



“The Antiquity and World Expansion of Human Culture” non è incluso nelle *Œuvres* di Teilhard de Chardin pubblicate in tredici volumi da Seuil.

Si tratta di una lunga conferenza stesa in inglese per un Convegno organizzato alla fine del 1954 dalla “Wenner-Gren Foundation for Anthropological Research” e pubblicata postuma dalla University of Chicago Press nel 1956.

Karl Schmitz Moorman l’ha inserita nell’*Œuvre scientifique* (Olten-Freiburg, Walter-Verlag, 1971), che è però difficilmente reperibile.

Nel 1999, Paul R. Samson e David Pitt, ritenendo che lo scritto “The Antiquity and World Expansion of Human Culture” sia “*uno dei maggiori contributi di Teilhard*”, lo hanno quasi integralmente incluso nella loro importante opera antologica: *The Biosphere and Noosphere Reader*, Routledge, London/New York 1999, alle pp. 73-79.

Riteniamo doveroso, nei riguardi di Teilhard de Chardin, dare rilievo alla sua ultima, riepilogativa riflessione sulla Noosfera. Il testo qui riprodotto è tratto dall’*Œuvre scientifique*.

I concetti più importanti sono posti in evidenza dalla redazione.

THE ANTIQUITY AND WORLD EXPANSION OF HUMAN CULTURE

Pierre Teilhard de Chardin

PLANETARY NATURE OF MAN: A PRESENTATION OF THE NOOSPHERE

How and how much does man, by his presence and his activities, transform the face of the earth? As a common background to the various technical answers, dealing with soil conservation, water distribution, city building, etc., we should like to mention and to emphasize a still deeper and more general change which our zoological group has brought to the terrestrial world. This change would betray and characterize the presence of man on earth to an observer on Sirius, namely, the progressive expansion of a special layer of thinking and cultured substance all around the globe.

More than a half-century ago the great geologist Suess took a bold and lucky step when, in addition to describing our planet by the classical sequence of concentric, spherical shells (barysphere, lithosphere, atmosphere, etc.), he decided to add the biosphere, in order to affirm, in a concise and vivid way, that the frail but superactive film of highly complex, self-reproducing matter spread around the world was of decided geological significance and value. Since Suess's times, the notion of a special planetary envelope of organic matter distinct from the inorganic lithosphere has been accepted as a normal basis for the fast-growing structures of geobiology¹ (a new branch of science). But, then, why not take one step more and recognize the fact that, if the appearance of the earth has undergone a major alteration by turning chlorophyll green

¹ **N.d.R.** – La nuova scienza della “geobiologia” nacque nel 1940 a Pechino, quando Teilhard de Chardin, coadiuvato da Pierre Leroy, divenne direttore del primo “Istituto di geobiologia”.

La geobiologia studia i legami, nel tempo, fra il sistema degli esseri viventi (Biosfera) e l’evoluzione fisico-chimica della Terra.

or life-warm since the Paleozoic period, an even more revolutionary transformation took place at the end of Tertiary time, when our planet developed the psychically reflexive human surface, for which, together with Professor Édouard Le Roy and Professor Vernadsky, we suggested in the 1920's the name "noosphere"²

Ultimately, neither earth nor man can be fully understood except with regard to the marvelous sheet of humanized and socialized matter, which, despite its incredibly small mass and its incredible thinness, has to be regarded positively as the most sharply individualized and the most specifically distinct of all the planetary units so far recognized.

As a natural introduction to the problem, devoted precisely to the study of the relations existing between earth and man in the course of their respective developments, let us therefore summarize the essence of what can be scientifically stated today concerning (1) the historical establishment of the noosphere; (2) the cultural structure; and, finally, (3) the present comportment, as well as the possible future, of mankind considered as a biological whole on a planetary scale.

HISTORICAL DEVELOPMENT OF THE NOOSPHERE

Scarcely more than a century has elapsed since living man, realizing that he, too, was a product of biological evolution, began to hunt not only for animal fossils but also and predominantly for "fossil man." In spite of intensive research, we are still far from hav-

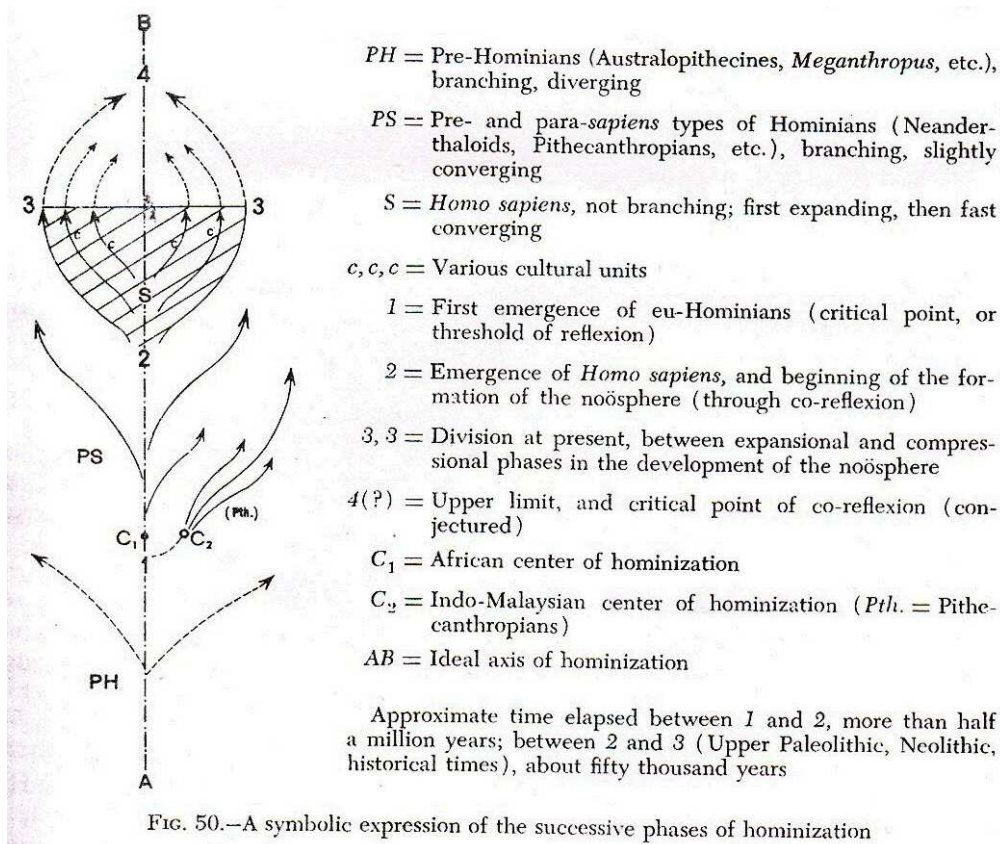


FIG. 50.—A symbolic expression of the successive phases of hominization

ing gained a complete vision of the history of our zoological group. Yet, as we consider its main features (Fig. 50), the reconstruction of our past is by now sufficiently advanced to have taken what may be regarded as its final general shape. The main lines

² From the Greek *noos*, "mind", and *sphaera*, "sphere".

of the picture gradually have come to light through the joint efforts of prehistory and paleoanthropology.

Most surely, for stringent geological and paleontological reasons, the mysterious phenomenon of initial "hominization" (that is, the mutational emergence in nature of a reflexive, or "self conscious," type of consciousness) must have taken place, by the end of the Pliocene, within the tropical or subtropical areas of the Old World in which there happened to be concentrated, at the closing of the Tertiary, the most advanced representatives of the higher, tail-less chimpanzee or gorilla-like primates presently included by the zoologists in the Pongidae family.

What were the number, the physical appearance, and the comportment of these first true Hominians? That, we perhaps shall never know. Owing to the fact that the first stages of any organized system are constitutionally of a fragile structure, the traces of any "beginning" are selectively erased by the passage of time. There is still, and probably there will almost always remain, a blank in our vision of the past at the place occupied by the origins of man, though no more or less, in fact, than in the case of the birth of any other animal species or of any human civilization.

The presence of recognizable para or pre-Hominians, anatomically comparable with the Pleistocene Australopithecines of Africa recently has been detected as early as the Upper Miocene of Italy (*Oreopithecus bamboli*). But no "eu-Hominians" were likely to have wandered on the surface of the earth before the Basal Pleistocene (Villafranchian), that is, earlier than approximately a million years ago.

In so far as we can guess, the initial hominization must have developed along an extensive west-east South Himalayan belt, ranging from equatorial Africa to Malaysia. But at a very early stage in the process it seems that this elongated "mutational front" was ruptured in the middle; the result of this segmentation was the individualization of two distinct centers of hominization: Center 1, located in Central Africa ([C₁, Fig. 50](#)), and Center 2 ([C₂, Fig. 50](#)), located some where in Indo-Malaysia.

Zoologically speaking, Center 1 and Center 2 were remarkably symmetrical in their structures. Each of them shows a core of eu-Hominian type, surrounded by a cluster of para-Hominian forms (Australopithecines of Africa [?], *Meganthropus* of Java, etc.).

But in so far as their evolutive power is concerned, they were in fact of quite different values. Whereas the pithecanthropians (*Pithecanthropus*, *Sinanthropus*, *Homo soloensis*) of the Far East never exceeded the dimensions of a marginal branch of humanity, or ever rose above a low anatomical stage comparable with that of Neanderthal man of Middle Pleistocene of Europe, evidence is growing that in the heart of Africa, and nowhere else, there originated what has become the bulk, if not the totality, of modern mankind.

To be sure, bony remains of ancient man still are very scarce in Africa south of the modern Sahara, and so far they consist mostly of the pithecanthropian like (and relatively late) skulls of Rhodesia and Saldanha. But hidden behind this outer envelope of "neanderthaloid" or "para-sapiens" appearance, the presence in Africa of an exceptionally progressive subphylum of proto-*sapiens* type (perhaps actually represented by the modern-looking, yet heavily fossilized, Kanam jaw from Kenya) becomes more and more probable. Without this assumption, it would be extremely difficult either to explain the unique development in the Lower Pleistocene of Africa of a hand-ax culture

which is the oldest and the richest of the world or to understand the sudden outburst of "modern man" throughout Eurasia (apparently from south to north) at the dawn of Upper Paleolithic time.

For the greater part of the Pleistocene (that is, during the whole Prelithic[?] and early Paleolithic times), facts force us to admit that man has remained strangely limited, geographically, within the original boundaries of his zoological birth. Except for some marked peripheral advance of the hand ax industry in southwestern Europe and Southeast Asia (as far as Indonesia[?]), the territory occupied by our ancestors some fifty thousand years ago was still substantially the same tropical and sub tropical "Pongids belt" on which the first hominization occurred hundreds of thousands of years before at the end of the Pliocene. It is as though, during an enormous span of time, man, still immature, was kept busy by some organic adjustment at the innermost part of himself.

But subsequently, by the end of the Middle Pleistocene, a general movement of populations resulted in a fundamental redistribution of man on the surface of the earth. At that time a definitely modernized type of man, radiating apparently from a Mediterranean base, succeeded for the first time in invading those expanded northern parts of the continents where the Old and the New Worlds come into close contact, or even weld, along a boreal belt. To some extent, Africa, despite its size, had been for millenniums a closed container for man or even a blind corner. Once having reached the vast free spaces, first, of northern Eurasia and, somewhat later, of North America, man, endowed at last both anatomically and culturally with his full expansive force, seems to have progressed quickly, like an irresistible tide, over the newly open land: only a few thousands of years later he had already reached Patagonia!

This was a true "second hominization," indeed: the rise out of Africa and the world-wide spreading of *Homo sapiens*, the "universal man."

As a result of this Upper Paleolithic expansion, Mesolithic man was no longer merely a tropical and subtropical animal. At last he had become what we are now: a pan-terrestrial form of advanced life. But his hold on the earth at this early stage was still most precarious and very loose. And it was to require the continuous and intensive effort of many more millenniums of agricultural and proto-industrial cultures to fill the gaps and to establish a first satisfactory net of connections between men and men all over the world.

Several hundred thousand years had been spent on the mere preparation, mainly in Africa, of a human planetary invasion. Some thirty thousand years more had been required for the actual occupation of the extra-African lands. Approximately ten thousand years (that is, the whole combined Neolithic and historical times) were necessary before a preliminary consolidation of the human envelope had been realized all around the earth.

But today, after so many eons of hominization, the great accomplishment pursued by life since its first emergence on earth two or three billion years ago is over; namely, the achievement of an unbroken, co-conscious organism, coextensive with the entire area of the globe. Definitely cemented on itself in the course of the last century by the powerful forces of industry and science, the newborn noosphere is now spread right before our eyes and is caught already in the first grip of an irresistible totalization.

Before trying to investigate this final phase of the development of the noosphere, let us first analyze the secret of its internal structure in order to discover the deep reasons why man represents so obviously (judging merely from his biological success) a revolution in the very process of natural evolution.

CULTURAL NATURE OF THE NOOSPHERE

By human culture, I refer to the manifold process according to which any human population, whenever left to itself, immediately starts spontaneously to arrange itself at a social level into an organized system of ends and means, in which two basic components are always present. First: a material component, or "increase in complexity," which includes both the various types of implements and techniques necessary to the gathering or the production of all kinds of food or supplies and the various rules or laws which provide the best conditions for an optimum birth rate or for a satisfactory circulation of goods and resources within the limits of the population under consideration. Second: a spiritual component, or "increase in consciousness," namely, some particular outlook on the world and life (an approach which is at once philosophical, ethical, aesthetic, and religious), the function of which is to impart a meaning, a direction, and an incentive or stimulus to the material activities and development of the community.

For the many fragments of mankind that have become isolated or have gained their independence in the course of time, just so many tentative technico-mental systems of the world as a whole - that is, just so many *cultures* - have gradually come into existence. This is one of the major lessons taught by the universal history of man, from the earliest known stages until the present time.

Understood thus as a collective answer to the general biological problem of survival and growth, the typically human phenomenon of culture is of course foreshadowed, to some extent, at the prehuman levels of life. In the case of animals, too, the struggle for life leads each different species forcibly toward the discovery of some constructive adjustment between germinal forces of reproduction and multiplication, on the one hand, and quasi-social forces of collective arrangement, on the other.

But whereas, in the case of non-reflexive life, *social* and *germinal* persistently have been unable to combine into a definite and unlimited creative process,³ in the case of man, on the contrary (and clearly in some sort of connection with the newly acquired human power of "thinking"), both social and germinal have given rise, by their conjunction, to a decidedly superior type of evolution - a "new evolution" in fact⁴ - special to the noosphere and characterized at the same time by a new and more efficient form of invention, by a new and more efficient form of heredity, and by a new and more efficient form of speciation.

A New and More Efficient Form of Invention

Since its earliest beginnings, life has never stopped "inventing" and perfecting new organic contraptions along the most amazing variety of lines. But for a very long time

³ Either the social is lagging behind in the animal world, or, as it happens for the insects, society chokes the development of the individual.

⁴ This expression is from George Gaylord Simpson's *The Meaning of Evolution*, 1951.

this continuous advance seems to have been achieved much more through a patient expectation and utilization than by a positive pursuit and control of chances. Before man, the evolution of animal life was unquestionably directional and preferential. But in its mechanism it did not show any real *purpose*. *Since the appearance of man, however, the living individual being becomes able to plan. And this power of planning, when focused on research and when brought socially to the dimensions of a concerted effort for discovery, opens a new era in the development of terrestrial life.* Without escaping the general conditions and "servitudes" of every organic substance in the universe, man has introduced, and is gradually expanding at the very core of nature through his collective power of reflexive invention, a new method for arranging matter: no longer the old random arrangement but an active arrangement through self-evolution.

A New und More Efficient Form of Heredity

Germinal heredity, so deeply investigated by our modern geneticists, proved to be a marvelous instrument of progress during the earlier, prehuman stages of the development of life. But owing to the very nature of its chromosomic mechanism, germinal heredity is affected, in fact, with a triple basic weakness which makes it unable to insure, if left to itself, any further advance of evolution in the case of such a complicated and fast-changing type of organism as man, especially *collective* man. First, the characters transmitted by genes are by their very nature restricted to a category of rather elementary features; namely, those which control the material arrangement of the cells in the course of embryogenesis. Second, the number of these elementary characters is drastically limited in the germ by the exiguous size of the chromosomes. Third (if we except the possible case of some social instincts among the insects), there is no observable chromosomic transmission to the species of the characters eventually acquired by the industrious activity of each individual in the course of its life.

Now, remarkably enough, it is precisely on these three different grounds that a decided improvement becomes manifest in the *cultured* zones of life, in so far as the registration and the transmission of human experience are concerned. *Thanks to language, to information, and to education, an unlimited number of unlimitedly complex ideas or techniques accumulate continuously, and organize themselves permanently, in the unlimited capacity of collective human memory.*

Thus, duplicating the history of the old chromosomic heredity, an incomparably more sensitive and receptive educational heredity is now at work in the noosphere. This is precisely the more-needed power to collect the over abundant products and to feed the constantly accelerated progress of a self-evolving process.

A New and More Efficient Form of Speciation

Considered over a sufficiently protracted span of time, every animal population shows a tendency to split, under a statistical effect of genetic mutations, into branching systems of varieties, sub-species, and, ultimately, true, new, specific forms. In the case of man, things proceed in much the same way, except that, as a consequence of the specifically human association between germinal and social, the splitting and branching operation results in the formation of new, *mainly cultural*, instead of new, *mainly anatomical*, types.

Fundamentally, according to my point of view, culturation is nothing but a "hominized" form of speciation. Or to express the same thing differently: *cultural units are for the noosphere the mere equivalent and the true successors of zoological species in the biosphere. True successors, we insist.* And how much better fitted than their predecessors to satisfy the new requisites of an advanced type of evolution!

Let us briefly dwell on this important point. Considered as an instrument for evolution, zoological speciation, in addition to being very much slowed down by the non-inheritance of acquired characters, is seriously handicapped by the fast-increasing estrangement observable between the products of its operation. In the very process of becoming itself, each newly formed zoological type becomes more and more separated and isolated from the other surrounding species in the process of its inner development. Growing aloneness, mutual impermeability, and consequent basic incapacity for any sort of interspecific synthesis were the common fate of animal phyla under the "old" regime of evolution.

In contrast, with the rise of self-evolution, not only does the speed of transformation increase rapidly, because of the cumulative transmission of planned inventions, but, and more important, a remarkable capacity emerges among the socialized offsprings of the new evolution for keeping in close inner touch with one another - and even for fusing with one another - in the course of their development. On the one hand, *the various human cultural units spread all over the world at a given time never cease (even during the most acute phases of their differentiation) to react mutually on one another at the depth of their individual growth.* Whatever may be the degree of their mutual divergence, they still form, when taken together, an unbroken sheet of organized consciousness. And, moreover, on the other hand, they prove able (provided they happen to be sufficiently active and sufficiently compressed on one another) to penetrate, to metamorphose, and to absorb one another into something fundamentally new. *This is the well-known process of acculturation - a process possibly bound to culminate some day in a complete "mono-culturation" of the human world, but a process, in any case, without which no formation of any continuous human shell would ever have been physically possible on the surface of the earth.*

From the preceding analysis of the cultural nature of human expansion one might conclude erroneously that the so called "noosphere" is nothing more than an uninteresting kind of pseudo or para-organism, since, according to a widespread opinion, it would be dangerously confusing to identify what is really *natural* and what is simply *cultural* (that is, "artificial") in the world. Here, we confess to touch upon a point still hotly debated even among anthropologists; namely, to decide whether the word "biological" can or cannot be applied correctly (in a non-allegoric way) to the workings and to the products of human culture. And yet, in our opinion, a decisive and final positive answer to the problem is already forced upon our mind by the three following joint considerations:

1. Whatever may be the ultimate physical nature of psychological awareness, increasing consciousness - traceable by increasing cerebration - is overwhelmingly proved by general paleontology and comparative zoology to be a safe and absolute parameter (or index) of biological evolution.

2. Aside from any undue anthropocentrism, but from the inescapable evidence derived from the revolutionary effects of hominization, *reflexive awareness must be held, not as a mere variety, but as a superstage of consciousness.*

3. Judging from the very mechanism of its operation, which is, ultimately reducible to a process of *co-cerebration* and *co-reflexion*, *culturation cannot be regarded as anything less than a direct prolongation of hominization.*

Obviously, if they are linked with one another in their natural order, these three successive steps scientifically detected in the terrestrial development of life - (1) direct (or simple) consciousness; (2) reflexion (consciousness raised to its second power; for man, *to know that he knows*); and (3) culture (co-reflexion) - have one, and only one, possible meaning. They show in an unmistakable way by their mere natural sequence that man, through culturation, is not drifting away along some side path and toward some blind corner of the universe but that he is still moving directly along the major axis of cosmic development. From all that we know most certainly from the entire history of the past, *culturation, because it biologically expresses a collective advance in reflexion, decidedly is not an inferior or reduced form of evolution but rather represents a supertype. This evidence, far from being of merely speculative interest, turns out to be of the utmost importance, both for our power of vision and for our power of action.*

It is of importance for our power of action, of course, because it is tremendously necessary to the security of man and to his sense of values to be sure at last, in his effort to become more human ("ultra-human"), that he is responsible for, and supported by, the main and most central forces of a growing universe. *It is important for our power of vision too, because, if the full impact of evolution is actually concentrating at present on the achievement of the noosphere, then we can understand better the terrific energies at work and the incredible potentialities still awaiting us in the process and in the progress of human acculturation.*

PRESENT STATUS AND POSSIBLE FUTURE OF THE NOOSPHERE

A common attitude today, one repeatedly expressed in the statements of highly intellectual and religious people, is that man and mankind are regarded as being a practically stabilized product of evolution and even as a disintegrating and decaying one. Under the influence of science and techniques, man is supposedly not improving but even regressing biologically. Hence "progress" is a myth and an illusion. In many quarters this is the new and fashionable way of thinking "realistically."

For anyone who is aware of the basic evolutive significance of any increase of consciousness through complexity inside the noosphere, such a pessimistic view of the present status of the world is so incredibly wrong scientifically, and at the same time so dangerously depressing psychologically, that we believe that the time has come to react against it openly and vigorously. And this can best be done, it seems to us, by presenting a more objective and more comforting interpretation of the major crisis which we have been going through since the beginning of the twentieth century.

Something very deep and very wide is certainly taking place, these days, at the core of the humanized zones of the planet. But *what?* To this question the only satisfactory answer, in our opinion, is as follows.

Up to a very recent date the phenomenon of "hominization", because it was continuing (for perhaps about a million years) to operate on a relatively unpopulated world, was predominantly a process of *expansional and diverging* directions. Just as in any given animal species the main rule of life is to propagate and to differentiate at a maximum, so the chief occupation of man during this first period was to invade all the free parts of the earth and, at the same time, to attempt every possible form of cultural arrangement.

At present, however (that is, for less than a century!), owing to the coincidence of a sharp demographic jump with an incredible progress in intercommunication, the development of mankind has suddenly become *compressional and converging* in its direction.⁵ The movement has completely reversed its phase, with the result that, under a tremendous and incoercible *rapprochement* and compression of both human bodies and human minds, *co-arrangement and co-reflexion are now rising toward astronomical values at the interior of the noosphere*. Even if humanity is not becoming either better or happier in the course of the process, it is today forced, more than ever, in its entirety and under two irresistible factors (that is, by the double curvature of our rounded mother-planet and of our converging minds) *to move toward unheard-of and unimaginable degrees of organized complexity and of reflexive consciousness*.

To become ultra-reflexive (that is, "ultra-human") by reaching some stage of monoculturation - or else to resign and to die on the way - this, aside from any temperamental or philosophical considerations, must on purely scientific grounds be regarded as the biological fate of man.

For conventional and conservative reasons we dislike, and we try to weaken, the growing evidence that, judged by the best standards of biological evolution, our species is still far from being zoologically mature. Instead of closing our eyes to the stupendous technico-mental acceleration of anthropogenesis in our modern times, why not rather try to face the situation and to guess how far the process is likely to carry us and how it is going to end eventually?

Whenever we speculate on the future of civilization, we generally assume that, except for the unlikely case of some physical, physiological, or psychological accident of planetary dimensions, man will survive practically unchanged as long as the earth will supply him with a sufficiency of food and energy. But, in our opinion, we should consider another idea that is both more interesting and more probable; namely, that the whole human adventure, in so far as it turns out to represent a *fast-converging process*, is bound to end some day, not by exhaustion from *external* causes, but climactically for *internal* reasons, just because *there is a critical upper limit (or threshold) to the planetary development of co-reflexion*.

If we follow this line of thought to the end, we are led to the suspicion that *every "thinking planet" in the universe (like a psychical nova) must culminate sooner or later, through protracted inner maturation, in some implosive concentration of its cultural noosphere*. And this specific event should possibly coincide with some escape of the

⁵ Very much in the same way as a pulsation entering a globe through the lower pole would first expand, up to the level of the equator, and then, in moving farther on toward the upper pole of the sphere, would become more and more compressed ([cfr. Fig.50](#)).

fully "co-reflected" parts of the *Weltstoff* outside and beyond the apparent boundaries of time and space. Strangely enough, such a wild hypothesis of a transhuman universe conforms perfectly to the general pattern of a physical world in which absolutely nothing can grow indefinitely without meeting ultimately some critical level of emergence and transformation. From the inflexible point of view of energetics, the process fulfils, we believe, a condition *sine qua non* for the steady continuation of human effort during the next million years toward an ever greater culture and acculturation.

So far, man has accepted blindly (just as the industrial workers of a century ago) the pushing-ahead of the terrestrial development of life, without asking himself whether it was a paying game to play at being Atlas. But this phase of instinctive co-operation is decidedly over. The time can be foreseen when the human drive for climbing always higher toward consciousness through complexity will die out, unless it is stimulated by growing scientific evidence that, through ever intensified hominization, we are really moving *somewhere and forever*.

That some definite Everest [N.d.R. - "Omega Point"] should really be there ahead of us, behind the clouds, an Everest from which there is no return to the plain; that through a stubborn confluence of our minds and hearts we should eventually succeed in breaking the barrier of darkness and mutual exteriority which still separates life as we know it from some higher and more stable form of knowledge and unanimity; and to become actually and acutely conscious of the imperative craving of our deepest ego for some definitely *irreversible* type of achievement-might well be, we venture to say, the next step which man will take (very soon, perhaps) in the process of his co-reflexive self-evolution.

REFERENCES

- BLUM Harold F., *Time's Arrow and Evolution*, Princeton University Press, Princeton, N.J., 1951, pp. 222.
- BOYD William C., *Genetics and the Races of Man*, Little, Brown & Co, Boston 1950, pp. 453.
- BRIDGMAN P.W., "The Potcnial Intelligent Society of the Future," pp. 229-50 in NOHTHOP, F. S. C. (ed.), *Ideological Differences and World Order*, Yale University Press, New Baven, Conn. 1949, pp.486.
- DARWIN Charles Galton, *The Next Million Years*, Doubleday & Co., New York 1953, pp. 210.
- HUXLEY Julian S., *Evolution in Action*, Harper & Bros, New York 1953, pp 177.
- NEEDHAM Joseph, *Time, the Refreshing River*, Macmillan Co., New York 1943, pp. 280.
- REDFIELD Robert, *The Primitive World and its Transformations*, Cornell University Press, Ithaca, N.Y., 1953, pp. 183.
- SEIDENBERG Roderick, *Post-historic Man*, University of North Carolina Press, Chapel Hill 1959, pp. 246.
- SIMPSON George Gaylord, *The Meaning of Evolution*, Mentor Books, New York 1951, pp. 192.
- TEILHARD DE CHARDIN Pierre, "La Structure phylétique du groupe humain", *Annales de paléontologie*, XXXVII, 77-106.
- WHITE Leslie, *The Science of Culture*, Farrar & Straus, New York 1949, pp. 444.
- VIENER Norbert, *The Human Use of Human Beings: Cybernetics and Society*, Houghton Mifflin Co., Boston, pp. 199.