Questions have always been asked about the "end of the world," about the "new earth" and about other eschatological matters. Answers that used to make metaphysical sense in an earlier culture no longer seem to make practical sense in the cultural context of modern cosmology. Classical cosmology, with its emphasis on Aristotle's hylomorphic categories that paid less attention to processes of transformation and more to stability of forms, did not foresee the possibility of new empirical data about nuclear, molecular and galactic processes and the direction of these processes over long periods of time. As a result, classical cosmology has no place for cosmic evolution. Nor could it have discussed its data as patterned in the mathematical language of empirical scientists. Thus classical cosmology is failing to motivate empirical cultures to participate meaningfully in the task of building the new earth.

There is no intention here of discussing eschatology in the language of mathematics and the natural sciences. That language is too specialized to make sense in the realm of common-sense meanings. In fact, it appears impossible at present to establish communication between the "two cultures" described by C. P. Snow,¹ for whom one culture has been isolated from the other by the acceptance or rejection of mathematical language.

And yet a mission has been given to communicate [Christian] eschatology to all cultures, and to the missionary belongs the

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¹ C. P. Snow, The Two Cultures and the Scientific Revolution (New York: Cambridge Univ. Press, 1961) 1 and passim.
responsibility of inculturating eschatology and so of optimizing the language in which it is to be communicated. Eschatological meanings are now perceived to be in need of a "new framework," and the need includes the proviso that this new framework evoke meanings in the technological culture of today such as to promote technological participation in an orthopraxis of hope. The task of building the "new earth" in preparation for eschaton calls for the broadest participation.

The hermeneutics of eschaton is presently distracted from its task by an ambiguous mixture of hopes and fears. Some theologians are afraid that the world might end in a nuclear holocaust. Others are less fearful and entertain the hope that the world will ultimately glow in a glorious blaze of cosmogenesis. Still others conjure up an image of world history fluctuating in waves of social progress and decline, with total uncertainty about ending up at either crest or trough of the last wave.

This vague mixture is made up of attempts to answer the question about the end of the world and about the new earth, but the questions are themselves vague. Perhaps what is needed is a frame of reference in which both the question and its possible answers can be formulated more meaningfully.

To construct a new framework, it is necessary (although insufficient) to conceptualize a "new earth" that is somehow consistent with meanings evoked by cosmic evolution, and with the more important meaning of human participation in divine creativity. Such conceptualization may be clarified in seven interconnected parts: (1) the Big Bang hypothesis of cosmic beginnings; (2) biosphere from matrix of clay; (3) information and instructions encoded in DNA molecules; (4) matter and spirit; (5) emergent probability; (6) justice and peace; and finally (7) functions of meaning.

BIG BANG

Spectroscopic data reveal that galaxies are moving away from each other such that the universe appears to be expanding in

space. In 1927, priest-cosmologist Georges Lemaître hypothesized that this expansion was a large-scale continuation of an event when a nuclear explosion in the "primeval atom" set off forces of mutual repulsion among its components, thus generating galaxies and stars and hydrogen-helium bombs like our sun, with planets orbiting around it.³

In view of this constructive direction of nuclear energy, its destructive power, although immense, can now be seen to be relatively insignificant. Thus Moltmann's fear of the world ending in a nuclear holocaust, although possible, becomes less probable than he at first believed on the basis of events in Arizona, Eniwetok, Hiroshima, Nagasaki and Chernobyl. Fears such as this weaken the present thrust to build the new earth and give the impression of "deferring life's meaning to the future alone."⁴ The present is very rich in life's meanings.

**BIOSPHERE FROM MATRIX OF CLAY**

The Big Bang also scattered dust particles all over space and some of these find their way to our planet and become clay. Biologists believe that one type of this clay, although inorganic, is patterned as a matrix of organic molecules that constitute terrestrial life⁵ and thus are capable of receiving the breath of life from the creative Power that initiated the Big Bang. Ecologically, the cosmos, with the generative power of nuclear energy, is our maternal ancestor: she generates on the surface of the earth a clayey matrix teeming with life called the biosphere. In this biosphere, there is an emerging power of self-organization generating social quasi-organisms, from beehives and termitaries to multinational bodies and world religions.

**DNA MOLECULES**

Fr. Thomas Berry, an eco-theologian, recently published a book

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³. David Millar et al., Chambers Concise Dictionary of Scientists (Edinburgh: Cambridge University, 1989) 243.
⁴. Lane, "Eschatology," 338.
entitled *The Dream of the Earth.* Like Teilhard de Chardin, Berry predicates on the universe an analogue of human consciousness: the earth is dreaming of developing itself. Does this dream contain detailed plans of development? Not initially. But each living organism on earth contains a set of "instructions" encoded in its DNA molecules, suggesting that groups of molecules develop organically into higher and higher systems nested within each other, with Gaia (or earth) herself as the all-encompassing super-system that organizes herself in accordance with the collective "memory" of the myriads of events that have occurred throughout her development. Sometimes, the development stabilizes into specific "habits." The earth is alive. This is the "new animism" movingly described by Rupert Sheldrake in his book *The Rebirth of Nature.*

Ideas like these are rejected by those who believe that they have an absolute right to plunder the earth for the sake of their short-term profits. For example, by destroying rain forests, man endangered earth's life-support systems that had evolved in past ages, thus endangering his own survival and frustrating earth's purpose.

This purposive aspect of earth processes is consistent with the classical concept of "obediential potency." However, classical cosmology hardly gives any inkling about the reality of the immanent component of this potency. This reality is analogous to human consciousness such that it evokes meanings that are becoming very fruitful in motivating human participation in the task of building the new earth, i.e. the task of changing potency into actuality. The emergence of these meanings from information encoded in molecular dynamics can protect the earth from plundering humans.

**MATTER AND SPIRIT**

The component of obediential potency that is immanent in all matter is consistent with Rahner's view that matter and spirit

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as they exist in the created universe are really united and mutually interdependent. This is true even from the moment of the Big Bang and all throughout cosmic evolution. Rahner would readily accept “consciousness” as present in matter that has reached a sufficiently high level of organization.⁸

The framework of mutual relationships and interaction between matter and spirit in the created universe may be called “spirit of the biosphere.” It is vividly expressed in the rich analogies of Teilhard.⁹ The process of cosmic expansion is accompanied by a process of self-organization into galactic, stellar, planetary systems and the earth’s biosphere. As this cosmic process grows in complexity, the process of self-organization grows in purposiveness. In a sense based on sound analogy, the universe grows in the dimension of “complexity-consciousness.” On planet earth, this appears as the growth of life, individual as well as communal.

The communal or biospheric aspect of life’s evolution on earth is a trial-and-error process of following instructions collectively encoded in the memories of all DNA molecules. Errors leading to internal fights for survival can diminish with the growth of consciousness. This growth can evoke the emergence of a highly organized system of living things, a system capable of reflecting on the meanings of its revelatory experiences and of imaging the configurations of a radically new earth.

There are two sources of revelatory experiences: one source transcends all creation and the other is immanent in creatures.

**EMERGENT PROBABILITY**

The immanent sources reveal to man a world process characterized by order, design and intelligibility that gives a generic account of large numbers, long intervals of time, a variety of distributions and concentrations in space, enormous differentiation, increasing systematization, stability without necessity, as-

survance without determinism, development without chance. Lonergan calls this account emergent probability.10

Its description is basically mathematical. It focuses on events that form sequences of conditional antecedents and consequents, and classifies them into nested schemes of recurrence. The interaction between events, schemes of events, and schemes of schemes, etc., is governed not only by classical (or deterministic) laws but also by statistical (or probabilistic) laws.

One corollary of emergent probability concerns the probability of emergence followed by the probability of survival. This abstract formulation is more easily understood with the aid of an insight occurring — perhaps independently — in the mind of Sheldrake: "... new kinds of molecules, crystals, organisms, patterns of behavior and patterns of thought should tend to occur more readily the more they have happened before ... And there is already evidence that this habit-forming process actually occurs."11 Some innovations survive and stabilize into habits, and the measurable probabilities of earth's "habits" facilitate extrapolation, prediction and control of earth's processes that would otherwise be impossible. This is true of both constructive and destructive processes on earth. For example, the present volume of atmospheric pollution by factories and the present rate of plundering of rain forests by industrial firms can be used to predict the probable span of time that the earth's basic life-support systems can last. Another example is global economics: economic dysfunctions are seen by Lonergan to be conditioned by human ignorance of the meanings of measurable and recurrent fluctuations between growth and decline. This condition can, and indeed must, be reduced by a sharing of meanings within a community of technologists and theologians. For theologians are deeply concerned about justice and peace.

JUSTICE AND PEACE

Up to the present, the meanings of processes arising from

cosmic evolution are not fully understood to be closely related to theological concerns for the justice and peace needed for the emergence of a new earth. And yet, a moment’s reflection will clarify how geophysical and macroeconomic disasters cause the earth’s resources to dwindle. This intensifies the competitive struggle between peoples for self-preservation and leads to global wars of survival; in wars, might is right and injustice reigns supreme.

It is true that God, according to the Gaudium et Spes constitution of Vatican II, “is preparing a new dwelling place and a new earth where justice will abide.” But the constitution hastens to add: “They are mistaken who, knowing that we have no abiding city but seek one which is to come, think they can shirk their earthly responsibilities.” These responsibilities can be clarified by meanings arising from cosmic evolution and can be met in decision-making events whereby the energies wasted in injustice and global wars are channelled into the building of a new earth by turning cosmic potentialities into actualities through participation in divine creativity by communities of theologians and technologists sharing in common meanings.

FUNCTIONS OF MEANING

In the preceding six sections, we have been talking about meanings and how they may help in constructing a new framework for eschatology. These meanings are not only cognitive. They are also efficient, constitutive and communicative.

On the efficient function of meaning, Lonergan says:

Men work. But their work is not mindless. What we make, we first intend. We imagine, we plan, we investigate possibilities . . . From the beginning to the end of the process, we are engaged in acts of meaning; and without them the process would not occur or the end achieved . . . [The builders of this world] have covered it with cities, laced it with roads, exploited it with industries, till the world man

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13. Ibid. no. 43.
has made stands between us and nature. The whole of that added, man-made, artificial world is cumulative, now planned, now chaotic, product of human acts of meaning.\textsuperscript{14}

On the constitutive function of meaning, he says: "Just as language is constituted by articulate sound and meaning, so social institutions and human cultures have meanings as intrinsic components."\textsuperscript{15} On the communicative function of meaning, he says: "What one man says is communicated to another . . . So individual meaning becomes common meaning."\textsuperscript{16} The conjunction of both the constitutive and communicative functions of meaning yields the notion of community: thus a community "is an achievement of common meaning . . .\"\textsuperscript{17}

Hopefully, a community of theologians and technologists will be so achieved and inspired to construct a new framework for eschatology. Theologians need not hesitate to accept Rahner's view about the integration of salvation history with cosmic evolution. Christian faith affirms this integration

. . . with an optimism which stems from God's grace and goes beyond all conceivable pessimism, that this world evolution in this phase of its spiritual history is not only capable of arriving at an immediacy to God, but that even now it has entered upon a phase through which, in a way that is irreversible for the totality of the history of freedom (prescinding from a theoretical affirmation about the individual person), this goal will actually be attained, and that the catastrophe, which in itself is possible, and the total halt to progress will not come to pass. This irreversibility and this orientation toward a future goal that will actually be attained, which are characteristic of the world's evolution and its history of freedom, are present for Christians in the Christian dogma of Jesus Christ as the "Logos of God made flesh," as God's irrevocable promise of salvation in Jesus of Nazareth.

. . . No matter how clearly and precisely theology and natural science have to be distinguished from one another and the line of demar-

\textsuperscript{15} Ibid.
\textsuperscript{16} Ibid.
\textsuperscript{17} Ibid.
cation drawn between them, they both have to do with one another, because human beings in all their dimensions, who are nature, endure nature, and pursue the science of nature, are called to that salvation which is the incomprehensible God himself.\textsuperscript{18}

In harmony with this, Teilhard prays:

And I, Lord, for my (very lowly) part, would wish to be the apostle — and, if I dare say so, the evangelist — of your \textit{Christ in the universe}.

For you gave me the gift of sensing, beneath the incoherence of the surface, the deep, living unity which your grace has mercifully thrown over our heart-breaking plurality.\textsuperscript{19}

\textsuperscript{18} Rahner, \textit{Theological Investigations}, 21: 55.