**ACC 2001 Week 2 Lecture Notes**

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**Week 2**

**Becoming Human: Does the use of technology make us human?**

**Lecture:** What is the relationship between the human and technology? Is technology something that distorts or otherwise alters the 'natural' state of the human? Or is the use of technology a defining characteristic of being human? We will begin our historical contextualization by examining the use of technology in prehistory.

**Tutorial:** Analysis and discussion of the constitutive relationship between the human and technology.

**Essential Reading:**


PDF available on Unit Blog

**Further Reading:**


It all begins with the feet (Andre Leroi-Gourhan).

And [what] if we already were no longer humans? (Bernard Stiegler, *Technics and Time*, v.1, 136).

At the heart of contemporary thinking about human evolution lies a deep and still unresolved problem. It concerns the very conception of what the human being is whose evolution we set out to explain. Is it a purely zoological entity, bounded physically by the skin and intellectually by the skull? Or does the essence of human being, as opposed to the being of non-human kinds, lie in a transcendence of the zoological, in the fields of our social involvement—mediated by words—with other people, and of our technical involvement—mediated by tools—with the material environment? (Ingold)

**Opening Remarks**

Our current historical moment is marked by a more obvious form of technological mediation in our everyday lives

- ubiquitous connectivity
- mobility

A question?

When was the last time you spent 24 hours without going online?

- without using your mobile?
- without reading?
- without speaking?

There are two things I want you to take from that question

i) How deeply mediated our everyday lives are by technology

ii) Information and Communication technology are not limited to computers and mobiles

- even language itself is an ICT

If that is the case, then our lives have been deeply mediated for a long time

- not just since the 20th c.
I propose that our current reality positions us to ask more basic questions about the relationship between the human and technology.

So what is the natural state of the human?
- naked in a primeval forest?

If there is a ‘natural’ state of the human, does that mean technology came after we were already human?

Does that mean that technology has always been a kind of contamination to the natural human altering and distorting the ‘natural’ state of the human?

There are many complex ideas discussed in Ingold’s critical assessment of the work of the late French paleoanthropologist.

One of the most basic questions asked is if there is a technical role in evolution
- that is, did the human evolve solely by biological means
- or did our use of technology play a role?

Leroi-Gourhan, along with Innis, Ong, McLuhan, and other media theorists, helps expand our very understanding of the term media
- media mediates things

In studying humans of prehistory, mediation occurs via tools, and language via orality and literacy
- using the mouth and the hand

One way to understand Leroi-Gourhan is that he suggests the human was always mediated via technology.

But even more than mediated, because the relationship to technology was constitutive.

To the point where we can ask this question:
Did the human invent technology (stone tools) or did technology invent the human?

Key point: until the point of tool making, the development of the human was a purely biological process
- evolution proceeds via genetic mutations that are favourable to their environment

Tool making added an extra-biological factor
- technology itself now plays a role in evolution

So for the human, anthropogenesis (the biological) enters into a complex, back and forth relationship with technogenesis (the technological; technicity)
- i.e. the development of the human becomes intimately related to the development of technology

Again, what is being suggested is that the process of human evolution follows a path only possible because of our founding relationship with technology.

In other words, if we are going to better understand how we became human, we need to understand how we began to first use and make stone tools
- stone tools as the earliest form of technology

N.B. This is a complex recursive relationship
- effects flow in both directions
- no simple, single cause
- a cascade of events starting when humans stood upright (‘it all begins with the feet’)

Hand and mouth; technicity and language.
Lithic industry of the Early Stone Age

[Technology was ‘liberated’ from the evolved architecture of the species, an increasing disproportion between the powers of technology and human intellect.

Video on prehistoric stone tools
http://www.youtube.com/watch?v=vmanlBDFfw0&feature=related

A question: did stone tools just appear as an extension of the bipedal body plan (‘exuded’ from the body like new external fingernails?) or did we ‘imagine’ them first and then make them?

Our species is Homo sapiens sapien (modern human)

Our earliest ‘human’ ancestor is in the genus Homo
• first appeared about 2.6 M ya
• the term human is related to the genus homo

Homo habilis (‘handy man’) was the first such species
• the emergence of our genus coincides with the appearance of the first stone tools

Oldowan stone tools

This marks the earliest examples of tool making by proto humans
• about 2.6 M years ago
• made by Homo habilis
• this marks the beginning of the Paleolithic period (‘Early Stone Age’)

When these proto-humans (Homo habilis) first began making stone tools, their brains were less than half the size of that of modern humans
• stone tools (lithic industry) remained unchanged for more than 1 M years

Among our hominid ancestors, early tool use was an extension of the hand—like an animal’s claw…as if their brains and bodies had gradually exuded them (Leroi Gourhan, Gesture and Speech, 106)

The first point is not that tool use caused the brain to get bigger

In other words, proto-humans did not start to make stone tools because they woke up one day and were suddenly so much smarter than their ancestors

The process was far more complex, and for Leroi-Gourhan, it had a more biological foundation

Remember Leroi-Gourhan’s maxim: ‘It all begins with the feet’

Thus cranial expansion (and subsequently, an increase in brain size) a recursive by-product of an upright posture
• initially a morphological adjustment for balance

Chart of different hominids, when they lived and their brain size

<table>
<thead>
<tr>
<th>Hominid</th>
<th>Time Period</th>
<th>Brain Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homo habilis</td>
<td>(2.6 M-1.4 M ya)</td>
<td>500-660 cc</td>
</tr>
<tr>
<td>Homo heidelbergensis</td>
<td>(.6-.35 M ya)</td>
<td>1,100-1,400 cc</td>
</tr>
<tr>
<td>Homo neanderthalis</td>
<td>(.5-.03 M ya)</td>
<td>1,000-1,850 cc</td>
</tr>
<tr>
<td>Homo sapiens sapien</td>
<td>(.2/.05 M ya)</td>
<td>1,100-1,800 cc</td>
</tr>
<tr>
<td></td>
<td>(M ya = millions of years ago)</td>
<td></td>
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</tbody>
</table>
**Did bigger brains make better tools?**

**Darwin**
Developed ‘the most sagacious’ thesis for the development of technics
- providing a reproductive advantage
- i.e. the ‘most sagacious; could design more ingenious tools gaining better strategies of subsistence

**Leroi-Gourhan**
Did not see the development of tool-making ability as a result of the most intelligent proto-humans
- rather, it is an expression of the very body plan of the human
- bipedalism
- the facial and manual poles of the anterior field

What does this mean: the facial and manual poles of the anterior field?

To clarify, Leroi-Gourhan is making a connection between the general body plan of species and what it can do

Leroi-Gourhan’s morphological principles
- i) radial symmetry
  - stationary species
- ii) bilateral symmetry
  - mobile species
  - split into a front and rear—also known as anterior and posterior fields
- iia) anterior field
  - can be broken down further for walkers (i.e. grazing mammals like antelopes, cows, etc.) and ‘graspers’ (bipeds)
- iib) for ‘graspers’ (bipeds)—like proto-humans
  - further broken down into manual and facial poles
  - in complimentary opposition

With bipedalism, this newly structured ‘anterior field’ allows for a new kind of responsiveness we can have with our environment
- changing relations between the face and hands allows for a new suite of activities to emerge
- i.e. greater manual dexterity
- thus the emergence of technicity (tool-making ability)

Unencumbered by the massive dental apparatus needed for the direct extraction of plant or animal food, the face was free to participate to the full in that most distinctive of human accomplishments, speech. (Ingold)

Tools for the hand, language for the face, are twin poles of the same apparatus. (Leroi-Gourhan)

**Bipedal locomotion, erect posture, and the enlargement of the brain**

[T]he intellectual advance is a consequence, not a cause, of brain enlargement—an incidental by-product of a more fundamental evolutionary change in posture.
Acheulean stone tools

About 1.6 M years ago, much more sophisticated stone tools appeared

Just to keep things in perspective, our species, *Homo sapien sapiens* did not emerge until anywhere from 200,000 to 50,000 ya

*Homo habilis* never left Africa

*Homo erectus* and *Homo neanderthalis* did spread throughout Europe and Asia

Leroi-Gourhan suggests a two stage process

**First**, bipedalism

“It all begins with the feet”

Walking brings about this cascade of effects

i) upright posture causes our skulls to change shape
  • for balance
  • to be able to look forward
  • incidentally, the available space in our skulls increases
  • this creates an evolutionary opportunity

Walking upright also frees our hands

ii) over time, this allows greater manual dexterity to develop
  • we no longer need our hands for locomotion
  • increasing our capacity to manipulate objects in the natural world around us
  • i.e. picking up stones to use for specific purposes

Walking upright also frees our jaw and mouth

iii) eventually allowing the capacity for language to develop
  • no longer use our mouths to carry things
  • think of a dog or any other mammal

But before we could learn to speak our brains needed to take on a whole new level of abilities

Stiegler calls the development of the brain amidst long-term tool-use corticalization
  • how there was a deeply integrated (recursive) relation between the two

[W]hat mirage of the cortex is experienced, as pathbreaking, in the hardness of the flint; what plasticity of gray matter corresponds to the flake of mineral matter; what proto-stage of the mirror is thus installed (Stiegler, 135).

We are suggesting that lithic industry (stone tool making) was a pre-condition of the human
  • but not because of superior cognitive faculties
  • remember Leroi-Gourhan suggesting the earliest stone tools were more like ‘an animal’s claw’

In short, that the modern human could only emerge because of the constitutive relation proto-humans had to stone tools
Remember how both stone tools and the brain size of early hominids remained unchanged for several million years.

What Leroi-Gourhan suggests is that there was a complex interplay between the usage of stone tools by these early hominids and the development of the brain.

In short, he suggests there is a transductive relationship between tools and the distinctive neurological development of the human.

To recap:

i) brain size increases dramatically, including the development of new advanced prefrontal elements
ii) new forms of intelligence emerge
iii) creative explosion and proliferation in technicity
iv) related intensification and proliferation of exteriorization of memory
v) ever-expanding archives create increasingly exponential gap between zoological and sociological capacities

Technology alters the capacity of the physical human

- but amidst this, actual intelligence has remained largely unchanged

[The thinking of an African or a citizen of ancient Gaul is completely equivalent to mine (Leroi-Gourhan, p. 147)]

In short, at a certain point several hundred thousand years ago, our technological capacity started to exceed our intellectual capacity.

That is, we made more and more complex and diverse tools but our brains have stopped growing.

This is part of what is at stake with ‘exteriorization’.

This is another way in which stone tools are like modern technology (like, say, an iPhone).

Stone tools, like all technology store information

- technology marks the exteriorization of memory
- N.B. keep this in mind when we study literacy next week

What does all this mean?

i) That technology that serves as a new medium for the transmission of memory
ii) that is, technology is an inorganic repository of memory
iii) that technology means the human (and its culture) exceeds biological time
iv) the preservation and transmission of epigenetic experience that gives human evolution an extra-genetic character—that is, as something more than a purely biological process

Technology, then, is a deeply constitutive element of the human

- it comprises an originary condition, a defining characteristic of the human

Thus we can make the claim that we have never been human as such.