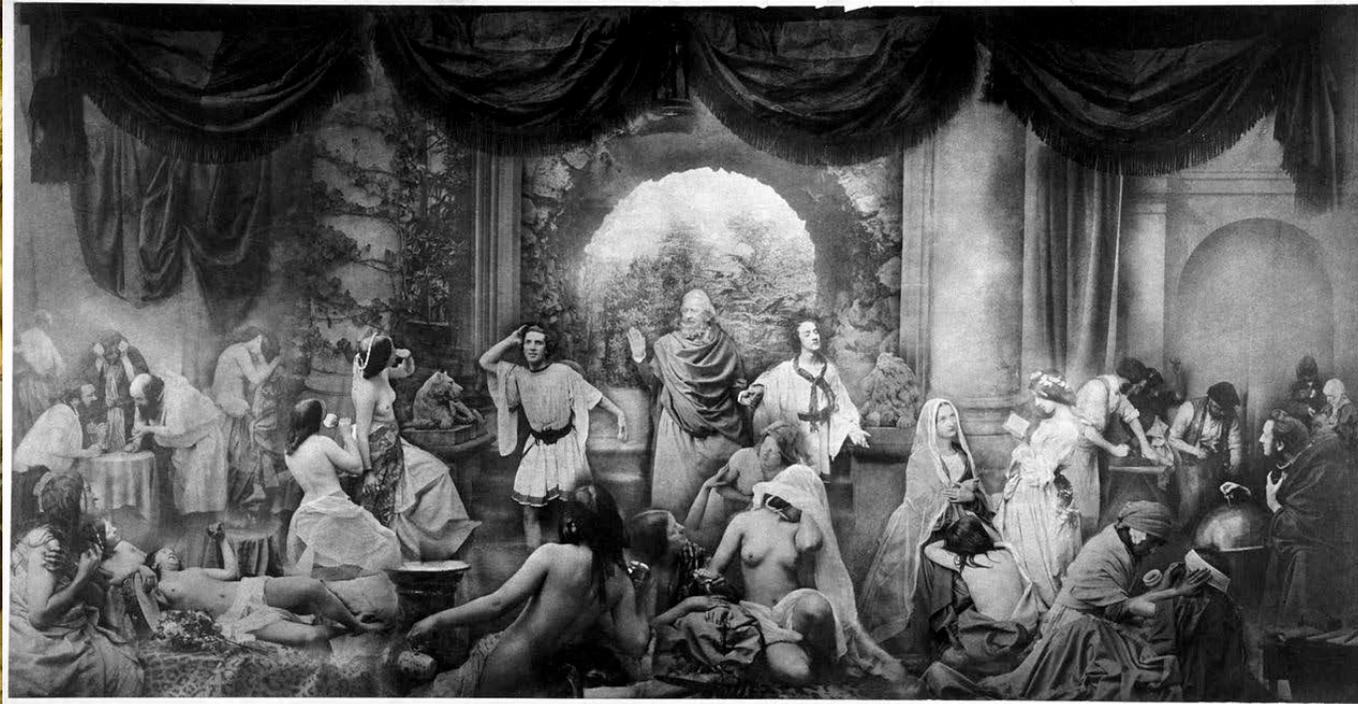


Neo-Malthusianism

classical artistic medium



Thomas Couture, *The Romans of the Decadence*, 1847



Oscar Gustave Rejlander, *Two Ways of Life*, 1857

BORN 1822.

SCIENCE possesses a learned devotee in Mr. Francis Galton—a name made famous by research in the subjects of heredity, meteorology, anthropology, and by successful scientific travel. Mr. Galton was born in 1822, and after studying medicine, graduated at Trinity College, Cambridge. For an exhaustive account of a charge of the Royal Observatory at Kew. The present interest in finger-prints as a means of identification is almost wholly due to the writings of this indefatigable scientist.

AGE 22. From a Silhouette. [Photograph.]

AGE 66. [Photograph.]

AGE 42. [Moira & Ralph.]

1897 Francis Galton British Eugenics poster by Paul D Stewart.

- In 1865, Darwin's half-cousin Sir Francis Galton published "Hereditary Talent and Character"
- one could apply the principle of artificial selection to humans just as one could in domestic animals, thereby exaggerating desirable human traits over several generations
- Galton coined the term "eugenics, in 1883, bringing together the Greek "eu" meaning "good" or "well" and "genics" meaning "born"
- In order to curtail the genetic pollution created by "inferior" genes, some governments made laws authorizing the forcible sterilization of the "insane, idiotic, imbecile, feebleminded or epileptic," as well as individuals with criminal or promiscuous inclinations
- hundreds of thousands of people were forced or coerced into sterilization worldwide, over 65,000 of them in the country which pioneered the eugenic effort: the USA

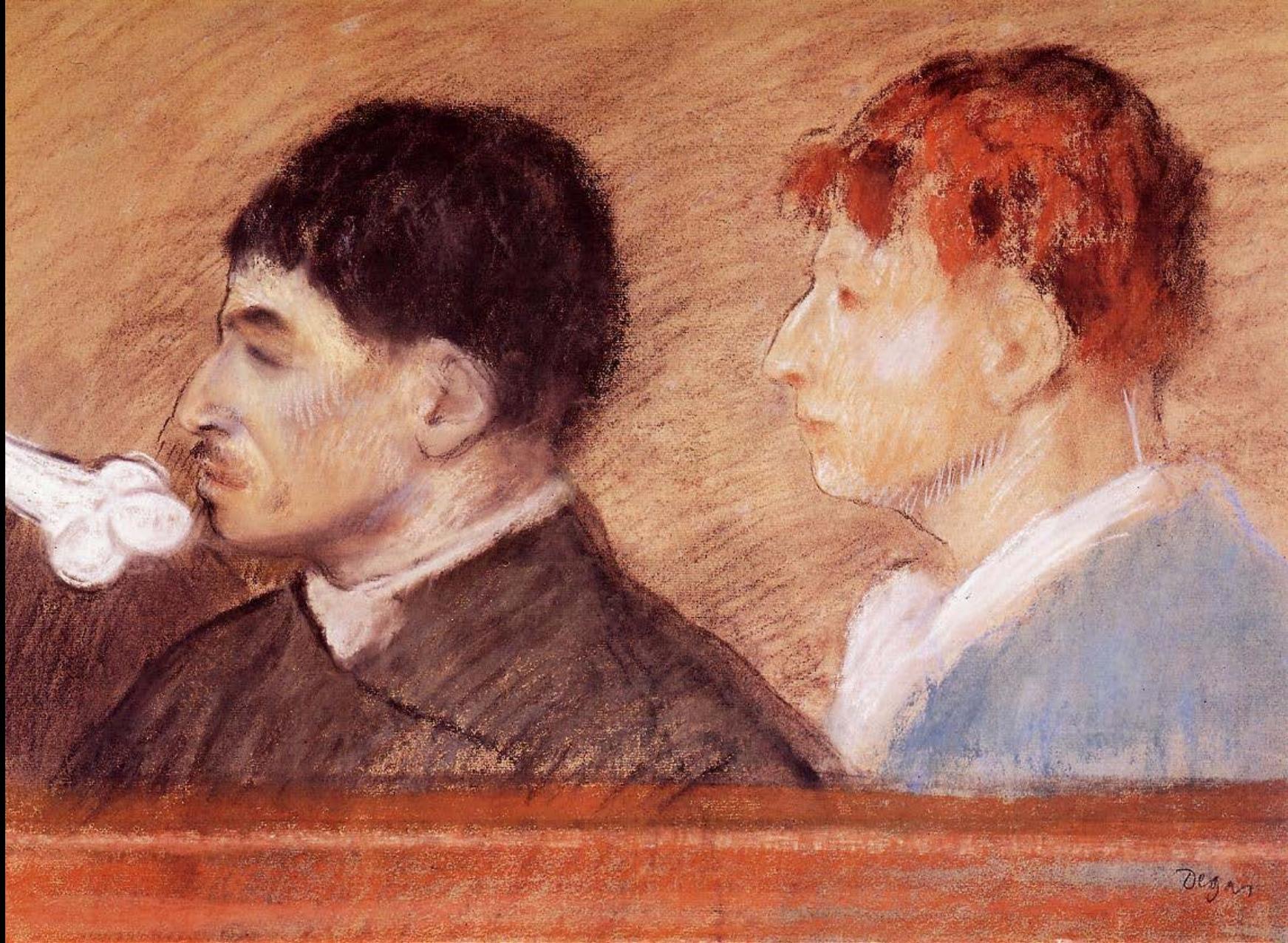
(Réduction photographique 1/7.)

Mo^r. Galton 19.4.93

Front.	Inclin* Haut* Larg* Part**	Sax.	Racine (cavité)	Ureille droite.	Bord. o. s. p. f.	Barbe	Color* (pig**
			Base		Lob. c. a. m. d.	Cheveux	'sang*
			Haut* Saillie. Larg*		A. trg. i. p. r. d.	Car	Cuint.
			Part**		Pli. f. s. h. E	Autres traits caractéristiques :	
			Part.			Sig ^t dressé par M.	

Francis Galton, aged 71, photographed as a criminal on his visit to Bertillon's Criminal Identification Laboratory in Paris, 1893.

An anthropometry photograph of Francis Galton at age 71, taken during a visit to Alphonse Bertillon's Criminal Identification Laboratory in Paris in 1893. Bertillon originated the criminal identification programme of face-on and profile photographs together with key biometric measurements. Galton, meanwhile, studied fingerprints and published two major works on the subject.



Edgar Degas, Criminal Physiognomies, 1881



Tronie painting

Typological Paintings

“face” or “head” painting

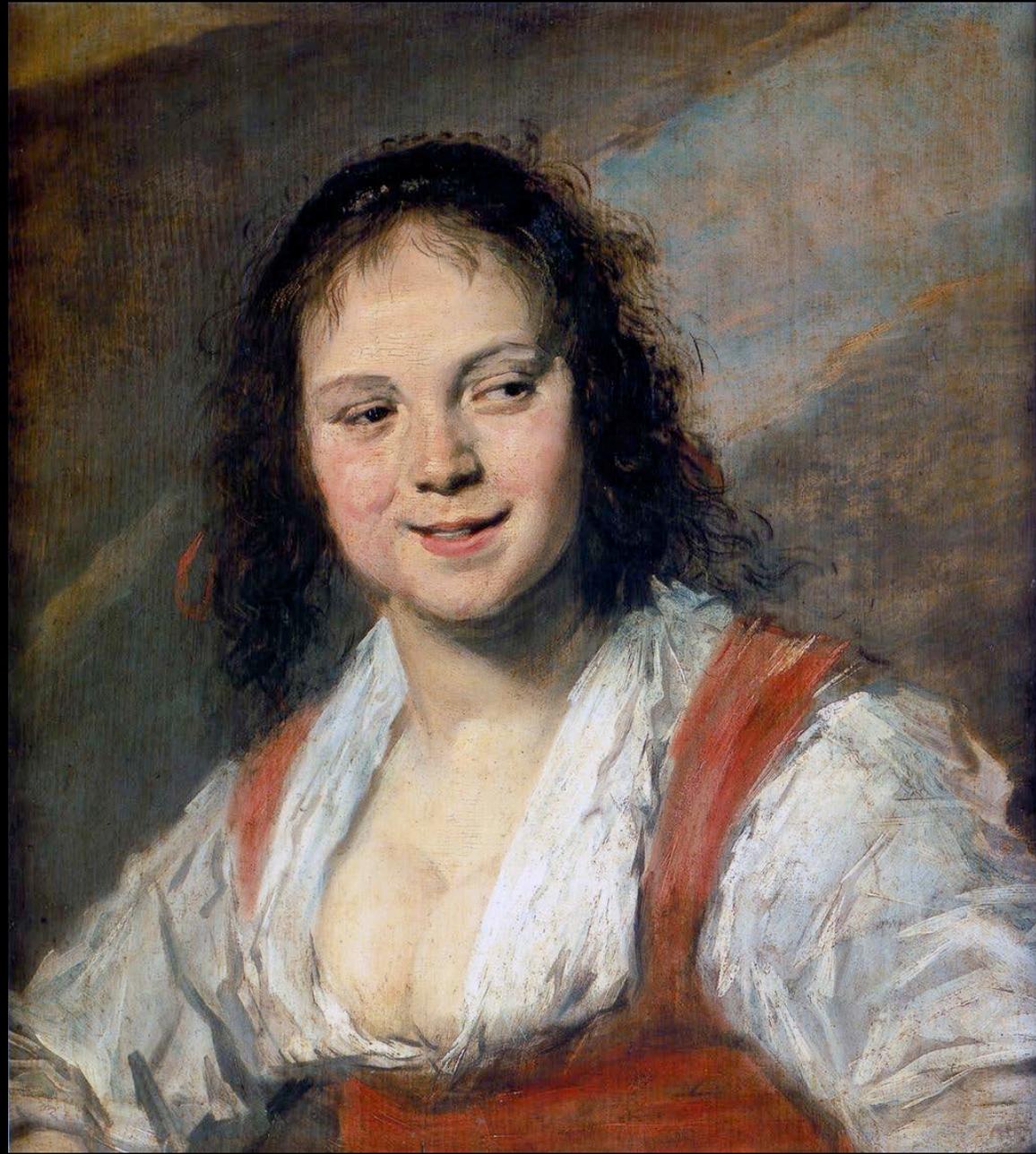
Johannes Vermeer, *The Girl with a Pearl Earring*, c. 1665



Leonardo da Vinci, Studies of grotesque heads, c.1494



Left: Joos van
Craesbeeck,
The Smoker,
1635



Right: Frans
Hals, The
Gypsy Girl,
1628



Left: Govert Flinck ,Portrait of African Male, c. 1645

Right: Govert Flinck, A Young Archer, 1639-40



Left: Frans Hals,
Malle Babbe,
1633-35



Right: Adriaen
Brouwer, Youth
Making a Face,
1632



August Sander, Washer Woman, 1930



August Sander, Beggar, 1926



August Sander, Criminal Type, 1926-30



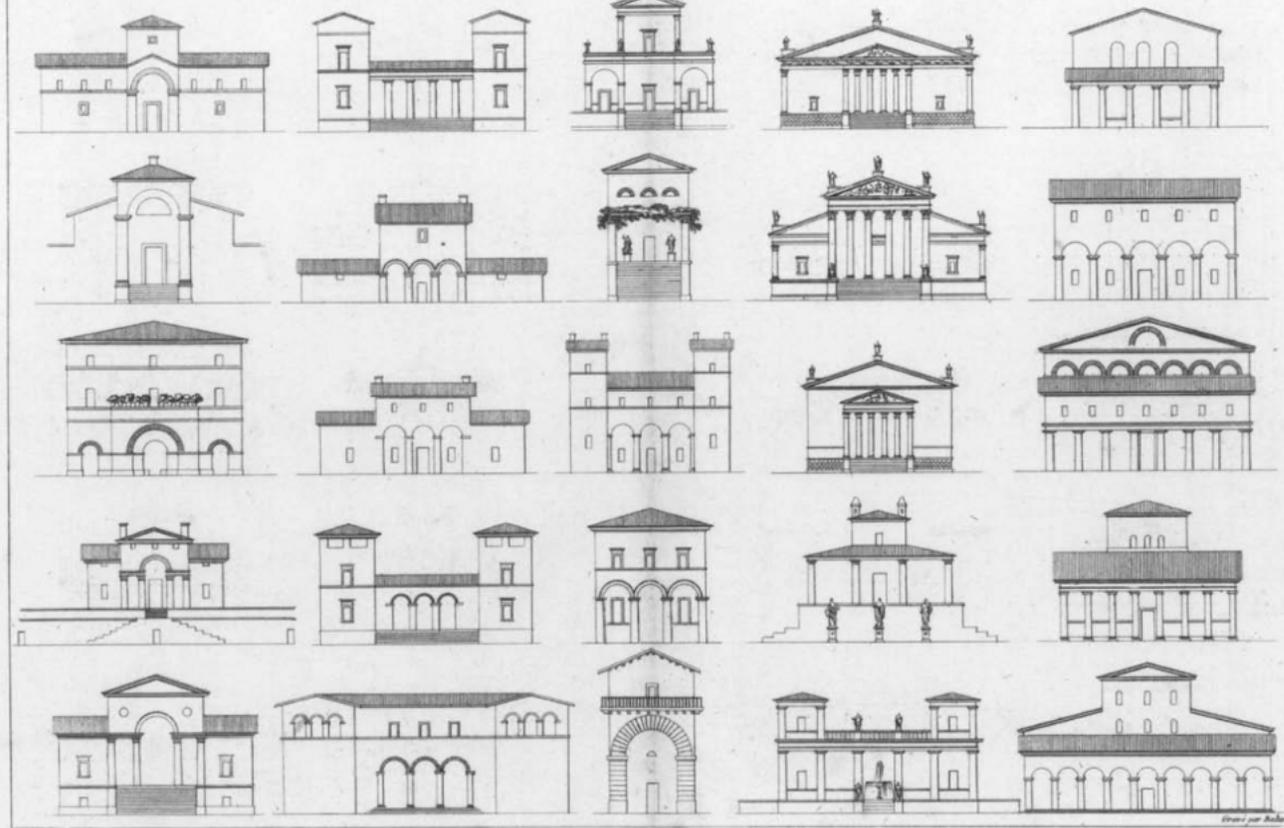
August Sander, Young Farmers, 1914



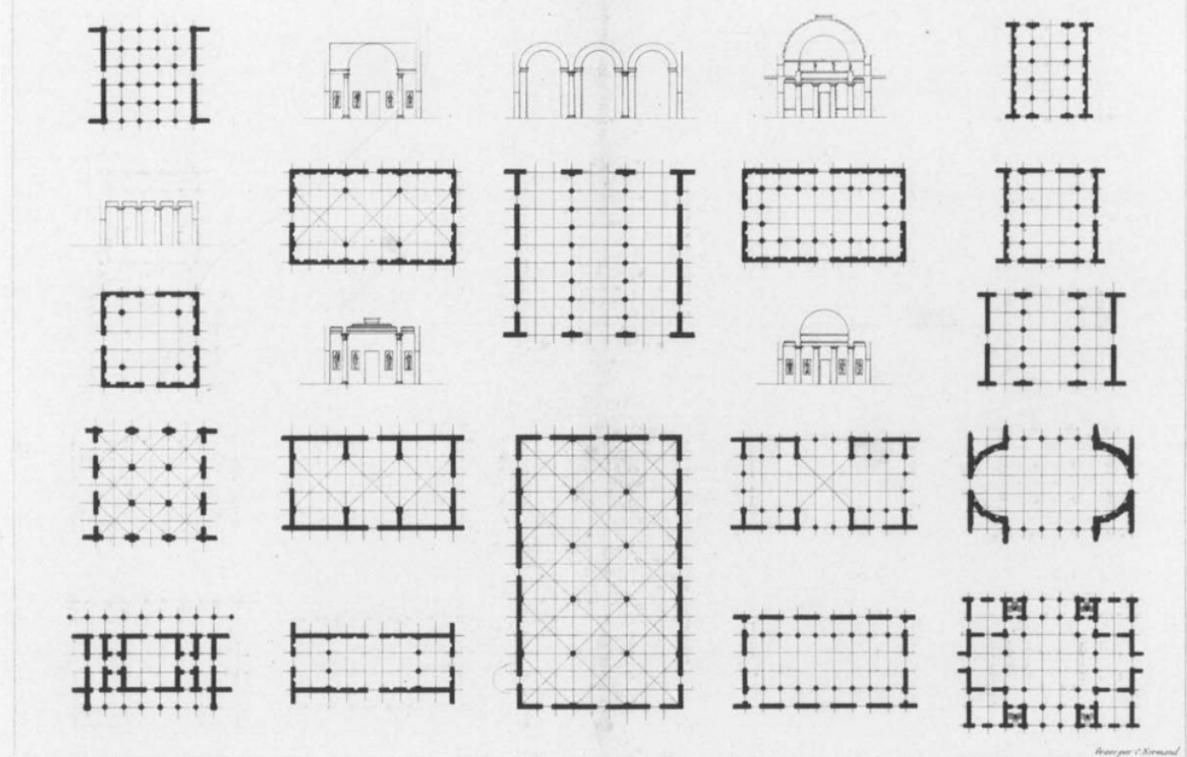
<https://flashbak.com/the-extraordinary-photos-of-german-photographer-august-sander-410620/>

August Sander, The Dadaist Raoul Hausmann [with Hedwig Mankiewicz and Vera Brodoy], 1929

PORCHES



VESTIBULES



J.N.L Durand – Précis des leçons d'Architecture (1802–5) vol 1 pt 2 plates 10–11

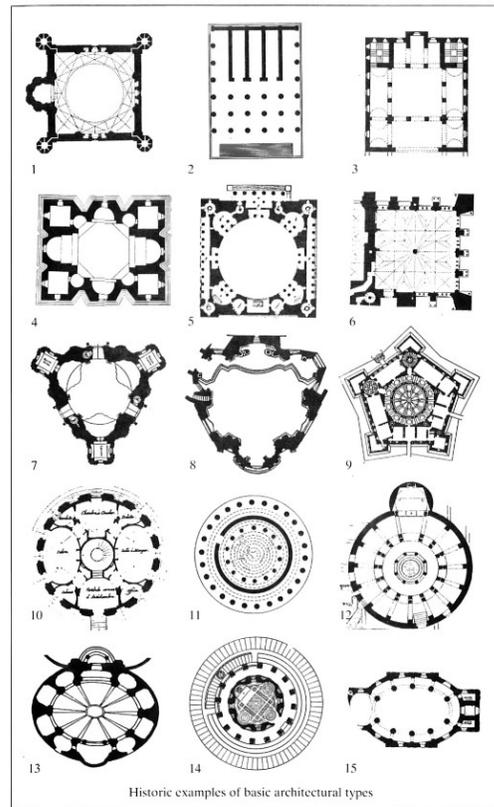
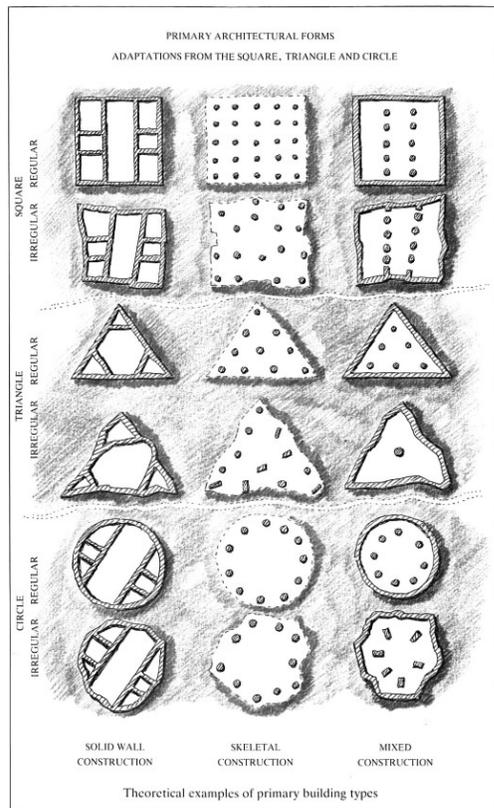
Luke Jones writes:

In *The Third Typology* (1977) Anthony Vidler argues that the invention of the enterprise of typology was as much about seeking *validation* for architectural form-making as it was about the systematisation of evidence. In a broad survey of the history of the idea since the mid 18th century, he identifies three currents, corresponding to *nature* (c 1750-1860), *production* (1860-1950) and *the city* (1960–).

Vidler writes:

From the middle of the eighteenth century, two distinct typologies have informed the production of architecture. The first, developed out of the rationalist philosophy of the Enlightenment, and initially formulated by the Abbé Laugier, proposed that a natural basis for design was to be found in the model of the primitive hut. The second, growing out of the need to confront the question of mass production at the end of the nineteenth century, and most clearly stated by Le Corbusier, proposed that the model of architectural design should be founded in the production process itself. Both typologies were firm in their belief that rational science, and later technological production, embodied the most progressive “forms” of the age, and that the mission of architecture was to conform to, and perhaps even master these forms as the agent of progress.

<https://medium.com/@tlukejones/on-the-three-typologies-ed0b5747fd9c>



BORN 1822.

SCIENCE possesses a learned devotee in Mr. Francis Galton—a name made famous by research in the subjects of heredity, meteorology, anthropology, and by successful scientific travel. Mr. Galton was born in 1822, and after studying medicine, graduated at Trinity College, Cambridge. For an exhaustive account of a charge of the Royal Observatory at Kew. The present interest in finger-prints as a means of identification is almost wholly due to the writings of this indefatigable scientist.

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(Réduction photographique 1/7.)

Mo^r. Galton 19.4.93

Front.	Inclin ^e	Racine (cavité)	Bord. o. s. p. f.	Barbe	Color* (pig*
	Haut ^e	Dos Base	Lob. c. a. m. d.	Cheveux	'sang*
	Larg ^e	Haut ^e Saillie Larg ^e	A. trg. i. p. r. d.	Car	Cuint.
	Part ^e	Part ^e	Pli. f. s. h. E	Autres traits caractéristiques :	
		Part ^e	Part.	Sig ^t dressé par M.	

Francis Galton, aged 71, photographed as a criminal on his visit to Bertillon's Criminal Identification Laboratory in Paris, 1893.

An anthropometry photograph of Francis Galton at age 71, taken during a visit to Alphonse Bertillon's Criminal Identification Laboratory in Paris in 1893. Bertillon originated the criminal identification programme of face-on and profile photographs together with key biometric measurements. Galton, meanwhile, studied fingerprints and published two major works on the subject.

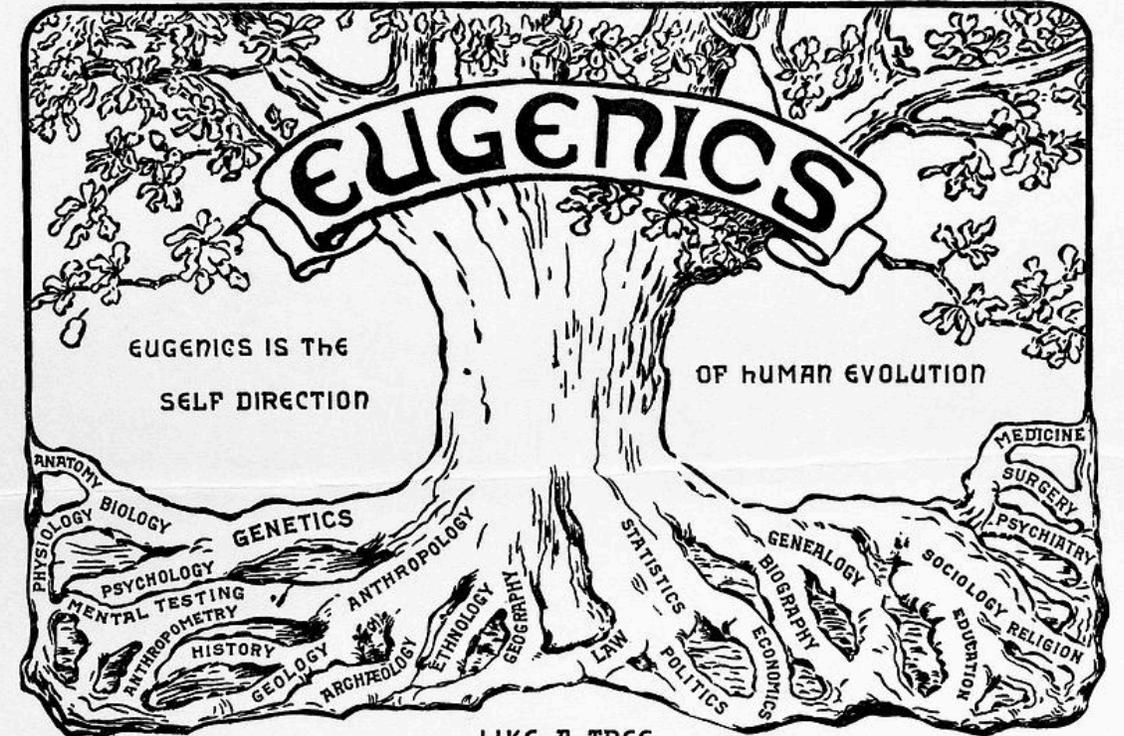
THE FEEBLE-MINDED

OR THE

HUB TO OUR WHEEL OF VICE, CRIME
AND PAUPERISM



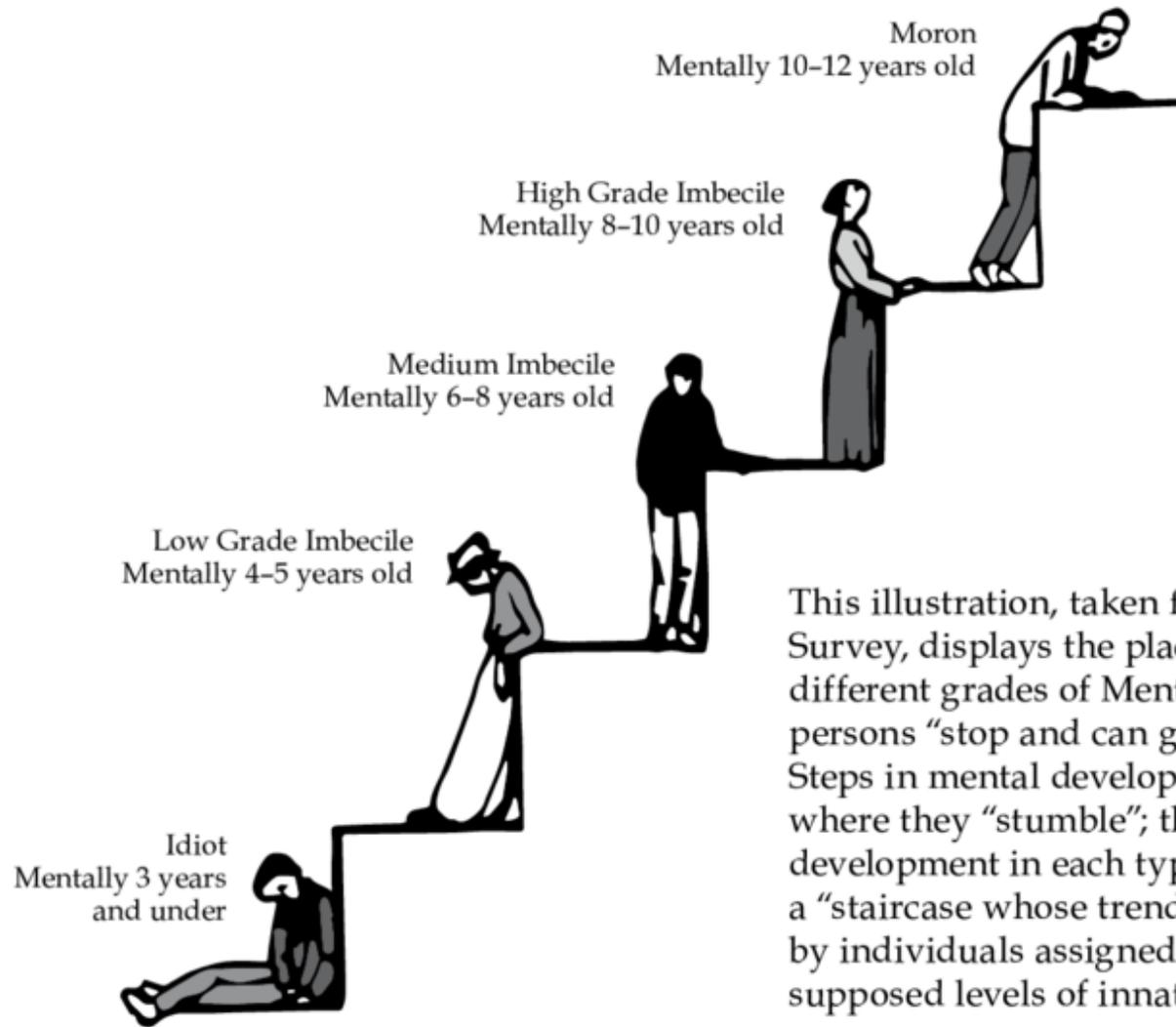
Cincinnati's Problem



LIKE A TREE

EUGENICS DRAWS ITS MATERIALS FROM MANY SOURCES AND ORGANIZES
THEM INTO AN HARMONIOUS ENTITY.

Social Darwinism



This illustration, taken from *The Survey*, displays the places where different grades of Mentally Defective persons "stop and can go no farther." Steps in mental development illustrate where they "stumble"; the limit of a development in each type is presented as a "staircase whose trends were occupied by individuals assigned on the basis of supposed levels of innate intelligence."



Courtesy of the American Philosophical Society. Noncommercial, educational use only.

Fitter Families exhibit and examination building, Kansas State Free Fair, Topeka, 1920



Supporters of the eugenics movement display signs on Wall Street (New York City, circa 1915)



Courtesy of the Robert Bogdan Collection



Eugenics and Nazi Germany



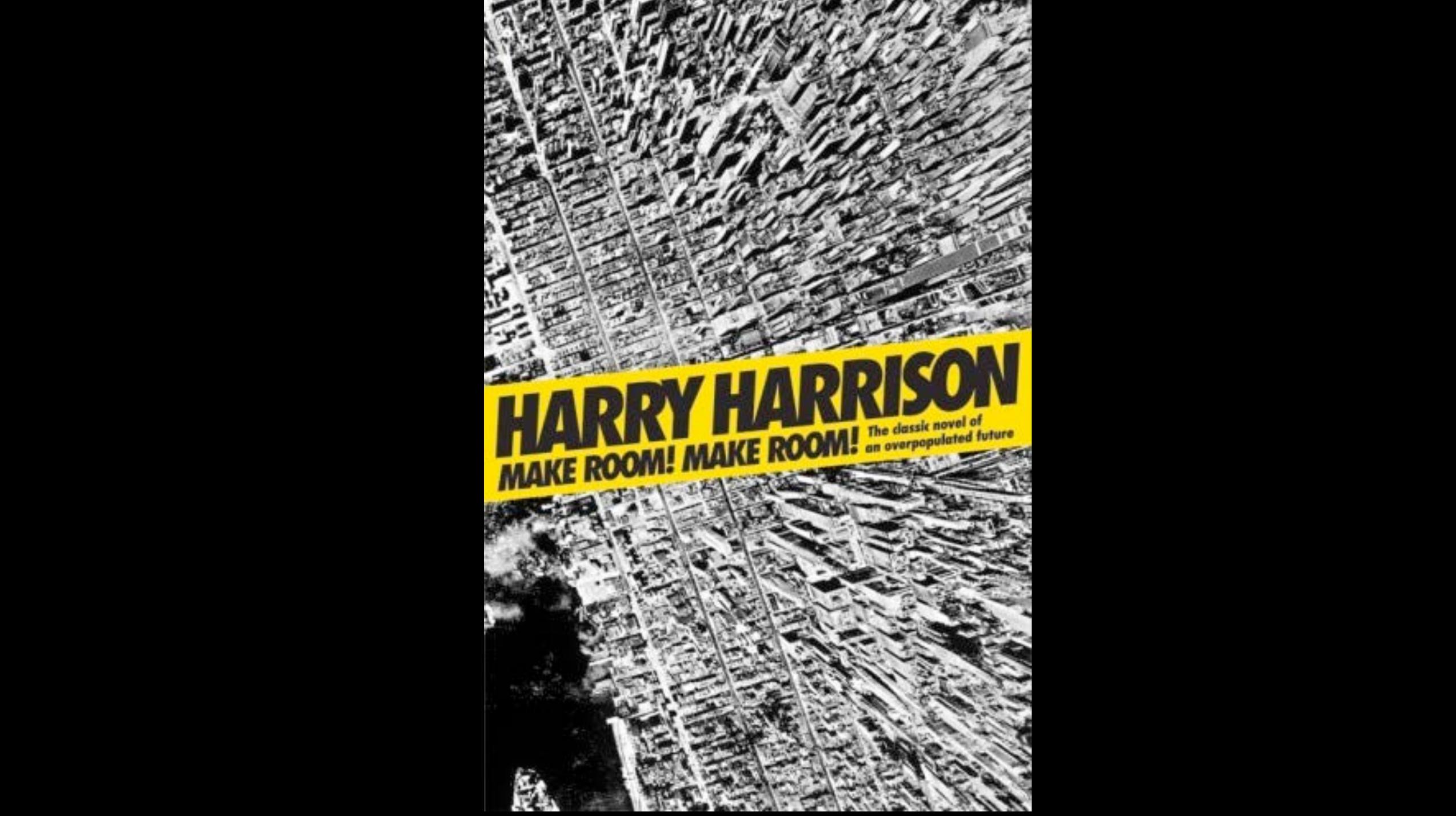
CHARLTON HESTON LEIGH TAYLOR-YOUNG

SOYLENT GREEN



It's the year 2022. People are still the same.
They'll do anything to get what they need
and they need SOYLENT GREEN.





HARRY HARRISON
MAKE ROOM! MAKE ROOM! *The classic novel of
an overpopulated future*



Charlton Heston and Edward G. Robinson in Soylent Green



Still showing crowding in Manhattan from *Soylent Green* (1973)





Malthus and power of the exponential



"If they would rather die, they had better do it, and decrease the surplus population."

—Ebenezer Scrooge



How to Control the AMERICAN Population by Paul Ehrlich

The Population Bomb Part 1 1968



Dr. Paul R. Ehrlich

THE NEXT GREAT MIGRATION



The Beauty and Terror of Life on the Move

SONIA SHAH

Author of *Paradise*

REYNOLDS & RYAN

CONTENTS

1. Exodus
 2. Panic
 3. Linnaeus's Loathsome Harlotry
 4. The Deadly Hybrid
 5. The Suicidal Zombie Migrant
 6. Malthus's Hideous Blasphemy
 7. *Homo migratio*
 8. The Wild Alien
 9. The Migrant Formula
 10. The Wall
- Coda: Safe Passage

Acknowledgments

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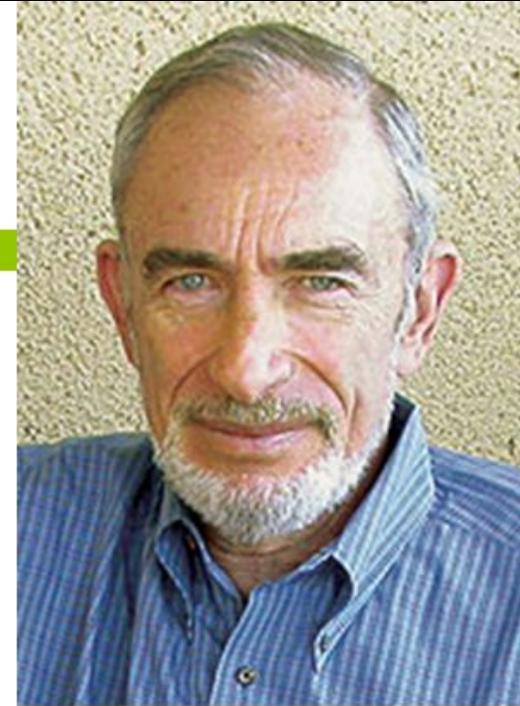
Notes

Index

A Note on the Author

Paul Ehrlich

- *The Population Bomb (1968)*
 - **Neo- Malthusian** ecologist
 - Made the argument about the ability of the earth to sustainably provide resources for an exponentially growing population.
 - Mass starvations
 - Societal uprisings
 - Raised the general awareness of population and environmental issues and influenced public policy.



The battle to feed all of humanity is over. In the 1970s hundreds of millions of people will starve to death in spite of any crash programs embarked upon now. At this late date nothing can prevent a substantial increase in the world death rate...

Also by Koula Mellos
L'IDEOLOGIE ET LA REPRODUCTION DU CAPITAL
(co-author)

Perspectives on Ecology

A Critical Essay

Koula Mellos

Associate Professor
Department of Political Science
University of Ottawa

1 Neo-Malthusian Theory

In the late 18th century, Thomas Malthus, an English political economist, advanced a theory of crisis in his *Essay on the Principle of Population*,¹ based on a posited relation of disproportion between

AB88824



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Richardson, Texas 75083-0643

to modify the pattern of economic activity in line with the limits of ecological scarcity. This conclusion echoes that of *The Limits to Growth* and concurs generally with those of other neo-Malthusian studies of trends and projections including subsequent reports to the Club of Rome. Indeed, the general conclusion of all neo-Malthusian assessments of present patterns of activity including the activity of breeding is the necessity of restraint to an extent determined by ecological exigencies. This proposal is the characteristic feature of neo-Malthusian social and political theory.

NEO-MALTHUSIAN SOCIAL AND POLITICAL THEORY

The social and political theory of neo-Malthusianism rests on the premise that human wants are infinite but the physical substructure necessary for their satisfaction is finite. This posited contradiction is resolved by an activity consistent with natural exigencies and physical finitude. This is essentially an activity of restraint both in the quantitative sense of limiting wants and in the sense of limiting the technical means of satisfying them to those compatible with ecological exigencies. The activity of restraint is politically determined such that allowable forms and degrees of activity are specified and monitored. It is thus an externally imposed restraint on the individual's activity. The individual does not freely define objectives and does not freely determine means to achieve them, but is rather subordinate to the political structure as one of control and surveillance of activity in line with ecologically determined criteria.

In examining this theory we shall argue that the premise of unlimited human wants is the Hobbesian liberal assumption of human nature as insatiably acquisitive. This classical liberal anthropology has been interpreted¹⁹ as being bourgeois in the sense of conceiving human nature on the model of the private, bourgeois individual who achieves his or her essence in the activity of private accumulation, or, in other words, private property. Neo-Malthusianism, we shall argue, implicitly assumes a human nature and the form of human nature it posits is private. Implicit in neo-Malthusianism is that the activity of private appropriation is basic to human nature. We shall argue that this anthropological assumption of private nature together with the assumption of insurmountable physical finitude underlie the theory of politically determined restraint. Physical ecology, rather than determining the form of this activity, merely sets the

quantitative boundaries within which activity can proceed. Since human nature is essentially private in neo-Malthusianism, this activity as an expression of human essence is private appropriating activity. The political theory of restraint thus is a theory of quantitative restraint of the amount of private property an individual may acquire.

Our interpretive hypothesis that a Hobbesian liberal anthropology underlies neo-Malthusian theory seems at first sight incorrect. Classical liberalism, after all, is a champion of individualism and neo-Malthusianism is vehemently critical of individualism. We find in neo-Malthusianism a depiction which is not altogether flattering of the independent individual as being excessive, irresponsible, chaotic, defying rather than obeying the laws of nature and creating harmful and destructive ecological and social conditions. He or she lacks a sense of moderation and control and depicts the predominant role as that of maximising a personal share of resources and of extracting as much from nature as possible. The individual exercises no restraint on personal appetites and, lacking all sense of frugality, remains insensitive to nature's limited capabilities. Ecological damage is thereby inflicted in proportion to the excesses of uncontained appetites.

This depiction of the individual stands in sharp contrast to the post-Hobbesian classical liberal conception, particularly that of Adam Smith. For neo-Malthusians the unrestrained individual leads to ecological and social destruction and for classical liberalism this same unrestrained individual leads to social well-being or in Adam Smith's words, 'the greatest good for the greatest number'. The difference lies in the opposing judgement of the same perception of the individual and this common conception derives from the common anthropological theory of human nature. For both classical liberalism including Hobbesian liberalism and neo-Malthusianism, unrestrained activity is an expression of human nature. But this free activity of classical liberalism is conceived as being a rational activity. It is rational because it is determined by reason and it is the individual who is the sole source of rationality. He or she defines personal goals, and develops devices to achieve them. Rational unrestrained activity is not the activity of Hobbes's state of nature 'of war of all against all', although that which is exercised in such a natural state is indeed unrestrained. That which distinguishes between rational unrestrained activity and irrational unrestrained activity is the relation between individuals. Since reason is the property of the

individual no external source of authority should tamper with it. Unrestraint, then, refers to the freedom of the individual to exercise his reason according to his own volition. This, of course, implies a relation of equality in the exercise of reason such that one does not constrain or impede the exercise of reason of the other. Competition is conceived as a wholly rational means by which individuals seek to achieve their own goals. It is a modality of action of equal and free individuals. It is in this exercise of individual rationality that human nature is expressed freely.

The key to the opposing judgement of individualism between classical liberalism and neo-Malthusianism is the relationship drawn between private individual rationality and public common good. For classical liberalism there is consistency, compatibility between the two. The interest of the private individual and the common interest is dependent on the private interest in the sense that unhampered, unimpeded activity to achieve private interests satisfies as well the common interest. There is no contradiction between the two since the common interest collapses into the private interest and becomes one with it. In neo-Malthusianism the relation between private and public interest is not one of harmony but of contradiction. Unrestrained activity in the pursuit of private interests leads to what Garrett Hardin calls 'the tragedy of the commons', i.e. depletion of resources, uncontrollable pollution and overpopulation. The resolution of this contradiction is evident for neo-Malthusianism. It is the subjection of private interests to the common interest.

The neo-Malthusian notion of unrestrained activity is not entirely equivalent to that of classical liberalism although the differences are minor and do not affect but rather serve to reveal their common anthropological basis. The 'unrestraint' character of the activity is conceived as relating more to the quantitative aspect of this activity than to the form of the activity itself. Private reason gets 'carried away', in a sense, and makes quantity its objective. Producing or acquiring more and more of this and more and more of that is unrestrained activity. It is propelled by unlimited wants including the want to have children. But although this quantitative aspect of unrestrained activity is emphasized, it is linked to the free individuals of classical liberalism (and indeed is enlarged to include the free corporate groups of neo-liberal pluralism) by the postulate of human nature as infinitely acquisitive.

If human wants are infinite they will be converted into quantitatively maximising activity by the free expression of the individual (or

THE NEXT GREAT MIGRATION



The Beauty and Terror of Life on the Move

SONIA SHAH

Author of Paradise

REYNOLDS & RYAN

CONTENTS

1. Exodus
 2. Panic
 3. Linnaeus's Loathsome Harlotry
 4. The Deadly Hybrid
 5. The Suicidal Zombie Migrant
 6. Malthus's Hideous Blasphemy
 7. *Homo migratio*
 8. The Wild Alien
 9. The Migrant Formula
 10. The Wall
- Coda: Safe Passage

Acknowledgments

References

Notes

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A Note on the Author

"All the News
That's Fit to Print"

The New York Times

LATE CITY EDITION

Weather: Cloudy, rain likely today and tonight. Partly sunny tomorrow. Temp. range: today 64-50; Wed. 67-46, Full U.S. report on Page 73.

VOL. CXIX... No. 40,997

© 1970 The New York Times Company.

NEW YORK, THURSDAY, APRIL 23, 1970

10 CENTS

**PRICES CLIMB 0.4%
BUT RATE OF RISE
APPEARS TO SLOW**

Gain in the Consumer Index
for March Lags Behind
the 4 Previous Months

INCREASE IS STEEP HERE

Medical Care and Mortgage
Interest Are the Major
Elements in Changes

By EDWIN L. DALE Jr.
Special to The New York Times

WASHINGTON, April 22—Consumer prices rose strongly again in March but there were signs that the pace of inflation was slowing, the Labor Department reported today.

After adjustment of the data to reflect normal seasonal changes, the Consumer Price Index rose four-tenths of 1 per cent in March, less than the five-tenths rise in February and the six-tenths rate of the three months before that.

What is more, one-quarter of the entire March increase in the index was accounted for by a somewhat artificial recording of an increase in Veterans Administration mortgage interest rates. The ceiling on these rates was recently raised by

Millions Join Earth Day Observances Across the Nation



Thongs jamming Fifth Avenue yesterday in response to a call for the regeneration of a polluted environment. View is north from 43d Street, with Central Park in background. The New York Times by Patrick A. Burns

**CAMBODIAN CRISIS
GROWS AS TROOPS
SEEM TO FALTER**

With Reds Near, Pnompenh
Is Gloomy Over Limited
Response to Aid Pleas

CIVIL AVIATION CURBED

Aide Declines to State How
Long Army Can Hold Out
With the Arms It Has

By HENRY KAMM
Special to The New York Times

PNOMPENH, Cambodia, April 22—An atmosphere of heightening national emergency is overtaking Cambodia.

It is due to evidence that the Cambodian Army is unable to turn back the Vietnamese Communist forces, which at one point are within 15 miles of the capital, and to the limited response to Premier Lon Nol's appeal to all nations for arms aid.

The military authorities closed the Pnompenh airport this evening to all civilian traffic. According to military sources, it is to remain closed until tomorrow in connection with an important military operation. The operation is presumably intended to dislodge the North Vietnamese and Vietnamese forces from the

**U.S. CONCERN SUED
WITH 2 IN JAPAN**

**Mood Is Joyful
as City Gives**

**Activity Ranges
From Oratory**

**BACKERS OF ROJAS
THREATEN REVOLT**

**U.S. Plane Flies In Arms
As Trinidad Fights Mutiny**

Neo-Malthusian Concern #1

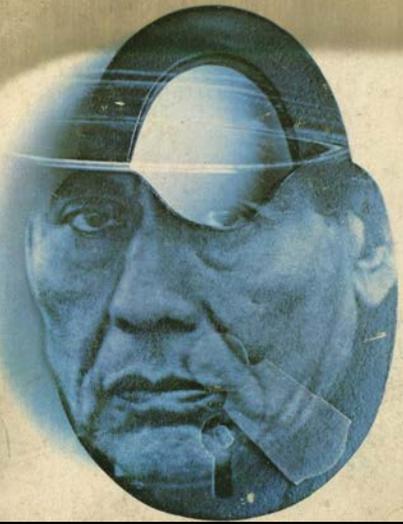
#1 SUSTAINABILITY: When the population reaches 10 billion, there may be problems keeping up with food demand.

- Soil erosion
- Soil nutrient loss
- Depletion of irrigation sources (water)
- Soil salinization (salt accumulation)

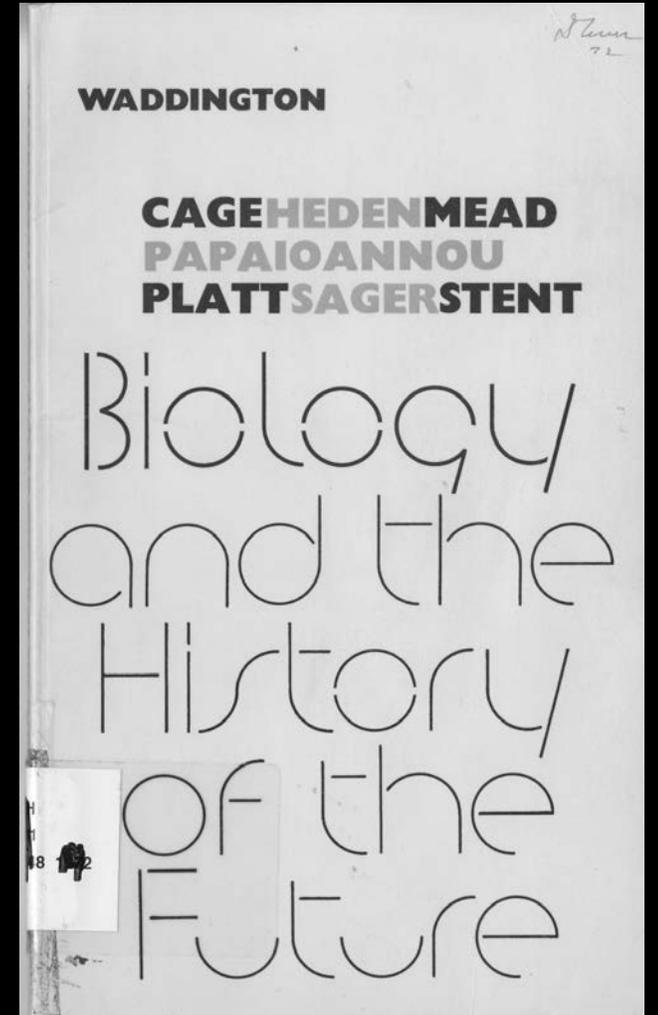
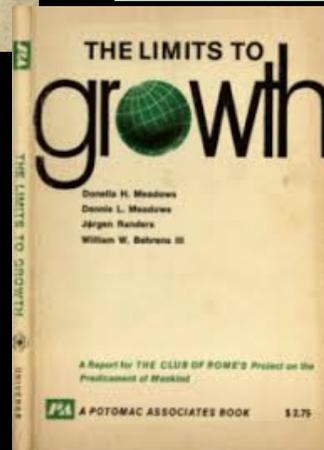
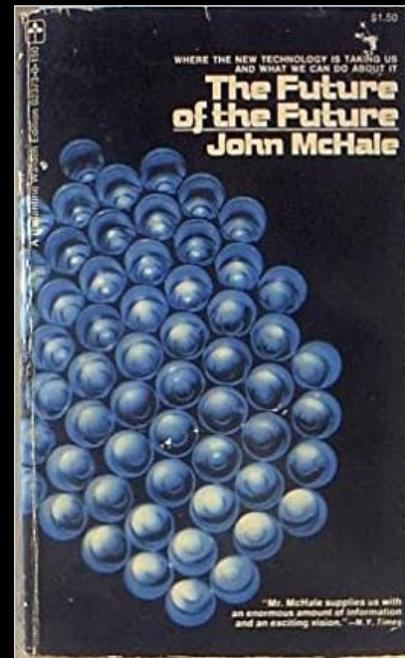
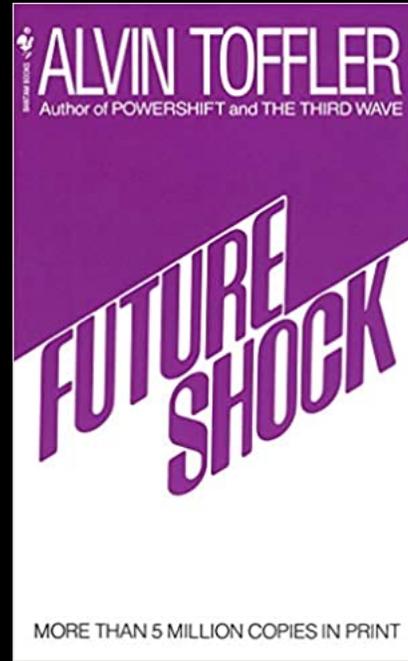
the futurists

Arthur C. Clarke, Paul Ehrlich, R. Buckminster Fuller, Herman Kahn, Marshall McLuhan, Margaret Mead, Alvin Toffler, Anthony J. Wiener, Robert Jungk, Arthur I. Waskow, John McHale, Olaf Helmer, Theodore J. Gordon, M. S. Iyengar, Erich Jantsch, Daniel Bell, I. Bestuzhev-Lada, Kenneth E. Boulding, Bertrand de Jouvenel, Yujiro Hayashi, Ossip Flechtheim, Fred L. Polak, John Wren-Lewis

edited by Alvin Toffler



Futurology and Future Studies



Some facts you should know



Coke Time... and all is well

IF YOU ARE SINGLE AND DON'T WANT TO BE:

FALSE TEETH
KLUTCH holds them tighter

Do I use the pronoun

Do I have a deep interest in

Do I laugh with affection?

Do I have any ingredient

do I "roll with the punches"?

do I feel a surge of jealousy?

**DON'T SHOOT
ARTHUR!**

**MANY NEVER
SUSPECT CAUSE
OF BACKACHES**



**SHE PINS UP
THE POISON
PEN CARDS**

Why
Not

WHY I TOOK

to the washers

in luxury flats

**Where travellers' cheques
are slave girls**

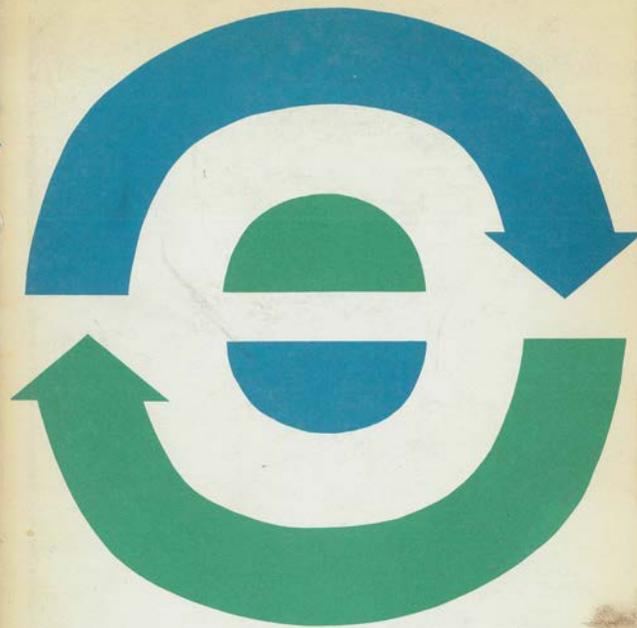
THREE scoundrels of Araby are on the
warpath again. . . They are
whooping over the silent roads in



2



John McHale 54

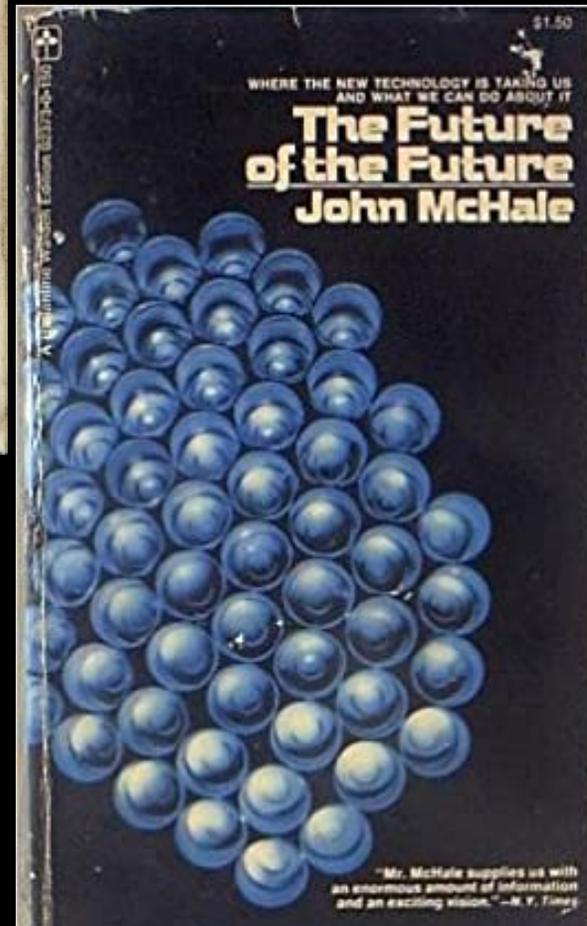


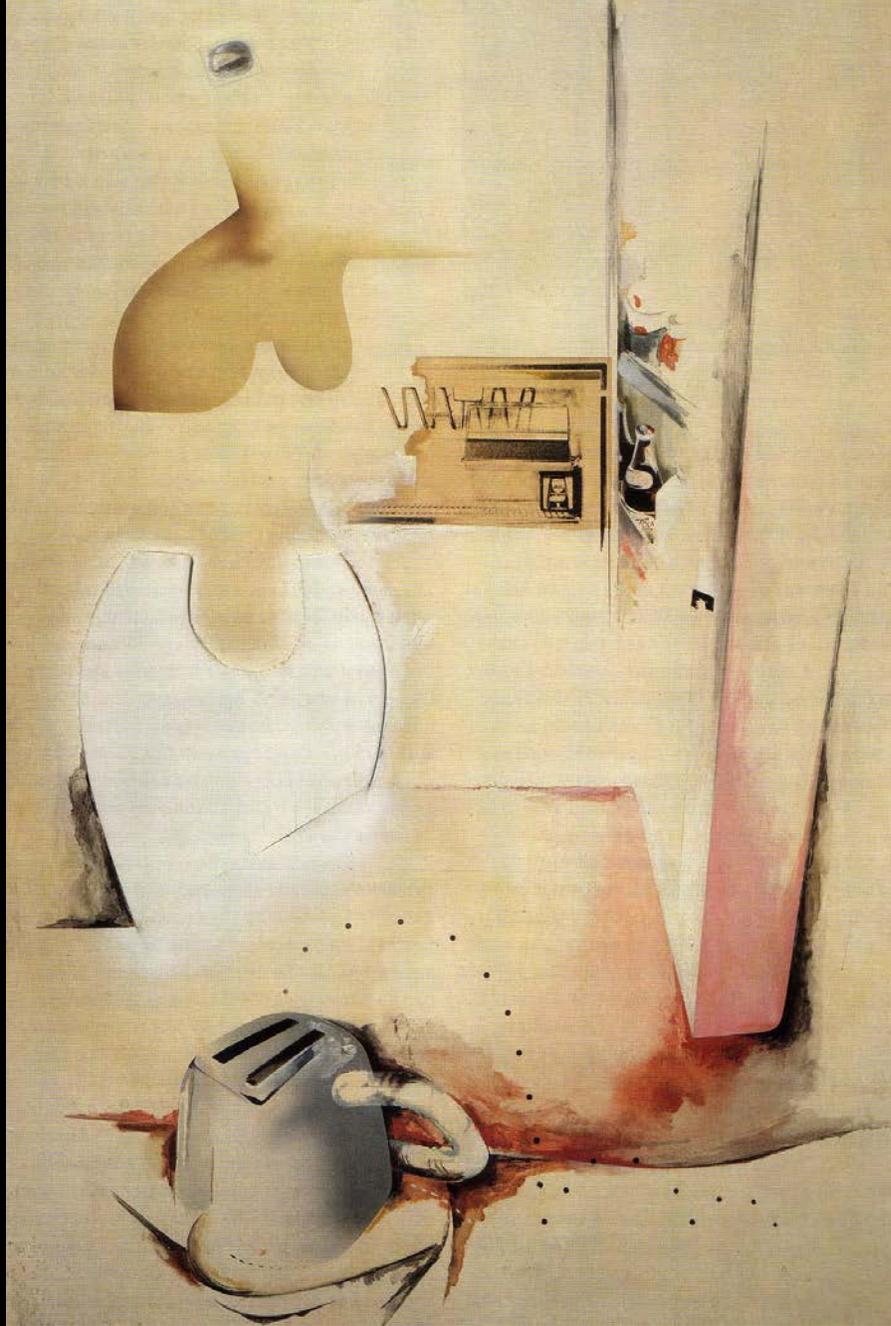
THE ECOLOGICAL
CONTEXT

JOHN McHALE

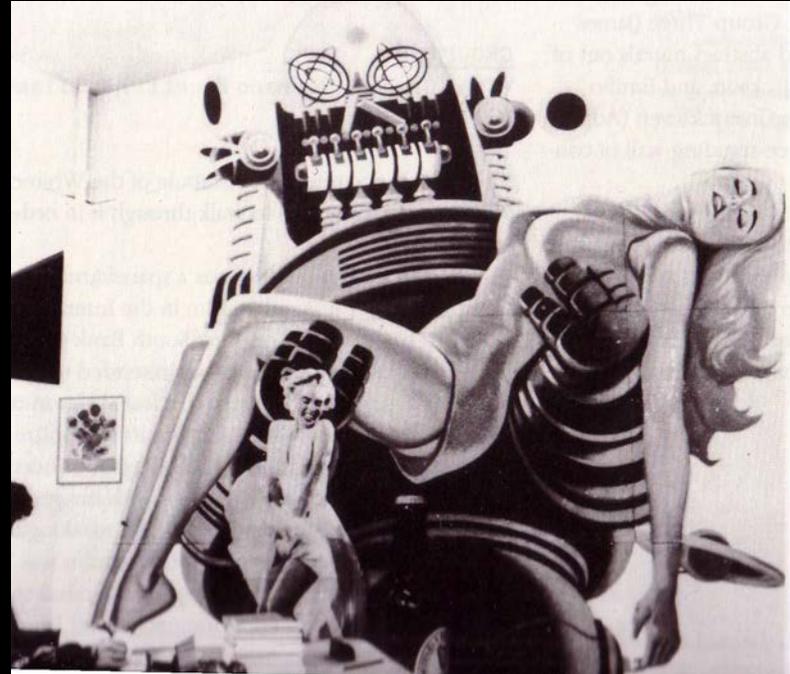
John McHale, "Why I Took to the
Washers

In Luxury Flats," 1954, collage book





Richard Hamilton, *She*, 1958-61; oil and collage on panel



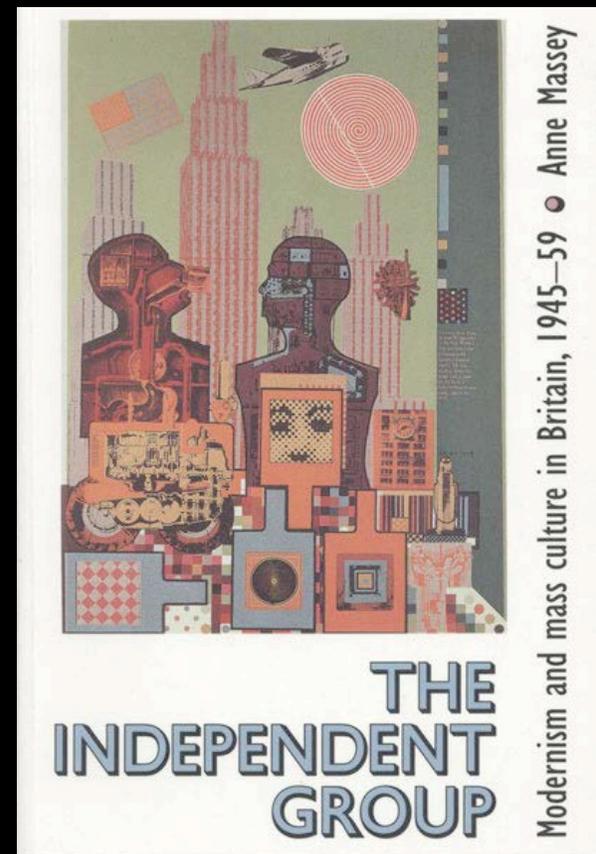
Modern Sources:

American
Consumerism

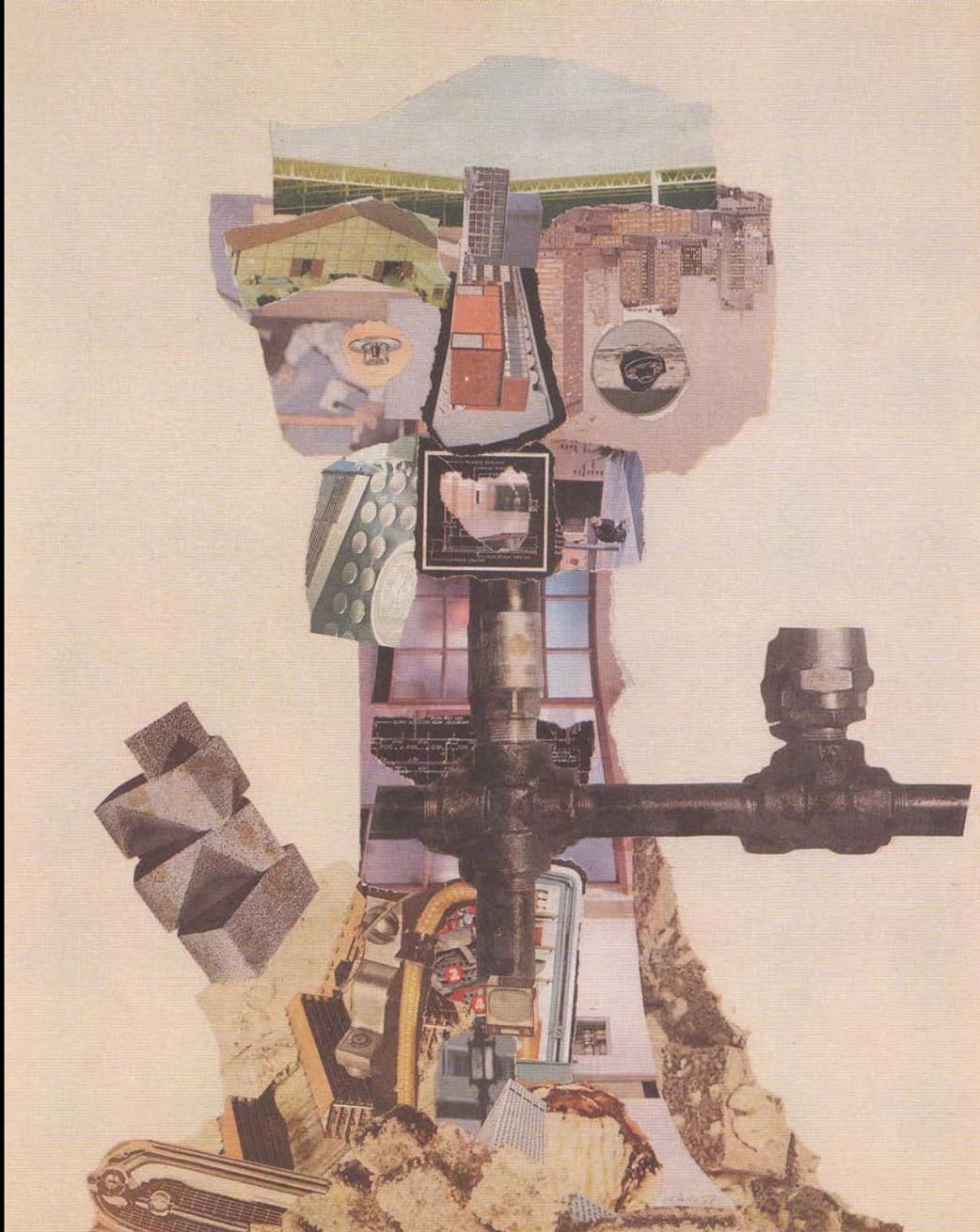
Science Fiction

Book cover from
*The Independent
Group's Modernism
and Mass Culture in
Britain 1945-59*
exhibition

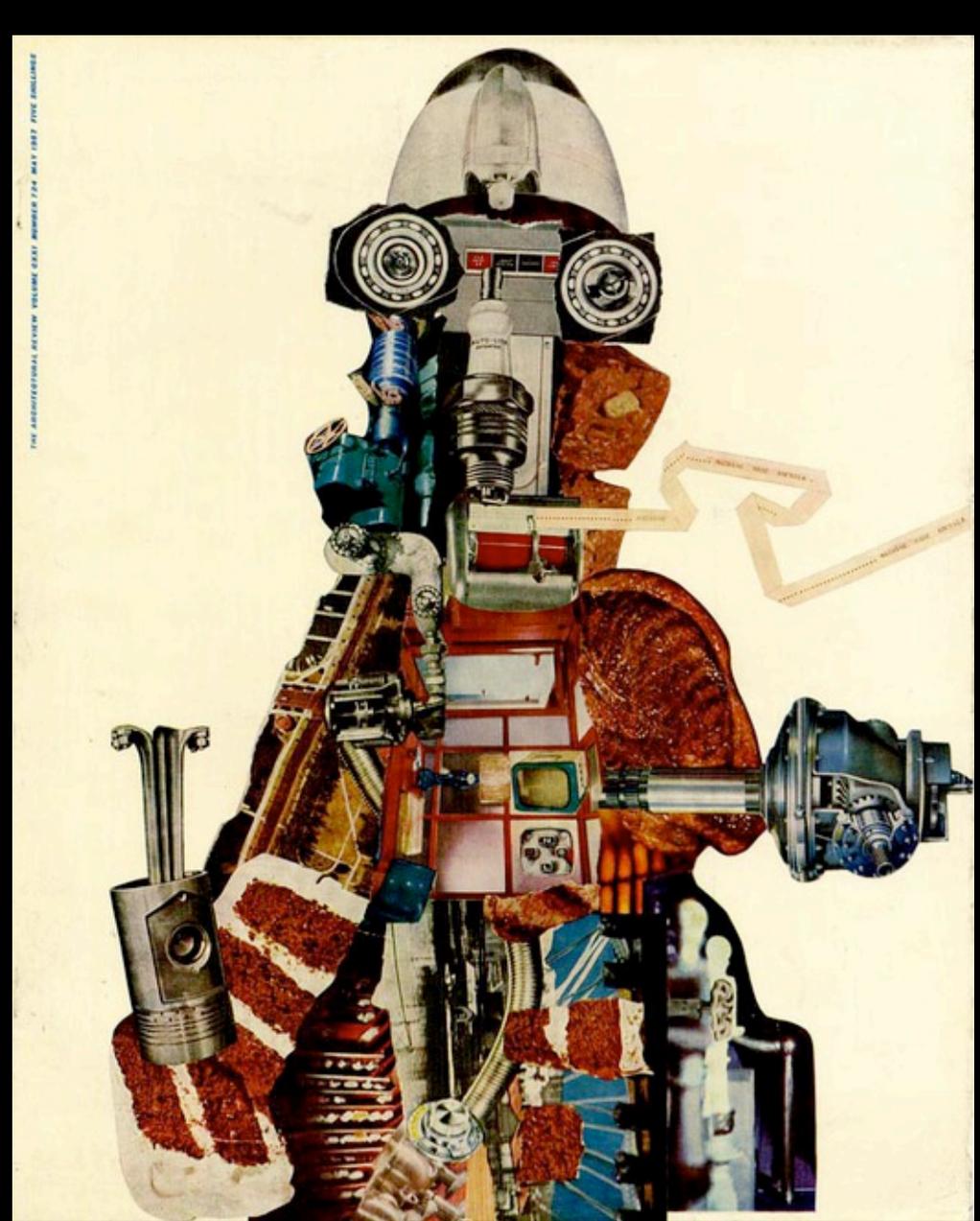
Eduardo
Paolozzi "Wittgenst
ein in New York,"
1964



Modernism and mass culture in Britain, 1945—59 • Anne Massey



John McHale, "Machine-Made America I," 1956-57, collage



John McHale, "Machine-Made America II," 1956-57, collage

MARGINALIA

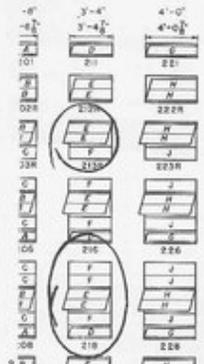


Eames catalogue building
At this time distant, it seems remarkable that no sharp West Coast speculator has yet emulated the enterprise of Charles Eames, and produced a 'U-hold-it' kit for a full street house, or perhaps, at lesser remove, something on the lines of the 'containing' items, advertised in U.S. car magazines, for giving that personal touch to the family auto. But, no doubt, even given such ac-



QUADREFLEX
Even, the Eames 'Catalogue' house would still stand as an unique and completely individual essay in means aesthetics. The view of the house shown here 1, is of the living room end, where the bedrooms occupy the second story; the overprinted numbers on the window elements are the types, chosen by the architect, from the catalogue of the Trucon Steel Co. It, gives a detail of the actual page section of the company's 'Architectural Projected Windows' with Eames' own notations.

In between extracting components from catalogues, and seeing their own designs get into catalogues, Charles and Ray Eames have contributed a chair to one generation, produced toys to confound the next, and turned out a series of original essays in film. Contrary to custom, the sequel to 'A Communications Primer,' one of the latter, is not, Eames says, to be called "Son of Communications" or "Communications Rides Again"—but "Theory of Feedback." Although the relationship of these film projects to architectural and other designing may seem tenuous, Eames does emphasize its relevance. His point becomes clearer when one considers the way in which I.B.M. have used Eames as a consultant—not on the design of actual products—but charged with carrying the designer's attitude into other management areas. His latest design is in



the same territory of Communications—a loudspeaker enclosure 2, the 'Quadreflex,' designed in collaboration with Stephens Trucon engineering staff.

Fuller: global encirclement
Though more amenable to catalogue treatment, and mass production, than the traditional building, the geodesic dome is still, generally, on a one-off basis, individually tailored to specific requirements. But the recent licensing, by Fuller, of commercial fabrication to produce domes, may change the situation. The biggest dome yet 4,—all aluminium, 144 ft. diameter and 57 ft. high—has been turned out by Kaiser Aluminium Co. This was erected in 20 hours by 38 men for a resort auditorium in Honolulu to seat 1,800 people. With locations such as this, Fuller does not seem geographically wide-spread; radars in the Arctic, a concert hall in the South Seas and the recent one in Kabul, Afghanistan. This latter, the Kabul Dome, 100 ft. diameter, of aluminium tube and nylon skin, was designed for the U.S. pavilion in the International Trade



Fair held there, and housed, among other items, an 80-ft. Cinemascope screen. From initial inquiry by the client, through designing, fabrication, transport, to final erecting on the site, took around 8 weeks. After Kabul, it is touring the Far East, and will eventually come to Europe this year.

Marginalia, like this month's cover, and his own spare head (right, a collage sculpture of beer-packs and string) has been assembled from machine-made Americana by John McHale, Glasgow-born collageist, biographer of Buckminster Fuller (AR, July, 1956) and recent special student under Josef Albers at Yale.



'Good to look at, pleasant to hold'
From General Motors pop, look on styling, the above quote refers to an example of hand sculpture from Pratt Institute 5, which shares page honours



with a vacuum-type coffee machine, fender detail from a Pontiac dream car—and an egg. Earlier in the same document, visuals of frontier axes, Kentucky rifles and duelling pistols (as well as a miscellany ranging from



patiently hand-crafted cherrywood mount—) with a difference! Its sleek, curvaceous bulk is of the same sandwich construction as, now obsolete, wood moulds used in forming auto bodies. A neat way of including tradition in and incidentally producing a particularly impressive, and 'new,' desk design. Besides the hand

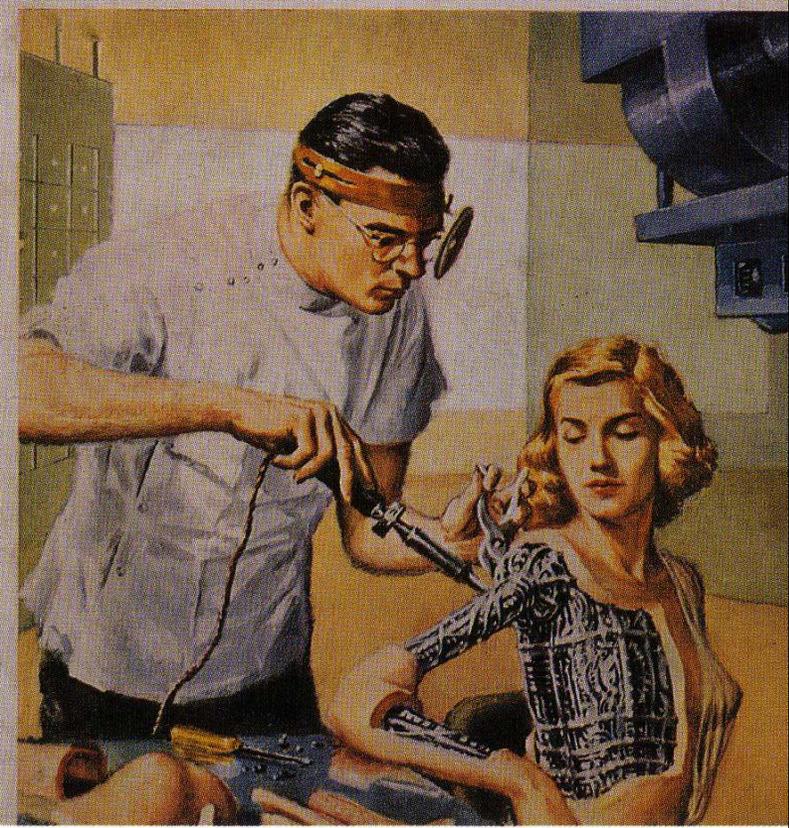


and eye piece were in its hub contours, the desk provides much manipulative therapy for the active executive by way of pushbutton panels for lighting, temperature and TV control, as well as a built-in waste basket.



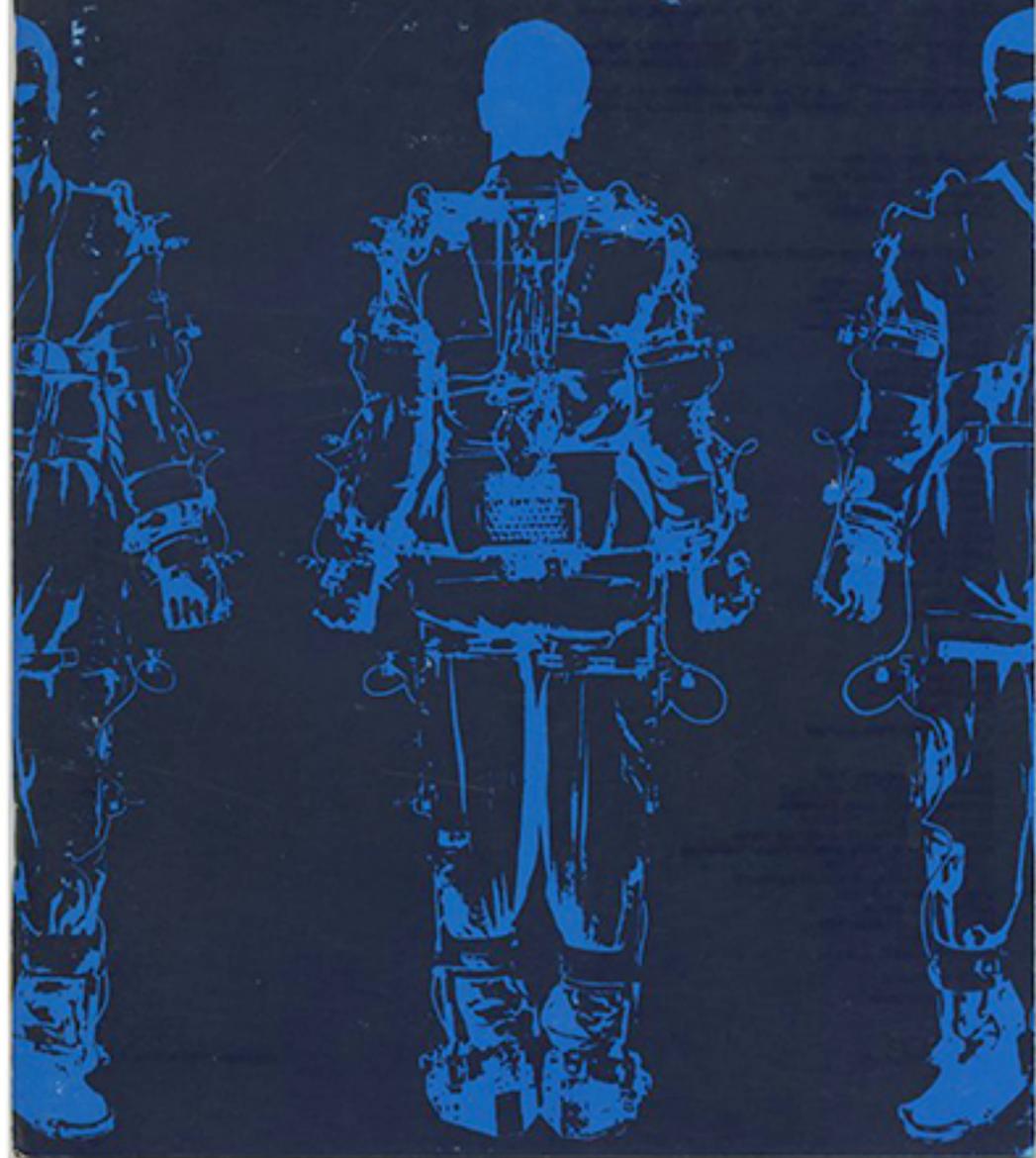
Galaxy

SEPTEMBER 1954
35¢
THE MAN WHO WAS SIX
By F. L. Wallace



Cover used by McHale as illustration for *This is Tomorrow* Exhibition, Institute of Contemporary Arts, London, 1956

Toward the Future / DESIGN QUARTERLY 72



DESIGN BY GERALD D. FINE, UNIVERSITY OF CALIFORNIA, BERKELEY



DESIGN BY GERALD D. FINE, UNIVERSITY OF CALIFORNIA, BERKELEY

Illustration of a large satellite in orbit. The satellite is shown in a perspective view, highlighting its complex structure and solar panel arrays. The background shows a stylized Earth from space.



DESIGN BY GERALD D. FINE, UNIVERSITY OF CALIFORNIA, BERKELEY

DESIGN BY GERALD D. FINE, UNIVERSITY OF CALIFORNIA, BERKELEY

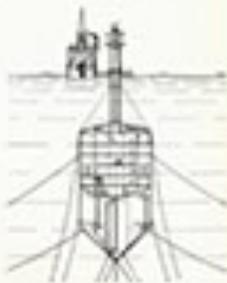


DESIGN BY GERALD D. FINE, UNIVERSITY OF CALIFORNIA, BERKELEY

DESIGN BY GERALD D. FINE, UNIVERSITY OF CALIFORNIA, BERKELEY



DESIGN BY GERALD D. FINE, UNIVERSITY OF CALIFORNIA, BERKELEY



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As the development of the space
 program in the U.S. is moving ahead at the
 rapid pace, the need for a more
 efficient and effective means of
 transport is becoming increasingly
 apparent. The development of a
 new type of aircraft, the X-15,
 is a direct result of the need for
 a more efficient and effective
 means of transport. The X-15 is
 a hypersonic aircraft, capable of
 flying at speeds in excess of 10,000
 miles per hour. It is the most
 advanced aircraft ever built, and
 it is the only one of its kind.

Diagram illustrating the concept of a
 space station in orbit around the Earth.

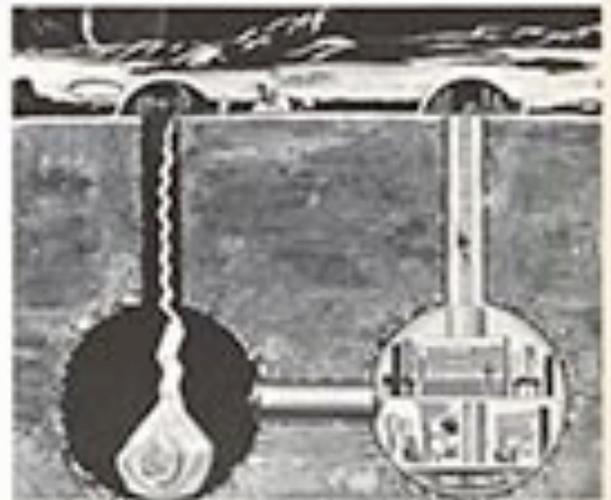
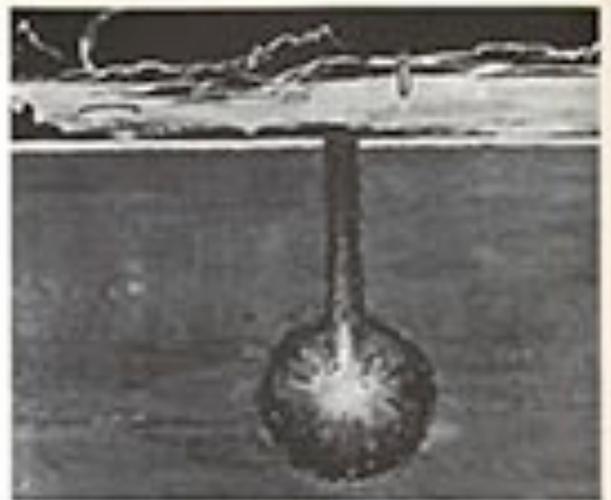


Diagram illustrating the concept of a
 space station in orbit around the Earth.



Diagram illustrating the concept of a
 space station in orbit around the Earth.



Model of lunar rover, designed by NASA, for use in the Apollo program. It is a four-wheeled, four-wheel drive vehicle.



Small lunar rovers, designed by NASA, for use in the Apollo program.



Model of lunar rover, designed by NASA, for use in the Apollo program. It is a four-wheeled, four-wheel drive vehicle.

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Model of lunar rover, designed by NASA, for use in the Apollo program. It is a four-wheeled, four-wheel drive vehicle.



Helen and Newton
Harrison, Portable
Orchard, 1972/2015





Left: Haus-Rucker-Co, 'Environment Transformer/Flyhead Helmet', 1968

Right: Group Haus-Rucker-Co, Austrian architects Laurids Ortner, Guenter Zamp Kelp, and Klaus Pinter

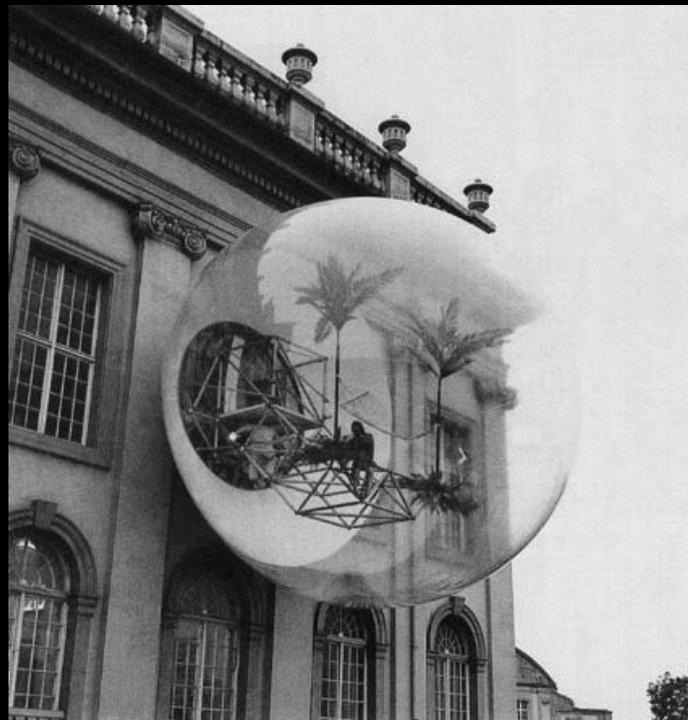




“Architects must cease to think only in terms of buildings.” The dazzling array of architectural inventions Austrian group Haus-Rucker-Co. affirms Hans Hollein’s plea in his 1968 *Bau* magazine essay, “Everything Is Architecture.” Founded in 1967 around a “Mind Expanding Program” (MEP), Haus-Rucker-Co aspired to extend people’s psycho-physical experiences through art and architecture. Hailing from Freud’s hometown, these Vienna-based architects were, unsurprisingly, fascinated with the “inner space” as much as with the physical built environment.

Beyond buildings, Haus-Rucker-Co infused architectural principles—re: form, function, content, structure, space, effect, spectacle, and meaning—into expendable commodities, producing highly imaginative designs to, so the story goes, send their users on a psycho-physical journey.

Haus-Rucker-Co, 'Environment Transformer/Flyhead Helmet', 1968



Haus-Rucker-Co., Oasis
Number 7, 1970

"Our balloons will help you to discover an unknown feeling of tranquility, of security, of relaxation. And love. We want to heighten your sensitivity. You will take a journey. Together with someone you love. Into inner space. Like Astronauts. Only an inward trip. You will attain a higher level of thinking and loving..."



Haus-Rucker, Flyhead Viewatomizer and Drizzler, 1968



Haus-Rucker-Co, *Grüne Lunge* (Green Lung),
outdoor installation at Kunsthalle Hamburg, 1973



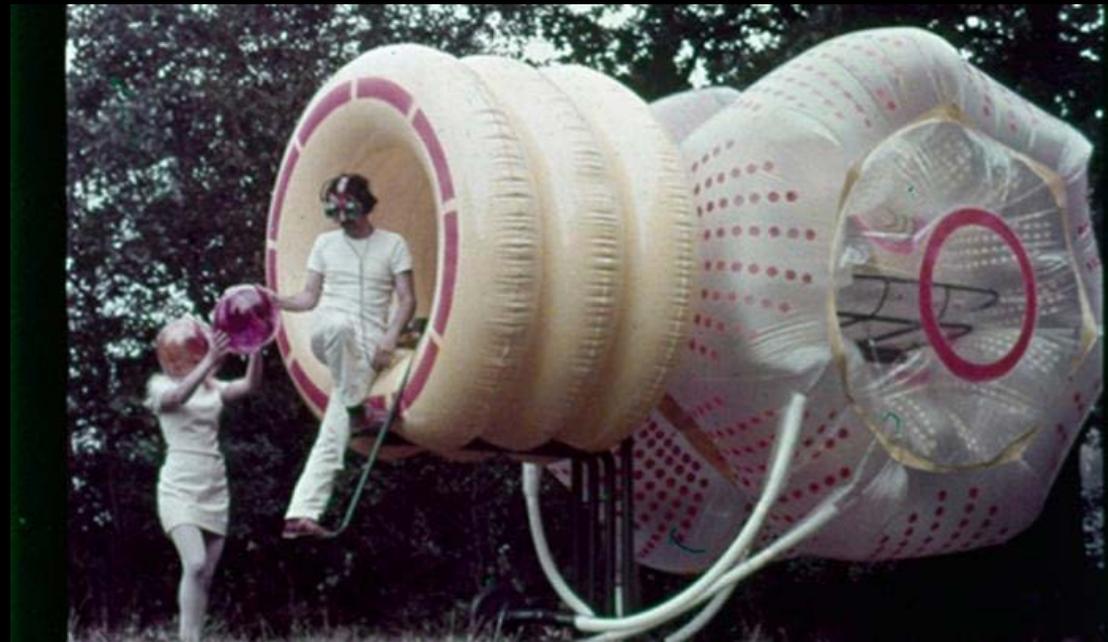
Haus-Rucker-Co. 'Mind Expander' 1967

No longer oriented side by side, the couple now sat with the woman on the man's lap, their legs conspicuously entwined. In this position, the man would reach down the overhead cover and turn on the rhythm machine. A psychedelic journey then began.





Haus-Rucker Co., Yellow Heart, 1968



PLUS-MINUS-ZELLEN

SCHLEUSE

B

B

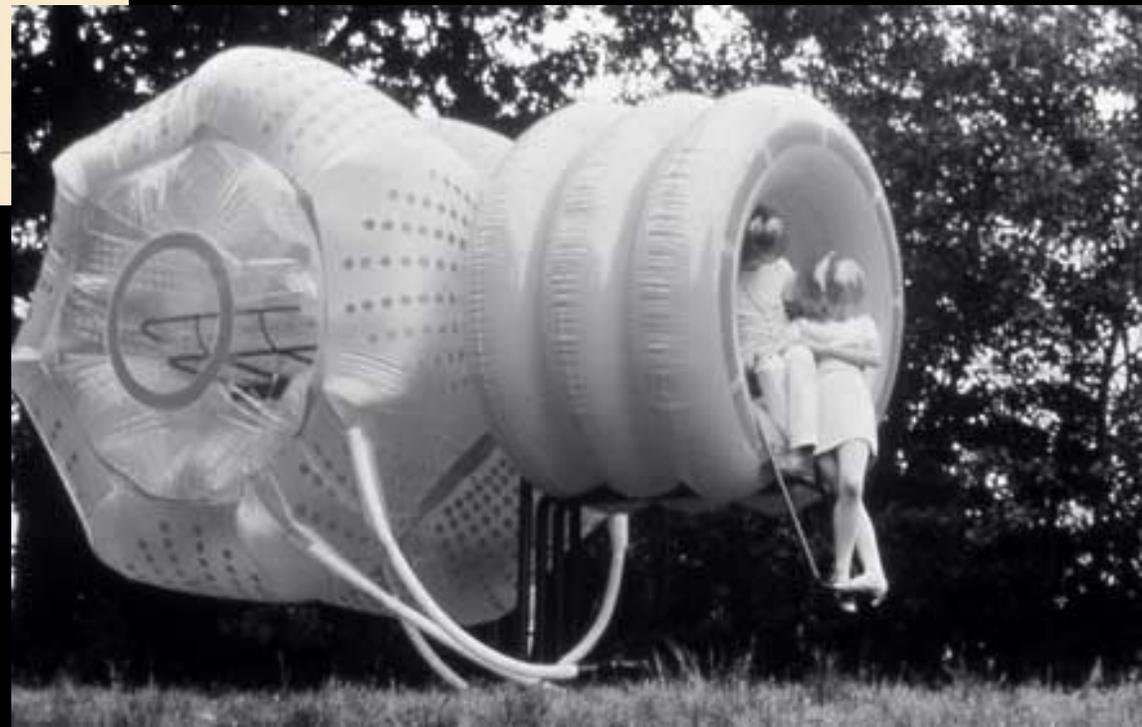
PNEUMATISCHE
PLATTFORM

ZULUFT ABLUFT

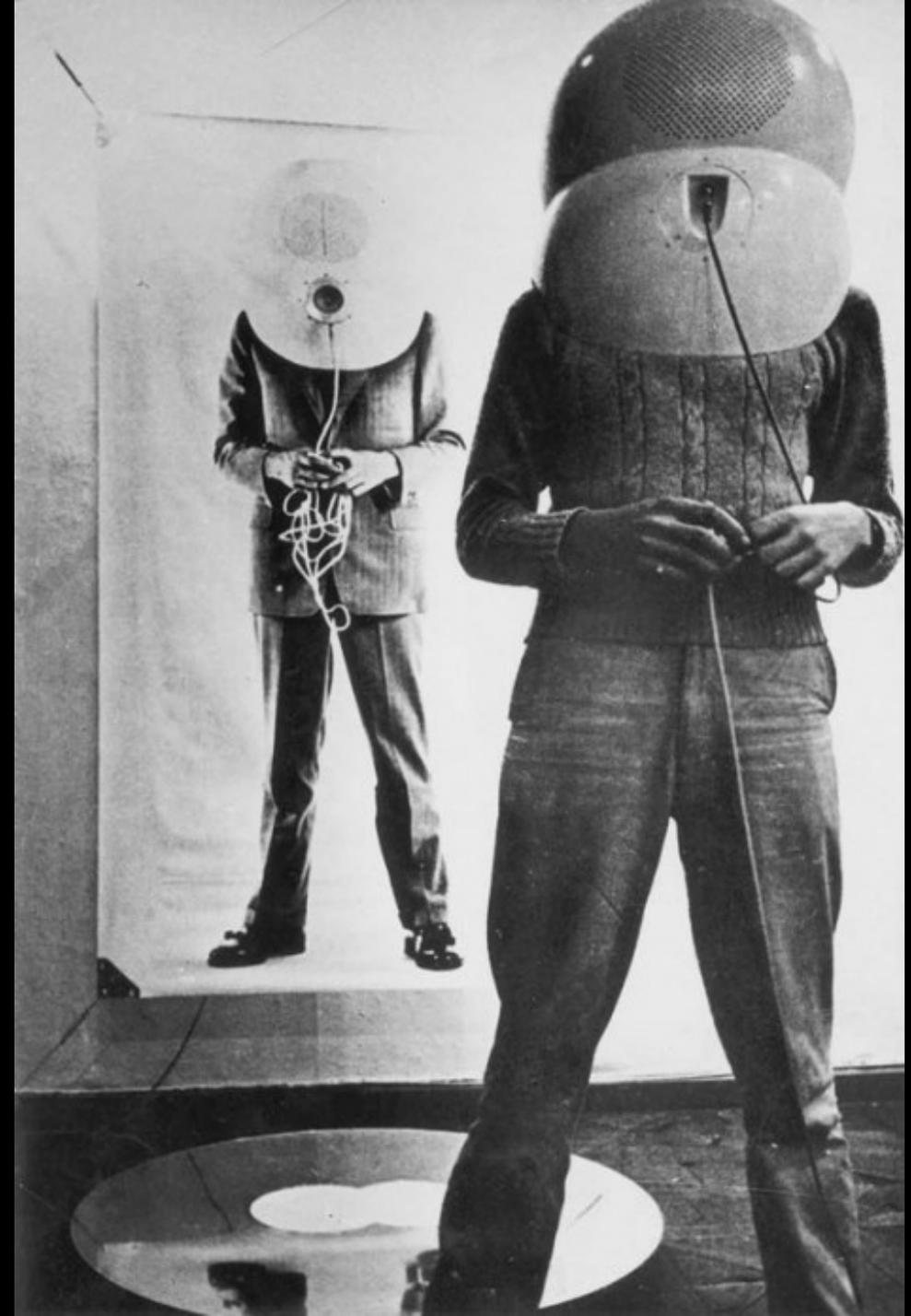
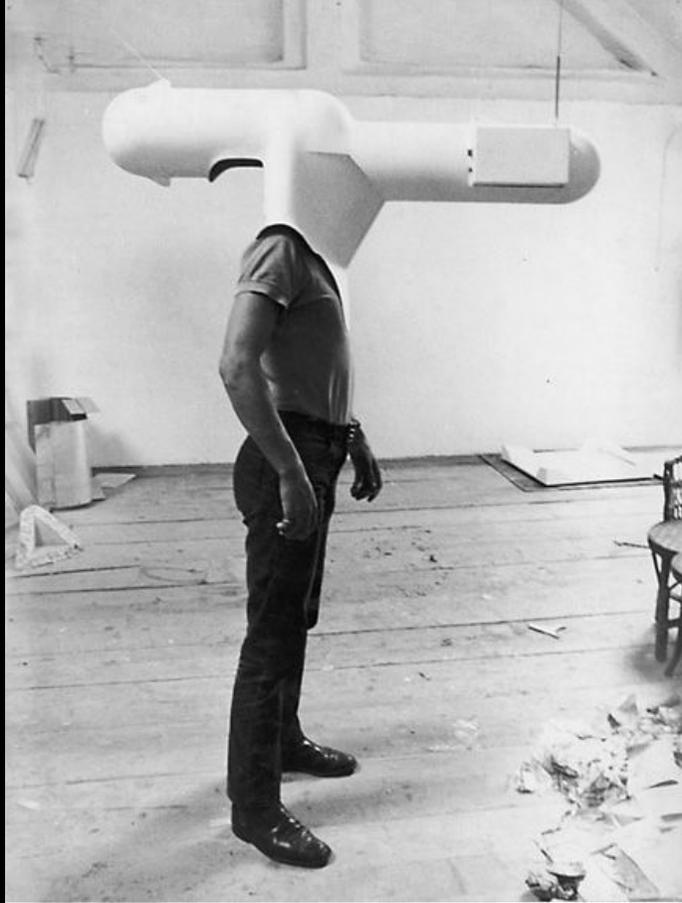
EINSTIEG

STEUERUNG DER
LUFTZUFUHR

AGGREGAT







Left: Walter Pichler, TV Helmet (Portable Living Room), 1967

Right: Walter Pichler, TV Helmet, 1967

Walter Pichler (1936-2012) was an Austrian sculptor, artist, architect and designer

TV Helmet created in 1967 is a technical device that isolates the user while embedding him or her in an endless web of information: closed off against the outside world, the wearer was completely focused on the screen before his eyes.



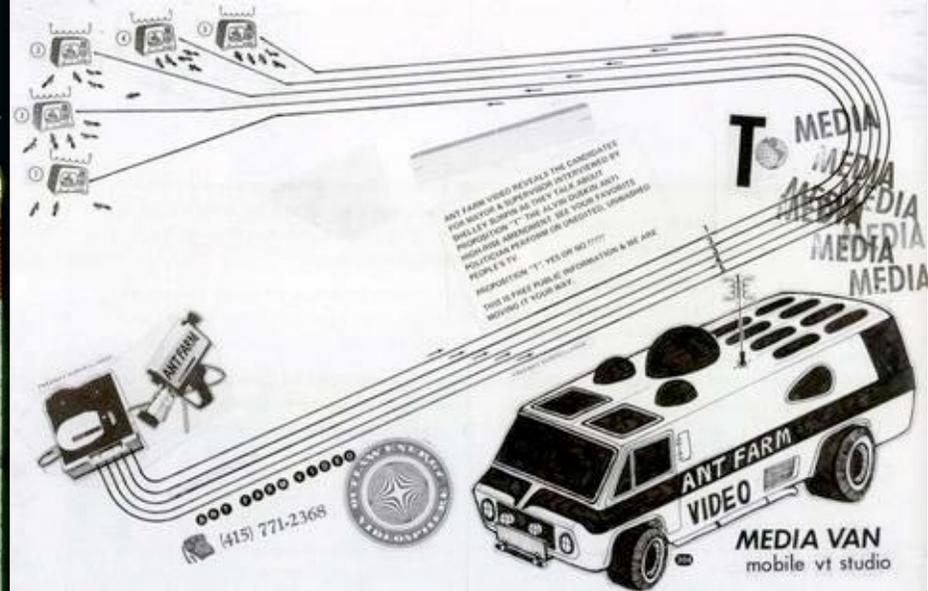
Clean Air Pod, 1970, performance at lower Sproul Plaza, University of California, Berkeley

Ant Farm [1968-1978] = Chip Lord, Hudson Marquez, and Doug Michels



Ant Farm, Inflatables – Clean
Air Pod, 1970-1971

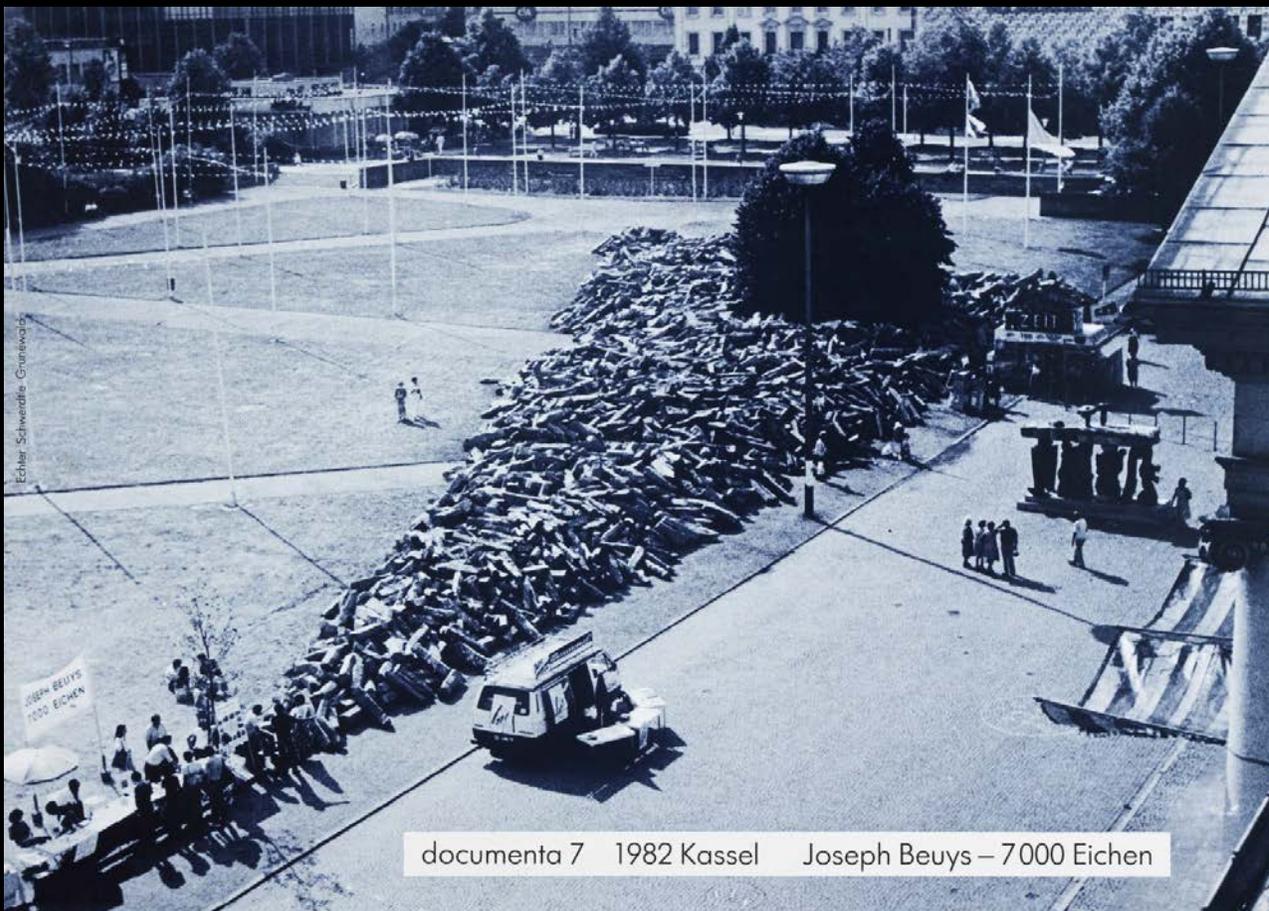




Ant Farm, Media Van, 1970-72/rehabilitated 2008

Ant Farm drove around the country conducting happenings, teaching people how to make pneumatic architecture, and making videos – all from the Media Van.





documenta 7 1982 Kassel Joseph Beuys – 7000 Eichen



Joseph Beuys, 7000 Oaks, 1982

CRISPR-Cas9

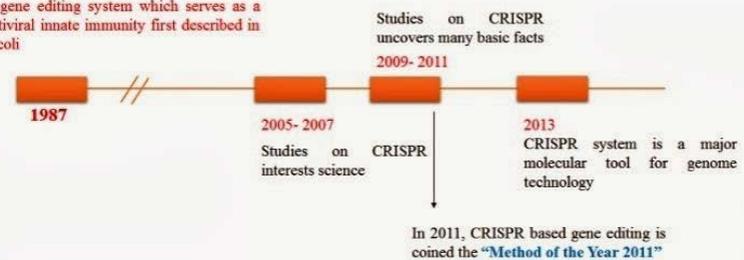


Summary of CRISPR Cas System

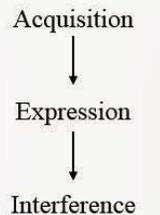
CRISPR type	Dependence on PAM	Signature Cas	Functionality
1	Yes	Cas 3	Cleave and degrade DNA
2	Yes	Cas 9	Cleave DNA
3	No	Cas 10	Cleave DNA (Subtype III A) or RNA (Subtype IIIB)

CRISPR Timeline

A gene editing system which serves as a antiviral innate immunity first described in E coli



Steps in CRISPR Cas functioning

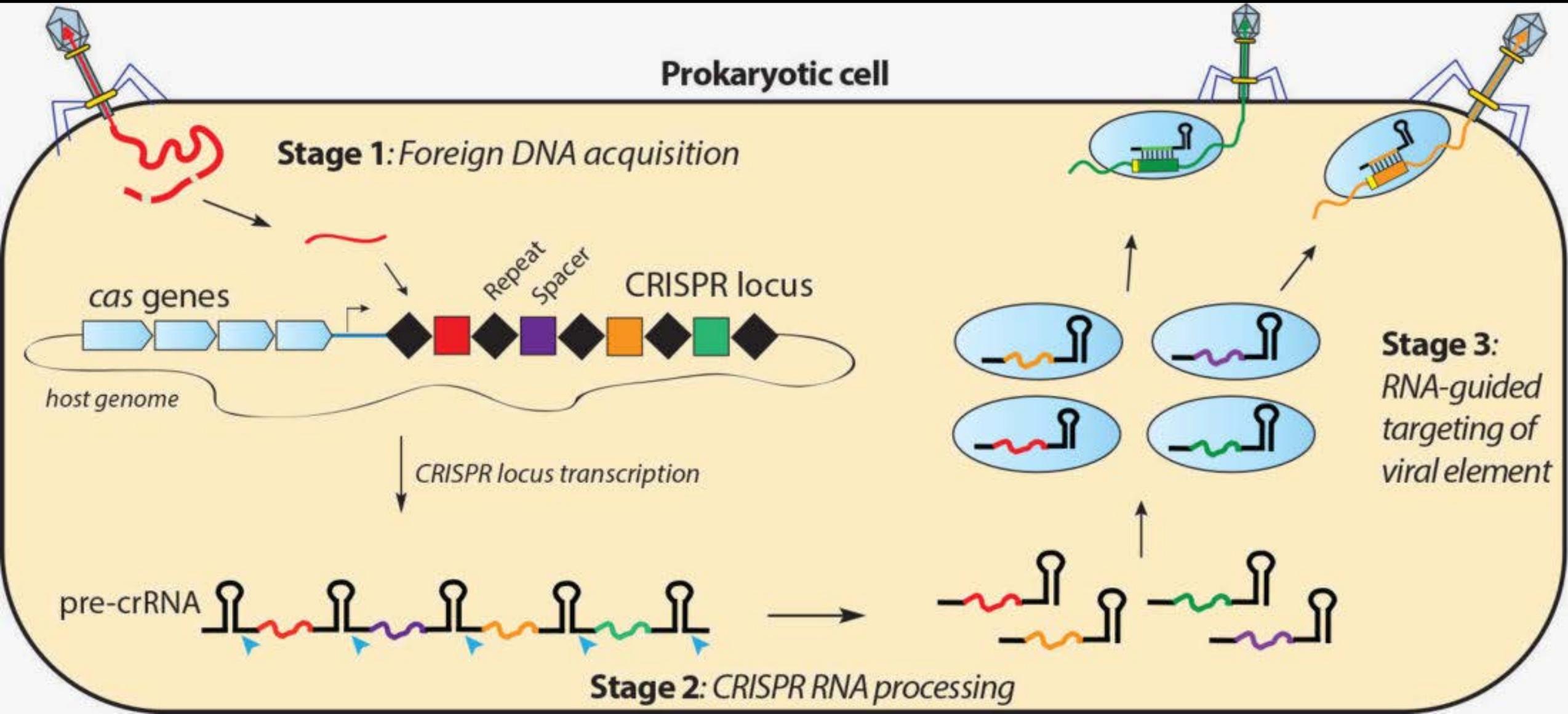


© Varun C N
Microboids

- CRISPR- Clustered Regularly Interspaced Short Palindromic Repeats
- Cas- CRISPR associated
- Based on the structure, activity and mechanism of functioning, it is classified into 3 types and several subtypes.

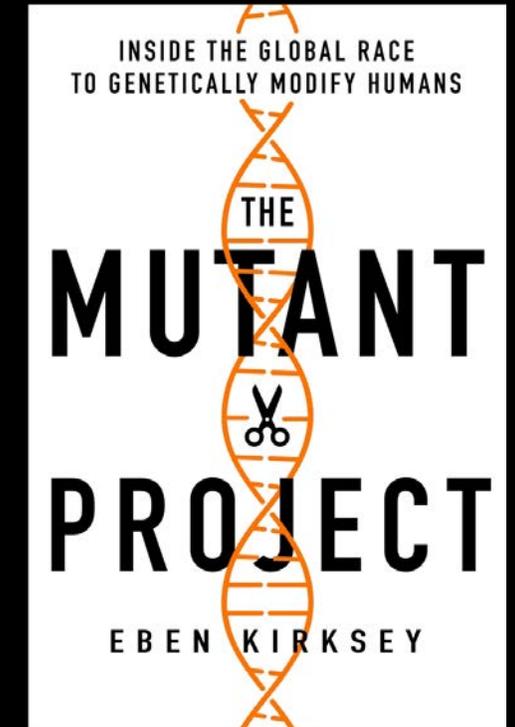
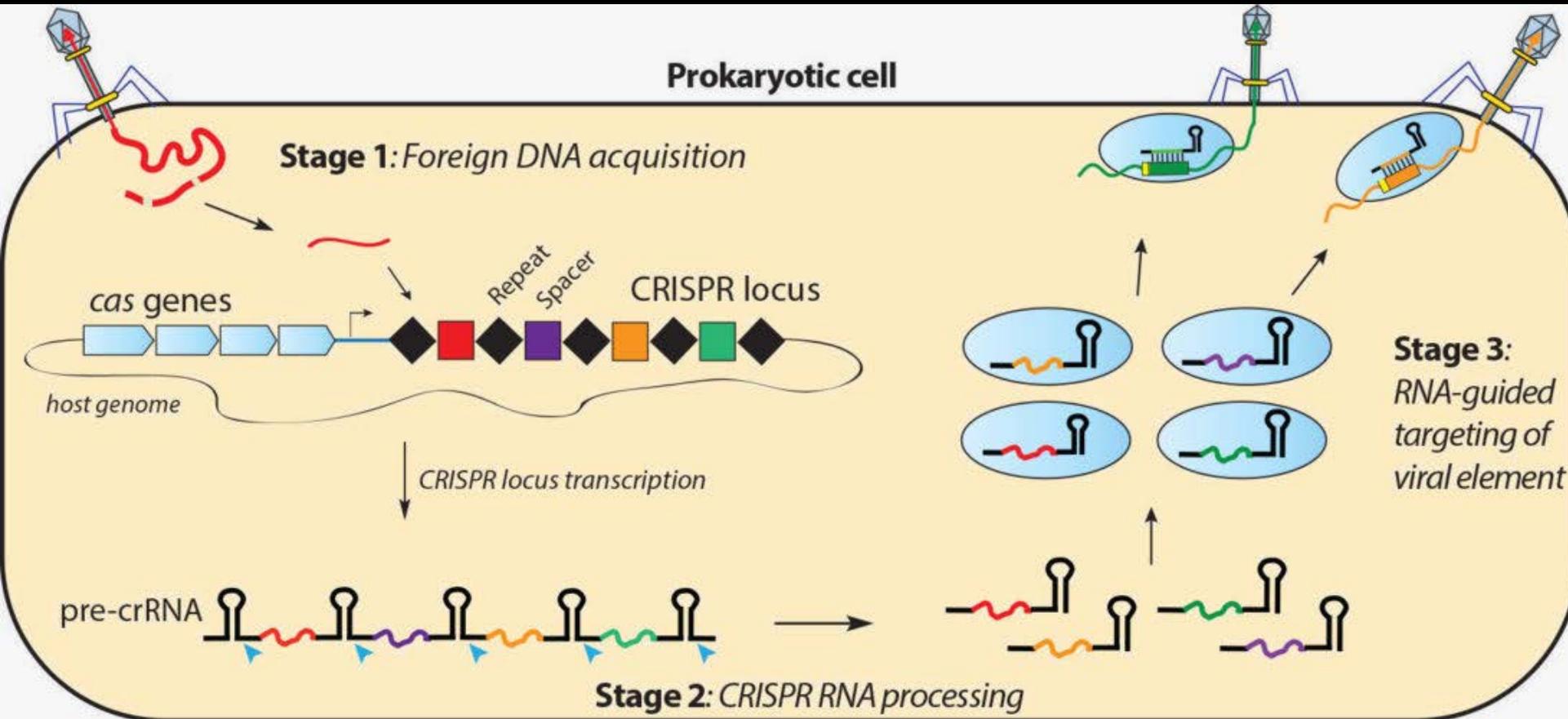
CRISPR-Cas9

<https://www.youtube.com/watch?v=avM1Yg5oEu0>



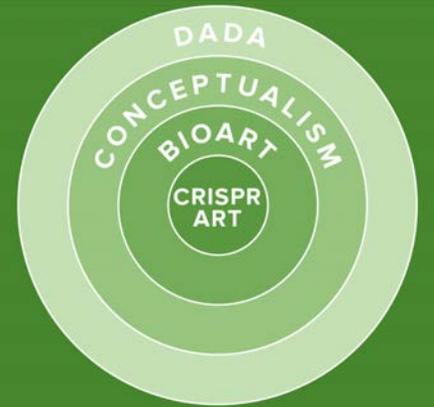
CRISPR-Cas9

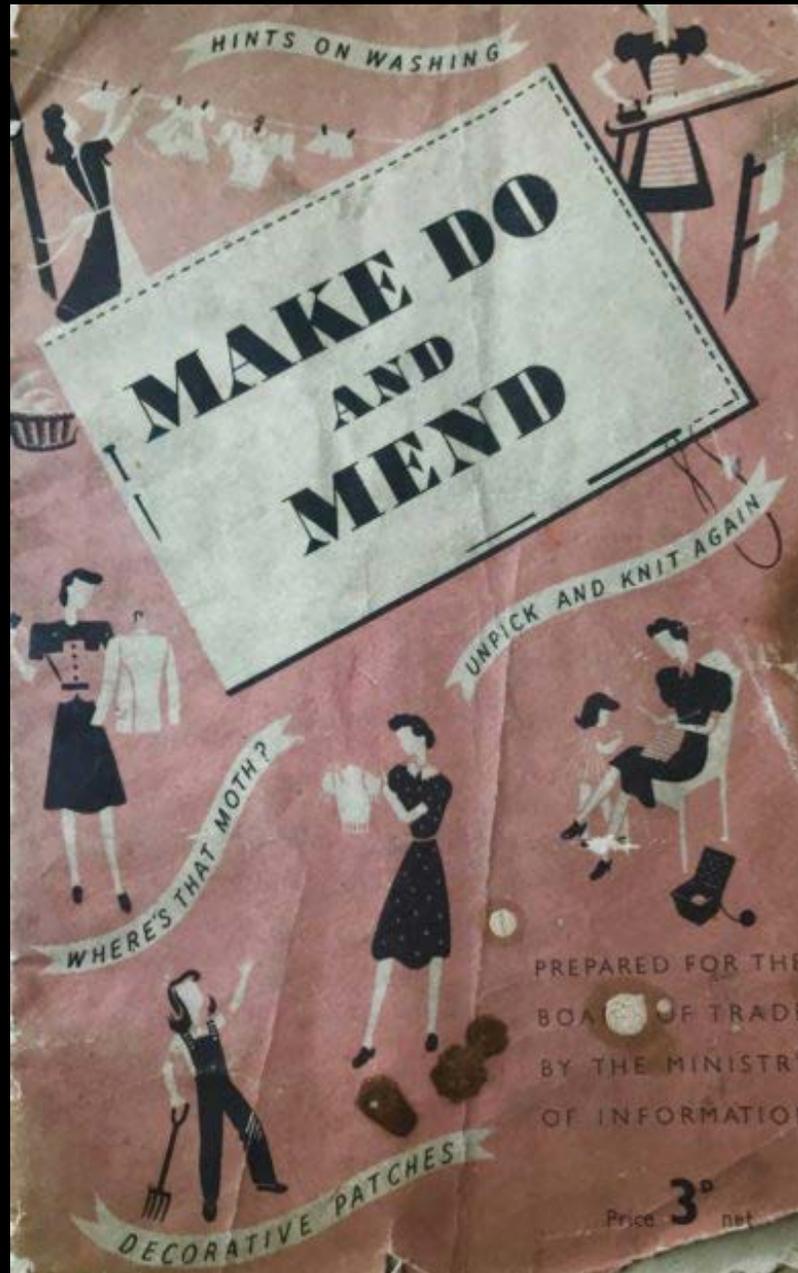
<https://www.youtube.com/watch?v=avM1Yg5oEu0>



CRISPR

ART





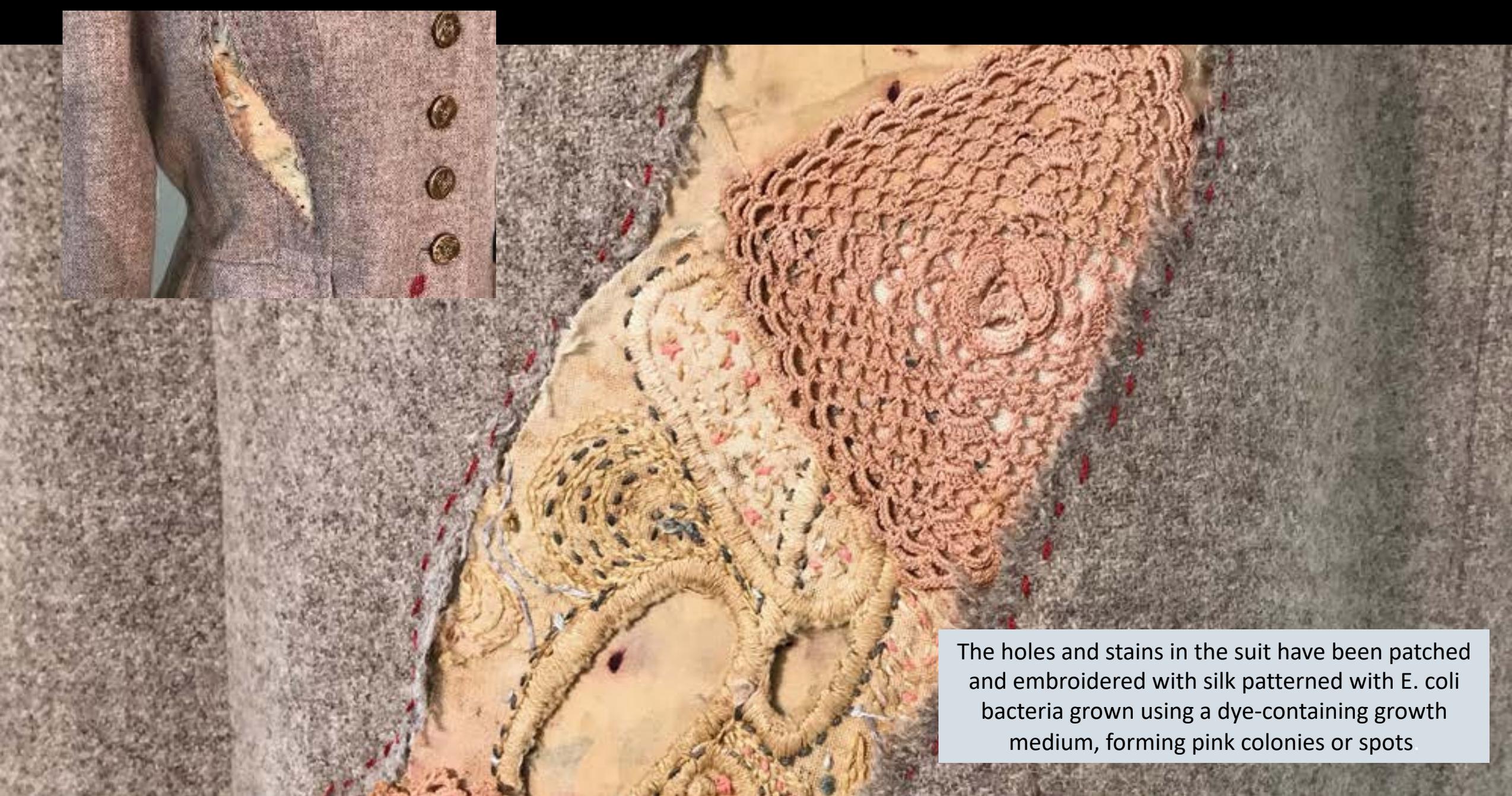
Anna Dumitriu, Make Do and Mend, 2017



Anna Dumitriu, Make Do and Mend, 2017
A patchwork of fabric sewn by hand and
dyed using bacteria manipulated by CRISPR
and then autoclaved



Anna Dumitriu made the installation, "Make Do and Mend," as part of The FEAT (Future Emerging Art and Technology) residency program



The holes and stains in the suit have been patched and embroidered with silk patterned with *E. coli* bacteria grown using a dye-containing growth medium, forming pink colonies or spots

The genomes of these E. coli bacteria have been edited using CRISPR to remove an ampicillin antibiotic resistance gene and repaired using a technique called homologous recombination to scarlessly patch the break with a fragment of DNA (converted into ASCII code and then to base 4) encoding the WWII slogan “Make Do and Mend”, which encouraged housewives to repair their clothes during the wartime rationing period.



Detail of patched and stained fabric

