L. Mumford:

The Myth of the Machine. Harcourt, Brace & World, Inc. New York. 1966. p.3

Ritual, Art, poesy, drama, music, dance, philosophy, science, myth, religion are all as essential to man as his daily bread: man's true life consists not alone in the work activities that directly sustain him, but in the symbolic activities which give significance both to the processes of work and their ultimate products and consummations.

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L. Mumford: The Myth of the Machine. Harcourt, Brace & World, Inc. New York. 1966. p.4

I shall suggest that not only was Karl Marx in error in giving the material instruments of production the central place and directive function in human development, but that even the seemingly benign interpretation of Teilhard de Chardin reads back into the whole story of man the narrow technological rationalism of our own age, and projects into the future a final state in which all the possibilities of human development would come to an end. At that 'omega-point' nothing would be left of man's autonomous original nature, except organized intelligence: a universal and omnipotent layer of abstract mind, loveless and lifeless.

L. Mumford: The Myth of the Machine. Harcourt,
Brace & World, Inc. New York. 1966. p.4

Just because man's need for tools is so obvious, we must guard ourselves against over-stressing the role of stone tools hundreds of thousands of years before they became functionally differentiated and efficient. In treating tool-making as central to early man's survival, biologists and anthropologists for long underplayed, or neglected, a mass of activities in which many other species were for long more knowledgeable than man. Despite the contrary evidence put forward by R.U. Sayce, Daryll Forde, and Andre Leroi-Gourhan, there is still a tendency to identify tools and machines with technology: to substitute the part for the whole.



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L. Mumford: The Myth of the Machine. Harcourt,
Brace & World, Inc. New York. 1966. p.5

Yet the description of man as essentially a tool-making animal has become so firmly embedded that the mere fine ding of the fragments of little primate skulls in the neighborhood of chipped pebbles, as with the Australo-pithecines of Africa, was deemed sufficient by their finder, Dr. L.S.B. Leakey, to identify the creature as in the direct line of human ascent, despite marked physical-divergences from both apes and later men. Since Leakey's sub-hominids! had a brain capacity about a third of Homo sapiens - Less indeed than some apes the ability to chip and use crude stone tools plainly neither called for nor by itself generated man's rich cerebral equipment.

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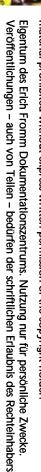
L. Mumford: The Myth of the Machine. Harcourt, -Brace & World, Inc. New York -- 1966 ... p. 5/6

If the Australopithecines lacked the beginning of other human characteristics, their possession of tools would only prove that at least one other species outside the true genus Homo boasted this trait, just as parrots and magpies share the distinctly human achievement of speech, and the bower bird that for colorful decorative embellishment. No single trait, not even tool-making, is sufficient to identify man. What is specially and uniquely human is man's capacity to combine a wide variety of animal propensities into an emergent cultural entity: a human personality.

# tool nothing - mt spec. luman.

L. Mumford: The Myth of the Machine. Harcourt, Brace & World, Inc.-New York - 1966 - p.6

If the exact functional equivalence of tool-making with utensil-making had been appreciated by earlier investigators, it would have been plain that there was nothing notable about man's hand-made stone artifacts until far along in his development. Even a distant relative of man, the gorilla, puts together a nest of leaves for comfort in sleeping, and will throw a bridge of great fern stalks across a shallow stream, presumably to keep from wetting or scraping his feet. Fiveyear-old children, who can talk and read and reason, show little aptitude in using tools and still less in making them: so if tool-making were what counted, they could not yet be identified as human.



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L. Mumford: The Myth of the Machine. Harcourt,
Brace & World, Inc. New York. 1966. p.6/7

To compensate for his extremely primitive working gear early man had a much more important asset that extended his whole technical horizon: he had a far richer biological equipment than any other animal, a body not specialized for any single activity, and a brain capable of scanning a wider environment and holding all the different parts of his experience together. Precisely because of his extraordinary plasticity and sensitivity, he was able to use a larger portion of both his external environment and his internal, psycho somatic resources.

Through man's overdeveloped and incessantly active brain, he had more mental energy to tap than he needed for survival at a purely animal level; and he was accordingly under the necessity of canalizing that energy, not just into food-getting and sexual reproduction, but into modes of living that would convert this energy more directly and constructively into

appropriate cultural - that is, symbolic - forms.

Only by creating cultural outlets could he tap and control and fully utilize his own nature.

### then a mind mething a wimet.

L. Mumford: The Myth of the Machine. Harcourt, Brace & World, Inc. New York. 1966. p.9

To consider man, then, as primarily a tool-using animal, is to overlook the main chapters of human history. Opposed to this petrified notion, I shall develop the view that man is pre-eminently a mind-making, self-mastering, and self-designing animal; and the primary locus of all his activities lies first in his own organism, and in the social organization through which it finds fuller expression. Until man had made something of himself he could make little of the world around him.

separated where the sacrifice of a finger joint is a rite of mourning: a personal loss to emphasize a greater loss.

--- Is one not justified in concluding that the mutila-

Excerpt of Mumford, L., 1970: The Myth of the Machine. The Pentagon of Power, New York (Harcourt Brace Jovnovich) 1970.



Henceforth the main business of man was his own self-transformation, group by group, region by region, culture-by culture. This self-transformation not merely rescued man from permanent fixation in his original animal condition, but freed his best-developed organ, his brain, for ther tasks than those of ensuring physical survival. The dominant human trait, central to all other traits, is this capacity for conscious, purposeful self-identification, self-transformation, and ultimately for self-understanding.

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L. Mumford: The Myth of the Machine. Harcourt,
Brace & World, Inc. New York. 1966: p.14

shaping his environment primitive man's first concern was to utilize his overdeveloped, intensely active nervous system, and to give form to a human self, set apart from his original animal self by the fabrication of symbols — the only tools that could be constructed out of the resources provided by his own body; dreams, images and sounds.

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L. Mumford: The Myth of the Machine. Harcourt,
... Brace & World, Inc. New York. 1966. p.18

Coldly appraised, the probability against cannibalism seems about as great as that for it. Few mammals kill their own kind for food under any conditions, and the likelihood is that if this perversion had been as common among early men as it was among many later savages, it would have worked against the survival of the groups practicing it, since the human population was extremely sparse and no one would have been safe against his neighbor's hunger. We know, from later evidence, that primitive hunting peoples feel guilty about taking the life of animals they need for food, and even pray the animal for forgiveness or rationalize its death as due to the animal's own wish. Is it so sure then that early man felt less sympathetic toward other human beings - except in surging moments of anger or fear?



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Causit.

L. Mumford: The Myth of the Machine. Harcourt,
Brace & World, Inc. New York. 1966: p.18

Even plentiful examples of cannibalism among 'contemporary' savages - for long it was rife in Africa and New Guinea -- do not establish it as common early practice. Just as primitive man was incapable of our own massive exhibitions of cruelty, torture, and extermination, so he may have been quite innocent of manslaughter for food. The assertion that man was always a killer, and a cannibal at that, once he had acquired a taste for flesh, must reckon with these many alternative possibilities. Any flatfooted assumption of man's aboriginal cannibalism rests on no sounder evidence than the contrary hypothesis, and should never have been presented as if it were unquestionable.

## Canall.

L. Mumford: The Myth of the Machine. Harcourt, Brace World, Inc. New York. 1966. p.18/19

Such pitfalls do not rob deduction, scrupulously applied, of its value. All that this argument suggests is that when alternative explanations are equally plausible and may be equally valid, one must leave the question open, and hope some day to find a bit of positive evidence to clinch this or that hypo-But if the deduced traits exist in a kindred primate species, as cannibalism does not, and if it also emerges in later human groups, as with close and relatively durable marital attachments, one may with fair safety attribute it also to early man. propose to adhere to this rule. But the fact that a question worth opening speculatively may have to remain open for an indefinite time is not a sufficient reason for not posing it at all. This holds for practically the entire sphere of human origins.

L. Mumford: The Myth of the Machine. Harcourt, Brace & World, Inc. New York. 1966. p.20/21

Yet from the moment Homo sapiens, at least, makes his appearance, we find evidences in his attitude toward death, toward ancestral spirits, toward future existence, toward sun and sky, that betray a consciousness that forces and beings, distant in space and time, unapproachable if not invisible, may nevertheless play a controlling part in man's life. This was a true intuition, although it may have taken hundreds of thousands of years before its full import and rational proof could be grasped by the human mind, which now ranges between invisible particles and equally mysterious retreating galaxies.

There seems a likelihood that the earliest peoples, perhaps even before language was available, had a dim consciousness of the mystery of their own being: a greater incentive to reflection and self-development than any pragmatic effort to adjust to a narrower environment. Some of this grave religious response



is'still present in the legends of creation among many surviving tribal cultures, and notably among - the American Indians.

Here again we may judiciously make use of our knowledge of contemporary primitives to cast a fresh light on the beliefs and acts of early man. mysterious imprints of human hands made upon the walls of caves as far apart as Africa and Australia. imprints are all the more puzzling because so many of these hands show one or more finger joints missing. One would have no clue to this symbol were it not for the fact that there are still tribes equally widely "separated where the sacrifige of a finger joint is a a personal loss to emphasize a \_\_rite of mourning; greater loss.

--- Is one not justified in concluding that the mutilated hand on the cave wall is probably a secondary symbol of grief, transferred for perpetuation from the ...short-lived primary symbol of flesh and bone to a stone surface? Such a symbolic hand may, even more

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sharply than a cairn of stones, count as the earliest public memorial to the dead. But it is also possible that this rite had an even deeper religious significance; for Robert Lowie describes the same mode of sacrifice among the Crow Indians as part of a truly religious retreat undergone in order to achieve communion with Deity.

### Phol Jevelopment - with tooks.

L. Mumford: The Myth of the Machine. Harcourt, Brace - & World, Inc. New York. 1966. p.23

But if tools were actually central to mental growth beyond purely animal needs, how is it that those primitive peoples, like the Australian Bushmen, who have the most rudimentary technology, nevertheless exhibit elaborate religious ceremonials, an extremely complicated kinship organization, and a complex and Why, further, were highly differentiated language? developed cultures, like those of the Maya, the Aztecs the Peruvians, still using only the simplest handicraft equipment, though they were capable of constructing superbly planned works of engineering and architecture, like the road to Machu Picchu and Machu And how is it that the Maya, who had Picchy itself2 neither machines nor draught animals, were not only great artists but masters of abstruse mathematical calculations2

There is good reason to believe that man's technical progress was delayed until, with the advent.



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of Homo sapiens, he developed a more elaborate system of expression and communication, and therewith a still more cooperative group life, embracing a larger number of members, than his primitive ancestors.

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L. Mumford: The Myth of the Machine. Harcourt, Brace

Still, whatever else man may be, he was from the beginning pre-eminently a brainy animal. What is more, he stands indisputably at the climax of the vertebrate line, with its increasing specialization of the nervous system, which began with the development of the olfactory bulb and the brain stem and added progressively to the quantity and complexity of nervous tissue in the thalamus or 'old brain,' the ancestral seat of the emotions. With the massigrowth of the frontal lobe a complete system was With the massive organized, capable of handling a larger portion of the environment than any other animal, enregistering sensitive impressions, inhibiting inappropriate responses, correcting unsuccessful reactions, making swift judgements and coherent responses, and not least storing the results in a capacious file of memories.

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L. Mumford: The Myth of the Machine. Harcourt, Brace -- & World, Inc. New York. 1966. p.26

If one could sum up man's original constitution at the moment he became more than a mere animal, chained to the eternal round of feeding and sleeping and mating and rearing the young, one might do worse than describe him as Rousseau did, in his 'Discourse on the Origins of Inequality,' as an "animal weaker than some and less agile than others, but taking him all round, the most advantageously organized of any."

This general advantage may be summed up as his upright posture, his wide-ranging stereoscopic color vision, his ability to walk on two legs, with its freeing of the arms and hands for other purposes than locomotion and feeding. With this went a coordinate aptitude for persistent manipulation, rhythmic and repetitive bodily exercise, sound-making, and toolshaping. Since, as Dr. Ernst Mayr has pointed out, very primitive hominids with brains hardly larger than



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those of anthropoids had a capacity for tool-making, the last frait was probably only a minor component in the "selection pressure for increasing brain size." Later, I shall develop these points further and add one or two more traits in man's special mental equipment that have been strangely overlooked.

L. Mumford: The Myth of the Machine. Harcourt, Brace & World, Inc. New York. 1966. p.27/28

In speaking of man's nervous responses, I use brain and mind as closely connected but not interchangeable terms, whose full nature cannot be adequately described in terms of either aspect alone. to avoid both the traditional error of making mind or But I purpose soul, into an impalpable entity unrelated to the brain, and the modern error of disregarding as subjective that is, beyond trustworthy scientific investigation all typical manifestations of mind: that is, the larger part of man's cultural history. Nothing that happens in the brain can be described except by means of symbols supplied by the mind, which is a cultural emergent, not by the brain, which is a biological organ.

The difference between brain and mind is surely as great as that between a phonograph and the music that comes forth from it. There is no hint of music in the disc's microgroove or the amplifier, except



through the vibrations induced via the needle by the record's rotation: but these physical agents and events do not become music until a human ear hears the sounds and a human mind interprets them. For t final purposeful act, the whole apparatus, physical and neural, is indispensable: yet the most minute analysis of the brain tissue, along with the phonograph's mechanical paraphernalia, would still throw no light upon the emotional stimulation, the esthetic form, and the purpose and meaning of the music. electro-encephalograph of the brain's response to music is void of anything that even slightly resembles musical sounds and phrases - as void as the physical disc that helps produce the sound.

When the reference is to meaning and the symbolic agents of meaning, I shall accordingly use the word When the reference is to the cerebral organization that first receives and records and combines and conveys and stores up meanings, I shall refer to the brain. The mind could not come into -existence without the active assistance of the brain,

or indeed, without the whole organism and the environing world. Yet once the mind created, out of its overflow of images and sounds, a system of detachable and storable symbols, it gained a certain independence that other related animals possess only in a minor degree, and that most organisms, to judge by outward results, do not possess at all.

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The Myth of the Machine. Harcourt, Brace L. Mumford: -&--World, Inc. New York. 1966. p.31

Note that in the last paragraph I put 'lifeless' in What we call lifeless matter is an quotation marks. illusion, or rather, a now-obsolete description based For among the basic on insufficient knowledge. properties of 'matter,' we know now, is one that for long was ignored by the physicist: the propensity for forming more complex atoms out of the primordial hydrogen-atom, and more complex molecules out of these atoms, until finally organized protoplasm, capable of growth, reproduction, memory, and purposeful behavior appeared: in other words, living organisms. At every meal, we transform 'lifeless' molecules into and with that transformation come living tissue; sensations, perceptions, feelings, emotions, dreams, bodily responses, proposals, self-directed activities: more abundant manifestations of life.



Age (Man

The Myth of the Machine. L. Mumford: Harcourt, Brace & World, Inc. -New York. 1966. p.32 ---

Physicists now estimate the age of the earth as between four and five billion years; and the earliest possible evidence of life comes about two billion years later, though living or semi-living protoorganisms that were not preserved surely must have come earlier. On that abstract time-scale man's whole existence seems almost too brief and ephemeral -to-be noted. -But to accept this scale would betray a false humility. Time-scales are themselves human devices: the universe outside man neither constructs .them...nor interprets them nor is governed by them.

In terms of the development of consciousness, those first three billion years in all their repetitive blankness can be condensed into a brief moment or two § With the evolution of lower organisms of preparation. during the next two billion years, those imperceptible seconds lengthened, psychologically speaking, into minutes: the first manifestation of organic sensitivity and autonomous direction. Once the mobile

explorations of the backboned animals began, favored increasingly by their specialized nervous apparatus, the brain made its first groping steps toward consciousness. After that, as one species after another followed the same track, despite many -branchings out, arrests, and regressions, the seconds and minutes of mindfulness lengthened into hours. There is no need here to detail the anatomical changes and the constructive activities that accompanied the growth of consciousness in other species, from the bees and the birds to the dolphins and the elephants, or the ancestral species from which both apes and hominids evolved. But the final breakthrough came with the appearance of the creature we now identify as man, some five hundred thousand years ago, on our present tentative estimates.

بية. Mumford: The Myth of the Machine. Harcourt, Brace: -- World, Inc. New York. 1966. p.43/44-

What concerns us in the present survey of the human past, in relation to technical history, is that there is a high probability that most of the present characteristics of the brain were at man's service, in an undeveloped state, before he uttered an intelligibl€ sound or used a specialized tool. Further development doubtless came about with all of man's widened activities, with a progressive shifting of the higher functions from the 'old brain' to the 'new brain' where they came under conscious direction. relationship between such increasing mental facility and the genetic enregistration by means of a larger brain with specialized areas and more complex neural patterns is still obscure, and probably cannot be uncovered without a radical change in the biologist's current approach. Until man fabricated a culture, his brain was undernourished and depleted.

What should be plain nevertheless is that man, at

an early essay, published in 'The Will-to-Believe' but never sufficiently followed up by him, William "Man's chief James put the case more clearly. difference from the brutes," he pointed out, "lies the exuberant excess of his subjective propensities his pre-eminence over them simply and solely in the number and in the fantastic and unnecessary character of his wants physical, moral, aesthetic, and Had his whole life not been a quest intellectual. for the superfluous, he would never have established himself as inexpugnably as he has done in the And from the consciousness of this he necessary. should draw the lesson that his wants are to be that even when their gratification seems trusted; furthest off, the uneasiness they occasion is still the best guide of his life, and will lead him to issues entirely beyond his present power of reckoning. Prune down his extravagance, sober him, and you undo



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the outset of his development, had unusual gifts, far beyond his immediate capacity for using them: The fact that the human brain "is unique in being constantly speculative and expectant" shows that man's growth was not confined to problem-solving in an immediate-situation or to adjusting himself to outside demands. He had 'a mind of his own, 'as we say: instrument for posing gratuitous problems, for making insurgent responses and counter-adaptive proposals, for seeking and fabricating patterns of significance. Therewith he showed a tendency to explore unknown territory and try alternative routes, never content for too long to follow a single way of life, no matter how perfect his 'adjustment' to it might be.

Despite the brain's capacity for absorbing informa--tion, man does not wait passively for instructions from the outside world. As Adelbert Ames put it, "It is within a context of expectancies that we perceive, judge, feel, act, and have our being."

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The Myth of the Machine. Harcourt, Brace Mumford: & World, Inc. New York. 1956. p.44

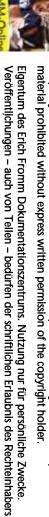
Not the least contribution of man's extraordinary L. brain was this heightened concern for the future. Anxiety, prophetic apprehensiveness, imaginative anticipation, which came first perhaps with man's consciousness of seasonal changes, cosmic events, and death, have been man's chief incentives to creativity. As the instruments of culture become more adequate, the function of the mind becomes increasingly that of bringing larger areas of the past and future into coherent and meaningful patterns.

IV

L. Mumford: The Myth of the Machine. Harcourt, Brace; &-World, Inc. New York. 1966. p.44-

Those who still take their biological models from physics fail to recognize this essential characteristic of organisms, as distinguished from unorganized matter. Unorganized matter neither records its past nor anticipates its future: whereas every organism has both its past and its potential future built into nor anticipates its future: it, in terms of the life-cycle of its species; the bodily structure of the higher organisms makes ample provisions for the future, as in the storage of fat and sugar to provide energy for future emergencies. or the progressive ripening of the sex organs, long before they are needed for reproduction.

In man, this pre-vision and pro-vision for the future become increasingly conscious and deliberate in dream images and playful anticipations, in the tentative trying out of imagined alternatives. from reacting only to the immediate sight or smell of food, like an animal confined in a laboratory, man



goes about seeking it hours, days, or months ahead.

Man is, one might say, a born prospector, though he often has only fool's gold to show for his pains.

As an actor, he often projects himself in new roles before the play is written, the theater chosen, or the scenery is built.

L. Mumford: The Myth of the Machine. Harcourt, Brace
& World, Inc. New York. 1966. p.45/6

The critical moment, I suggest, was man's discovery of his own many-faceted mind, and his fascination with what he found there. I I I I mages that were independent of those that his eyes saw, rhythmic and repetitive body movements that served no immediate function but gratified him, remembered actions he could repeat more perfectly in fantasy and then after many rehearsals carry out - all these constituted so much raw material waiting to be shaped; and this material, given man's original deficiency of tools other than the organs of his .own body, was more open to manipulation than the. external environment. Or rather, man's own nature was the most plastic and responsive part of that environment; and his primary task was to fabricate a new self, mind-enriched, different in both appearance and behavior from his given anthropoid nature.

L. Mumford: The Myth of the Machine. Harcourt, Brace & World, Inc. New York. 1966. p.46

The establishment of human identity is no modern Man had to learn to be human, just as he had to learn to talk; and the jump from animalhood to humanhood, definite but gradual and undatable, indeed still unfinished, came through man's endless efforts to shape and re-shape himself. For until he could establish an identifiable personality he was no longer an animal; but not yet a man. This selftransformation was, I take it, the first mission of human culture. Every cultural advance is in effect, if not in intention, an effort to remake the human personality. At the point where nature left off molding man, he undertook with all the audacity of ignorance to refashion himself.

L. Mumford: The Myth of the Machine. Harcourt, Brace World, Inc. New York. 1966. p.67

The creation of this realm of the sacred, 'a realm apart' serving as a connecting link between the seen and the unseen, the temporal and the eternal, was one of the decisive steps in the transformation of man. From the beginning, one must infer, these three aspects of ritual, the sacred place, the sacred acts, and the sacred cult leaders, developed together for religious use at the appointed moment.



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