UNIT 1—INTRODUCTION TO HUMAN ORIGINS

History of Resarch into Human Origins—Part II

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Early Studies of the Distant Past: The Birth of Research into the Origins of Humans continued

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We left off Part I with the recognition among scientists that, since Neandertals were too similar to us, there must be another missing link between us and the great apes. This idea of a missing link sparked a number of searches.

*The most immediately successful was carried out by **Eugene Dubois**, a young anatomist from the Netherlands, working in SE Asia. In 1891 on the island of Java he found the remains of several hominins that he named *Pithecanthropus*, which means 'monkey-like man'.

Dubois proclaimed to the scientific world that the "missing link" was found—some were receptive to the idea, but most were not. They put these fossils on a separate branch from that leading to modern humans.

Of course, today we understand that there is no one "link" between us and our very ancient ape-like ancestors—this was not a direct evolutionary line, but a large, complex evolutionary tree with many different branches and many different species in it.

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Two of the most influential figures of this time (the late 1800s and early 1900s) were Scottish anatomist, **Arthur Keith**, *and French anatomist, **Marcelin Boule**. While neither man had a problem with the concept of human evolution, they both rejected Neandertals as evolutionary ancestors of modern humans.

They argued instead that modern humans, in their present form, were much older than would be the case if Neandertals were their predecessors. In particular, they thought that the large brain and perfectly upright posture of modern humans predated the Neandertal line—this stemmed from the erroneous idea that Neandertals were stooped and had smaller brains than us.

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In timely support of this point of view, a skull and mandible turned up in very old gravel deposits at Piltdown, England between 1908 and 1911. The Piltdown cranium was modern in morphology—it had the large, rounded dome of a modern human—but the associated jaw was very ape-like. This fit exactly what Keith's and Boule's theory would predict—that our modern-looking cranium had been around for a very long time.

The Piltdown fossil turned out to be one of the most famous forgeries in the history of science, although it wasn't proved to be so until many years later. At the time of its discovery it lent strong support to *status quo* thinking, although, even at the time there were those who were suspect of its authenticity.

As it turns out, both Keith and Boule were correct, Neandertals are not our direct ancestors, but are close cousins, although their reasons for thinking this were incorrect.

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Other major fossil discoveries soon followed:

1921, the Broken Hill or Kabwe skull was found in a site in Rhodesia (now called Zambia), this was the first Neandertal-like skull found outside of Europe.

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In 1925, a very different hominin was found in S. Africa. **Raymond Dart**, an anatomist in Johannesburg, found the intact skull of a small child that he recognized to be something between modern humans and other primates. He called it *Australopithecus africanus*, but based on the name of the cave where it was found it came to be commonly referred to as the "**Taung Child**". Dart also met with little support that this was THE "missing link"—it was seen by other experts as too ape-like.

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In the early 1920s a Canadian physician, **Davidson Black**, who was teaching at a medical college in China, became involved in excavations at the site of **Zhoukoudian**. He recovered the remains of numerous hominin fossils that he named *Sinanthropus pekinensis*. Unfortunately, many of these fossils were lost during WW II and have never turned up again—although casts of them had been made first.

Today, both these and Eugene Dubois' fossils are classified as *Homo erectus*.

During the first three decades of the 1900s more *Homo erectus* remains were recovered in China and Java and many more Neandertals were discovered in Europe—especially in SW France. We will become much more familiar with these in later units.

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Another major contributor to human origins research was the Leakey family working in East Africa. Beginning with Louis Leakey and his wife, Mary, in the 1920s and followed by their son, Richard, and his wife, Maeve. Now Richard and Meave's daughter, Louise is following in the family footsteps.

Once it had been well accepted, at least among educated people, that the theory of evolution was valid and that there had been earlier species in the human line, the science of biological anthropology began to develop rapidly.

Throughout the mid and late 1900s more and more fossils turned up and, while controversies and personal battles continued (as they do today), the state of research into human origins generally started to

flesh out into the discipline of today and new types of analyses were developed to try to learn as much as possible about our evolutionary past. Today important research into human origins is carried out by Physical or Biological Anthropologists, Archaeologists, Paleoanthropologists, Geneticists, Geologists, and others working all over Africa, Europe and Asia.

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Other Directions of Physical Anthropology

Besides the study of human evolution, biological anthropological research headed in several other directions as well—some have continued as legitimate lines of research and others have turned out to be mis-directions.

- A major area of research in biological anthropology involves studying the variation in the morphology and physiology of modern humans

- For example—researchers are asking "why do we look like we do?" That is to say, we've evolved from previous hominin forms, so what are the adaptive reasons for our current form?

- Also—for many years now, biological anthropologists have examined the concept of "Race"—for much of this time this involved simply trying to classifying all the visible geographic variations in physical traits among modern humans. We will come back to this issue at the end of the course.

- in the late 1800s and early 1900s the idea of evolution and "survival of the fittest" came to be misused in the classification of cultures and in the policies structuring the interaction between European colonizing powers and the less technologically developed peoples they were encountering and colonizing

    - this involved linking geographic variation in physical traits with behavioural traits and intelligence: with white Europeans (especially men) at the top of the hierarchy. We'll get into this problem at the end of the course.

    - this led to some thinking that human physical variability and individual behaviour were connected and a significant amount of research was carried out in this area—today we recognize that this is very obviously wrong

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Biological Anthropology has also contributed significantly to archaeology—this has been mainly through the analysis of human remains recovered from archaeological sites. Human skeletal remains can tell us a lot about past peoples and their cultures:

- **skeletal pathologies can tell us about**
    - disease
    - nutrition and nutritional stress
    - specific behaviours—for example, chronic stress from repetitive tasks can result in certain types of bone growth, which may tells us something about that individual's livelihood before they died.
    - social structure—people with access to more or better food will leave healthier skeletons
- **the analysis of bone chemistry can tell us about an individual's…**
    - subsistence—that is, the types of food they ate
    - or about where they came from within a region
- **broken bones can often tell us about**
    - an individual's livelihood—professional soldiers for example
    - or the level of interpersonal violence within a society

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Before we end this unit, let's briefly examine one of the earliest Research Tools used by early physical anthropologists and archaeologists.

One of the very first tasks that scientists were faced with, and one that all scientists still use today, is to try to make sense out of large collections of things. We call this classification or taxonomy—from the Greek word *taxis* for arrangement, and it is one of the first tools that scientists developed.

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Early geologists were faced with all sorts of different types of rocks and before they could begin to try to understand how the geophysical world worked they had to arrange all these different rock types into some sort of order. Early astronomers were doing the same thing with all the different celestial objects they were beginning to observe—and this continues today, as we have just seen with Pluto being reclassified as a 'dwarf-planet'.

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Early biologists were faced with the most daunting task—to take all the millions of living organisms they could observe and try to organize them into some sort of manageable, understandable system:

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In the mid-1700s ***Carl Linnaeus***, a Swedish Botanist, developed the ***binomial classification system*** used to organize all living organisms. Initially he used it to classify plants, but applied it to the animal kingdom as well. While the actual classification of most species has changed dramatically, the system itself is still used today.

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The binomial classification system includes numerous levels of classification from Kingdom to subspecies, some that are not included in this list, but the bold lettering here indicates the 7 obligatory and most basic levels of classification.

Here we can examine the classification for modern humans….

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For *Homo erectus* the species is *erectus* rather than *sapiens*.

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And for Neandertals, depending on different researcher's views, either the species will change to *neanderthalensis* and they become *Homo*

neanderthalensis—or the species will remain *sapiens*, as with us, and the subspecies will be *neanderthalensis—Homo sapiens neanderthalensis*.

In common expression, Linnaeus' two-name system of classification includes the general (the genus) and the specific (the species). By convention, the genus name is capitalized and written in italics and the species (and subspecies) names are in small case and also in italics.

Classification is an important, and often controversial, part of human origins research. Deciding how to organize all the fossil remains that we have discovered so far is not easy and there is always at least a little, and often times, a lot of disagreement among researchers. But it's necessary, because otherwise the data remains in a big jumble and researchers can't effectively discuss their ideas or communicate these ideas to the public.

DNA may eventually help sort this out, but getting intact DNA from fossils is difficult under the best conditions and so far it has only been recovered from Neandertal bones—it may not be possible for very old