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ANGELS FEAR

TOWARDS AN EPISTEMOLOGY OF THE SACRED

Gregory Bateson & Mary Catherine Bateson

Full fathom five thy father lies;
of his bones are coral made;
Those pearls that were his eyes:
Nothing of him that doth fade,
But doth suffer a sea-change
Into something rich and strange.
Seanymphs hourly ring his knell:
 Ding-dong.
Hark! Now I hear them, $\frac{3}{4}$ Ding-dong, bell.
 $\frac{3}{4}$ SHAKESPEARE, *The Tempest*

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MCB

Cambridge, Massachusetts
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I Introduction (MCB & GB)

I. SETTING THE CONTEXT (MCB)

In 1978, my father, Gregory Bateson, completed the book titled *Mind and Nature: A Necessary Unity* (Dutton, 1979). Under the threat of imminent death from cancer, he had called me from Tehran to California so we could work on it together. Almost immediately, as it became clear that the cancer was in extended remission he started work on a new book, to be called *Where Angels Fear to Tread*, but often referred to by him as *Angels Fear*. In June 1980 I came out to Esalen, where he was living, having heard that his health was again deteriorating, and he proposed that we collaborate on the new book, this time as coauthors. He died on July 4, without our having had the opportunity to begin work, and after his death I set the manuscript aside while I followed through on other commitments, including the writing of *With a Daughter's Eye* (Morrow, 1984), which was already under way. Now at last, working with the stack of manuscript Gregory left at his death --miscellaneous, unintegrated, and incomplete -- I have tried to make of it the collaboration he intended.

It has not seemed to me urgent to rush this work forward. Indeed, I have been concerned on my own part to respect the warning buried in Gregory's title: not, as a fool, to rush in. The real synthesis of Gregory's work is in *Mind and Nature*, the first of his books composed to communicate with the nonspecialist reader. *Steps to an Ecology of Mind* (Chandler, 1972, and Ballantine, 1975) had brought together the best of Gregory's articles and scientific papers, written for a variety of specialist audiences and published in a multiplicity of contexts, and in the process Gregory became fully aware of the potential for integration. The appearance of *Steps* also demonstrated the existence of an audience eager to approach Gregory's work as a way of thinking, regardless of the historically shifting contexts in which it had first been formulated, and this moved him along to a new synthesis and a new effort of communication.

Where Angels Fear to Tread was to be different. He had become aware gradually that the unity of nature he had affirmed in *Mind and Nature* might only be comprehensible through

the kind of metaphors familiar from religion; that, in fact, he was approaching that integrative dimension of experience he called the *sacred*. This was a matter he approached with great trepidation, partly because he had been raised in a dogmatically atheistic household and partly because he saw the potential in religion for manipulation, obscurantism, and division. The mere use of the word *religion* is likely to trigger reflexive misunderstanding. The title of the book therefore expresses, among other things, his hesitation and his sense of addressing new questions, questions that follow from and depend upon his previous work but require a different kind of wisdom, a different kind of courage. I feel the same trepidation. This work is a testament but one that passes on a task not to me only but to all those prepared to wrestle with such questions.

In preparing this book, I have had to consider a number of traditions about how to deal with a manuscript left uncompleted at the time of a death. The most obvious and scholarly alternative was that of scrupulously separating our voices, with a footnote or a bracket every time I made an editorial change and a *sic* every time I refrained when my judgment suggested that a change was needed. However, since it was Gregory's own intention that we complete this manuscript together, I decided not to follow the route of the disengaged editor, so I have corrected and made minor alterations in his sections as needed. The original manuscripts will, of course, be preserved, so that if the work proves to merit that kind of attention, someone someday can write a scholarly monograph about the differences between manuscripts and published text that incorporates the work of us both. I will limit my scrupulosity to the preservation of the sources. After some hesitation, I decided not to supplement the materials Gregory had designated for possible use in this book by drawing extensively on his other writings, but I have made omissions and choices, as Gregory would have. Material that partly duplicates previous publications, however, has often been retained for its contribution to the overall argument.

On the other hand, where my additions or disagreements were truly substantive, I have not been prepared simply to slip them in, writing prose that the reader might mistake for Gregory's own. This would be to return to the role of amanuensis, the role I was cast in for *Mind and Nature*, in which I merged all of my contributions in his, as wives and daughters have done for centuries. The making of this book has itself been a problem of ecology and of epistemology, because Gregory's knowing was embedded in a distinctive pattern of relationship and conversation.

Thus, it seemed important that when I made significant additions, it should be clear that these, right or wrong, were my own. I have chosen to do this partly in the form of inserted sections, set in square brackets, and partly in the form of what Gregory called metalogues. Over a period of nearly forty years, Gregory used a form of dialogue he had developed between "Father" and "Daughter," putting comments and questions into the mouth of a fictionalized "Daughter," asking the perennial question "Daddy, why . . ." to allow himself to articulate his own thinking. Over a period of about twenty years, we actually worked together, sometimes on written texts, sometimes in public dialogue or dialogue within the framework of a larger conference, and sometimes across the massive oak table in the Bateson household, arguing our way towards clarity. The fictional character he had created, who initially incorporated only fragmentary elements of fact in our relationship, grew older, becoming less fictional in two ways: "Daughter" came to resemble me more fully, and at the same time I modeled my own style of interaction with Gregory on hers.

This was a gradual process. Part of the dilemma I faced in deciding how to deal with the materials Gregory left was that he never defined what he was doing in relation to me. He attributed words to a character named "Daughter," words that were sometimes real and sometimes imagined, sometimes plausible and sometimes quite at odds with anything I might have said. Now I have had to deal with an uncompleted manuscript left by him, using my own experience of the occasions we worked together and my understanding of the issues as guides. The lines given to "Father" in these metalogues are sometimes things Gregory said in other contexts, often stories he told repeatedly. But these did not, as conversations, ever occur as presented here. They are just as real – and just as fictional – as the metalogues Gregory wrote himself. Like Gregory, I have found the form sufficiently useful and flexible not to observe stringently his original requirement that each metalogue exemplify its subject matter in its form, but, unlike his metalogues, the ones in this book were not designed to stand separately. Nevertheless, it seems important to emphasize that the father-daughter relationship continues to be a rather precise vehicle for issues that Gregory wanted to address because it functions as a reminder that the conversation is always moving between intellect and emotion, always dealing with relationship and communication, within and between systems. Above all, the metalogues contain the questions and comments I would have raised had we worked on this manuscript together, as well as my best approximation of what Gregory would have said. I have also allowed myself near the end to emerge from the child role of the metalogues and to write in my own present voice. Each section of the book is labeled "GB" or "MCB," but this should be understood to be very approximate, meaning no more than "primarily GB" or "primarily MCB." The section of Notes on Chapter Sources provides further detail.

At the top of the stack of materials Gregory had accumulated for the book was a draft introduction, one of several, that began with this story:

"In England when I was a boy, every railroad train coming in from a long run was inspected by a man with a hammer. The hammer had a very small head and a very long handle, rather like a drumstick, and it was indeed designed to make a sort of music. The man walked down the whole length of the train, tapping every hotbox as he walked. He was testing to find out if any one was cracked and would therefore emit a discordant sound. The integration, we may say, had to be tested again and again. Similarly, I have tried to tap every sentence in the book to test for faults of integration. It was often easier to hear the discordant note of the false juxtaposition than to say for what harmony I was searching."

I only wish that in drafting an introduction Gregory had been describing something he had actually done rather than something he still aspired to do. Gregory was working in an interval of unknown length while his cancer was in remission. He was living at Esalen, an environment where he had warm friendships but not close intellectual collaborations. Even though the "counterculture" has faded in the 1980s, Gregory's occasional references to it provide a clarifying contrast for the shifting population and preoccupations of Esalen underlined his essential alienation. Always, for Gregory, the problem was to get the ideas and the words right, but his life-style in that last period, without a permanent base or a steady source of income, required that he keep on producing, reiterating, and recombining the various elements of his thought as he sang for his supper, but without doing the tuning or making the integration that they needed. It also meant that Gregory, always sparing in his reading, was more cut off than ever before from ongoing scientific work. He combined great and continuing originality with a store of tools and information acquired twenty years earlier.

In effect, his groping poses a challenge to readers to make their own creative synthesis, combining his insights with the tools and information available today, advances in cognitive science, molecular biology, and systems theory that are nonetheless still subject to the kinds of muddle and intellectual vulgarity he warned against.

There is no way that I can make this manuscript into what Gregory wanted it to be, and at some level I doubt that Gregory could have done so or that we could have done it together. Certainly what he wanted was still amorphous at the time of his death, the thinking still incomplete. But although the ideas were not yet in full flower, they were surely implicit in the process of growth.

Surely, too, the richest legacy lies in his questions and in his way of formulating questions.

In the autumn after the completion of *Mind and Nature*, living at Esalen, Gregory wrote several poems, one of which seems to me to express what he felt he had attempted in the work just completed, and perhaps an aspiration for the work that lay ahead.

The Manuscript

So there it is in words
 Precise
 And if you read between the lines
 You will find nothing there
 For that is the discipline I ask
 Not more, not less
 Not the world as it is
 Nor ought to be –
 Only the precision
 The skeleton of truth
 I do not dabble in emotion
 Hint at implications
 Evoke the ghosts of old forgotten creeds
 All that is for the preacher
 The hypnotist, therapist and missionary
 They will come after me
 And use the little that I said
 To bait more traps
 For those who cannot bear
 The lonely
 Skeleton
 of Truth

Because Gregory's manuscript did not yet correspond to this aspiration, I could not read it as the poem commands. It has not been possible for me to avoid reading between the lines -- indeed, that has often been the only way I could proceed. Often, too, working within the context of a metalogue, I have deliberately admitted emotion and evocation. In fact, Gregory's own language was often highly evocative. His ambition was to achieve formalism but as he groped and ruminated, he often relied on less rigorous forms of discourse.

The poem is important here, however, not only for what it asserts about method and style, but because it proposes a context for interpretation. In this poem, Gregory was expressing real caution and irritation. A great many people, recognizing that Gregory was critical of certain kinds of materialism, wished him to be a spokesman for an opposite faction, a faction advocating the kind of attention they found comfortable to things excluded by atomistic materialism: God, spirits, ESP, "the ghosts of old forgotten creeds." Gregory was always in the difficult position of saying to his scientific colleagues that they were failing to attend to critically important matters, because of methodological and epistemological premises central to Western science for centuries, and then turning around and saying to his most devoted followers, when they believed they were speaking about these same critically important matters, that the way they were talking was nonsense.

In Gregory's view, neither group was able to talk sense, for nothing sensible could be said about these matters, given the version of the Cartesian separation of mind and matter that has become habitual in Western thought. Again and again he returns to his rejection of this dualism: mind without matter cannot exist; matter without mind can exist but is inaccessible. Transcendent deity is an impossibility. Gregory wanted to continue to speak to both sides of our endemic dualism, wanted indeed to invite them to adopt a *monism*, a unified view of the world that would allow for both scientific precision and systematic attention to notions that scientists often exclude.

As Gregory affirmed in his poem, he had a sense of his thinking as skeletal. This is a double claim: on the one hand, it is a claim of formalism and rigor; on the other hand, it is a claim to deal with fundamentals, with what underlies the proliferation of detail in natural phenomena. However, it was not dry bones that he aspired to outline but the functioning framework of life, life that in the widest sense includes the entire living planet throughout its evolution.

In attempting to rethink these issues, Gregory had arrived at a strategy of redefinition, a strategy of taking words like "Love" or "wisdom," "mind" or "the sacred" -- the words for matters that the nonmaterialists feel are important and that scientists often regard as inaccessible to study -- and redefining them by invoking the conceptual tools of cybernetics. In his writing, technical terms occur side by side with the words of ordinary language, but these less daunting words are often redefined in unfamiliar ways. (A glossary has been provided at the end of the book.)

Inevitably, this attracted several kinds of criticism: criticism from those most committed to the orthodoxy of the meaninglessness of these terms, asserting that they are impermissible in scientific discourse; criticism from those committed to other kinds of religious and philosophical orthodoxy, arguing that these terms already have good, established meanings which Gregory failed to understand and respect; and, finally, the criticism that to use a term in an idiosyncratic way or to give it an idiosyncratic definition is a form of rhetorical dishonesty -- one for which Alice taxed Humpty Dumpty.

In fact, Gregory was endeavoring to do with words like "mind" or "love" what the physicists did with words like *force*, *energy*, or *mass*, even though the juxtaposition of a rigorous definition with fuzzy popular usage can be a continual source of problems. It is a pedagogue's trick, counting on the redefined term to be at once memorable and grounded, to be relevant both to general discourse and matters of value. But what is most important to Gregory is that his understanding of such words as "mind" should be framed in precision, able to coexist with

mathematical formalism.

The central theme of *Mind and Nature* was that evolution is a mental process. This was shorthand for the assertion that evolution is systemic and that the process of evolution shares key characteristics with other systemic processes, including thought. The aggregate of these characteristics provided Gregory with his own definition for the words "mental" and "mind," words that had become virtually taboo in scientific discourse. This allowed him to emphasize what interested him most about thought and evolution, that they are in an important sense analogous: they share a "pattern which connects," so that a concentration on their similarities will lead to significant new insight with regard to each, particularly the way in which each allows for something like anticipation or purpose. The choice of such a word as "mind" is deliberately evocative, reminding the reader of the range of issues proposed by these words in the past and suggesting that these are properly matters for passion.

Similarly, Gregory has found a place to stand and speak of "God," somewhere between those who find the word unusable and those who use it all too often to argue positions that Gregory regarded as untenable. Playfully, he proposed a new name for the deity, but in full seriousness he searched for an understanding of the related but more general term "the sacred," moving gingerly and cautiously onto holy ground, "where angels fear to tread." Given what we know about the biological world (that knowledge that Gregory called "ecology," with considerable cybernetic revision of the usage of this term by members of the contemporary biological profession), and given what we are able to understand about "knowing" (what Gregory called "epistemology," again within a cybernetic framework), he was attempting to clarify what one might mean by "the sacred." Might the concept of the sacred refer to matters intrinsic to description, and thus be recognized as part of "necessity"? And if a viable clarity could be achieved, would it allow important new insight? It seems possible that a mode of knowing that attributes a certain sacredness to the organization of the biological world might be, in some significant sense, more accurate and more appropriate to decision making.

Gregory was quite clear that the matters discussed in *Mind and Nature*, the various ways of looking at the biological world and at thought, were necessary preliminaries to the challenge of this present volume, although they are not fully argued here. In this book he approached a set of questions that were implicit in his work over a very long period, again and again pushed back: not only the question of "the sacred," but also the question of "the aesthetic," and the question of "consciousness."

This was a constellation of issues which, for Gregory, needed to be addressed in order to arrive at a theory of action in the living world, a cybernetic ethics, and it is this that I have listened for above all in his drafts. Imagining himself at the moment of completion, Gregory wrote, "It was still necessary to study the resulting sequences and to state in words the nature of their music." This is necessary still, and can in some measure be attempted, for the implicit waits to be discovered, like a still-unstated theorem in geometry, hidden within the axioms. Between the lines? Perhaps. For Gregory did not have time to make sure that the words were complete.

II. DEFINING THE TASK (GB)

The actual writing of this book has been a research, an exploration step by step into a subject

matter whose overall shape became visible only gradually as coherence emerged and discord was eliminated.

It is easier to say what the book is not about than to define the harmony for which I was searching. It is not about psychology or economics or sociology, except insofar as these are *chiaroscuro* within some larger body of knowledge. It is not exactly about ecology or anthropology. There is the still wider subject called epistemology, which transcends all the others, and it seems that the glimpses of an order higher than that of any of these disciplines have come when I have touched on the *fact* of anthropological and ecological order.

The book, then, is a comparative study of matters that arise from anthropology and local epistemology. As anthropologists we study the ethics of every people and go on from there to study comparative ethics. We try to see the particular and local ethics of each tribe against a background of our knowledge of ethics in other systems. Similarly it is possible, and begins to be fashionable, to study the epistemology of every people, the structures of knowing and the pathways of computation. From this kind of study it is natural to go on to compare the epistemology implicit in one cultural system with that in other systems.

But what is disclosed when comparative ethics and comparative epistemology are set side by side? And when both are combined with economics? And when all is compared with morphogenesis and comparative anatomy?

Such comparison will inevitably drive the investigator back to the elemental details of what is happening. He must make up his mind about the universal *minima* of the overlapping of all these fields of study. The minima are not parts of any one field; they are not parts even of behavioral science at all. They are parts, if you will, of *necessity*. Some are what Saint Augustine called Eternal Verities, others are perhaps what Jung called archetypes. These fundamentals, which must underlie all of our thought, are the subject matter of the next section.

Of course, the anthropologist and the epistemologist, the psychologist and the students of history and economics will all have to deal, each in his or her field of concentration, with every one of these Eternal Verities. But the verities are not the subject matter of any special field and are, indeed, commonly concealed and avoided by the concentration of attention upon the problems proper to each specialized field.

Many before me, aware of these higher levels of order and organization and sense, including Saint Augustine himself, have attempted to share their discoveries with those who came after. There is a vast literature of such sharing. In particular, every one of the great religions has contributed texts to the unraveling of these matters -- or sometimes to their further obfuscation.

Again, many of the contributions of the past have been made within the historically unique context of science, and yet today the intellectual preoccupation with quantity, the artificiality of experiment, and the dualism of Descartes combine to make these matters even more difficult of access than they have been heretofore. Science, for good reason, is impatient of muddled definitions and foggy confusions of logical typing, but in attempting to avoid these dangers, it has precluded discussion of matters of first -- indeed of primary -- importance.

It is, alas, too true, however, that muddleheadedness has helped the human race to find

"God." Today, in any Christian, Buddhist, or Hindu sermon, you are likely to hear the mystic's faith extolled and recommended for reasons that should raise the hackles of any person undrugged and un hypnotized. No doubt the discussion of high orders of regularity in articulate language is difficult, especially for those who are untrained in verbal precision, so they may be forgiven if they take refuge in the cliché "Those who talk don't know, and those who know don't talk." If the cliché were true, it would follow that all the vast and often beautiful mystical literature of Hinduism, Buddhism, Taoism, and Christianity must have been written by persons who did not know what they were writing about.

Be that as it may, I claim no originality, only a certain timeliness. It cannot now be wrong to contribute to this vast literature. I claim not uniqueness but membership in a small minority who believe that there are strong and clear arguments for the *necessity* of the sacred, and that these arguments have their base in an epistemology rooted in improved science and in the obvious. I believe that these arguments are important at the present time of widespread skepticism -- even that they are today as important as the testimony of those whose religious faith is based on inner light and "cosmic" experience. Indeed, the steadfast faith of an Einstein or a Whitehead is worth a thousand sanctimonious utterances from traditional pulpits.

In the Middle Ages, it was characteristic of theologians to attempt a rigor and precision that today characterize only the best science. The *Summa theologica* of Saint Thomas Aquinas was the thirteenth-century equivalent of today's textbooks of cybernetics. Saint Thomas divided all created things into four classes: (a) those which just are -- as stones; (b) those which are and live -- as plants; (c) those which are and live and move -- as animals; and (d) those which are and live and move and think -- as men. He knew no cybernetics and (unlike Augustine) he was no mathematician, but we can immediately recognize here a prefiguring of some classification of entities based upon the number of logical types represented in their self-corrective and recursive loops of adaptation.

Saint Thomas's definition of Deadly Sin is marked with the same latent sophistication. A sin is recognized as "deadly" if its commission promotes further committing of the same sin by others, "*in the manner of a final cause.*" (I note that, according to this definition, participation in an armaments race is among the sins that are deadly.) In fact, the mysterious "final causes" of Aristotle, as interpreted by Saint Thomas, fit right in with what modern cybernetics calls *positive feedback*, providing a first approach to the problems of purpose and causality [especially when causality appears not to flow with the flow of time].

One wonders whether later theology was not in many ways less sophisticated than that of the thirteenth century. It is as if the thought of Descartes (1596-1650), especially the dualism of mind and matter, the *cogito*, and the Cartesian coordinates, were the climax of a long decadence. The Greek belief in final causes was crude and primitive, but it seemingly left the way open for a monistic view of the world, a way that later ages closed and finally buried by the dualistic separation of mind and matter, [which set many important and mysterious phenomena outside of the material sphere that could be studied by science, leaving mind separate from body and God outside of the creation and both ignored by scientific thinking].¹

For me, the Cartesian dualism was a formidable barrier, and it may amuse the reader to be told how I achieved a sort of monism -- the conviction that mind and nature form a necessary unity, in which there is no mind *separate* from body and no god separate from his creation and how, following that, I learned to look with new eyes at the integrated world. That was

not how I was taught to see the world when I began work. The rules then were perfectly clear: in scientific explanation, there should be no use of mind or deity, and there should be no appeal to final causes. All causality should flow with the flow of time, with no effect of the future upon the present or the past. No deity, no teleology, and no mind should be postulated in the universe that was to be explained.

This very simple and rigorous creed was a standard for biology that had dominated the biological scene for 150 years. This particular brand of materialism had become fanatical following the publication of William Paley's *Evidences of Christianity* (in 1794, fifteen years before Lamarck's *Philosophie zoologique* and sixty-five years before *On the Origin of Species*). To mention "mind" or "teleology" or the "inheritance of acquired characters" was heresy in biological circles in the first forty years of the present century. And I am glad I learned that lesson well.

So well that I even wrote an anthropological book, *Naven*,² within the orthodox antiteleological frame, but, of course, the rigorous limitation of the premises had the effect of displaying their inadequacy. It was clear that upon those premises the culture could never be stable but would go into escalating change to its own destruction. That escalation I called *schismogenesis* and I distinguished two principal forms it might take, but I could not in 1936 see any real reason why the culture had survived so long, [or how it could include self-corrective mechanisms that *anticipated* the danger]. Like the early Marxists, I thought that escalating change must always lead to climax and destruction of the status quo.

I was ready then for cybernetics when this epistemology was proposed by Norbert Wiener, Warren McCulloch, and others at the famous Macy Conferences. Because I already had the idea of positive feedback (which I was calling *schismogenesis*), the ideas of self-regulation and negative feedback fell for me immediately into place. I was off and running with paradoxes of purpose and final cause more than half-resolved, and aware that their resolution would require a step beyond the premises within which I had been trained.

In addition, I went to the Cybernetics Conferences with another notion which I had developed during World War II and which turned out to fit with a central idea in the structure of cybernetics. This was the recognition of what I called *deutero-learning*, or learning to learn.³

I had come to understand that "learning to learn" and "learning to deal with and expect a given kind of context for adaptive action" and "character change due to experience" are three synonyms for a single genus of phenomena, which I grouped together under the term *deutero-learning*. This was a first mapping of behavioral phenomena onto a scheme closely related to Bertrand Russell's hierarchy of logical types⁴ and, like the idea of *schismogenesis*, was easily attuned to the cybernetic ideas of the 1940s. [The *Principia* of Russell and Whitehead provided a systematic way of handling logical hierarchies such as the relationship between an item, the class of items to which it belongs, and the class of classes. The application of these ideas to behavior laid the groundwork for thinking about how, in learning, experience is generalized to some class of contexts, and about the way in which some messages modify the meaning of others by labeling them as belonging to particular classes of messages.]

The significance of all this formalization was made more evident in the 1960s by a reading of

Carl Jung's *Seven Sermons to the Dead*, of which the Jungian therapist Jane Wheelwright gave me a copy.⁵ I was at the time writing a draft of what was to be my Korzybski Memorial Lecture⁶ and began to think about the relation between "map" and "territory." Jung's book insisted upon the contrast between *Pleroma*, the crudely physical domain governed only by forces and impacts, and *Creatura*, the domain governed by distinctions and differences. It became abundantly clear that the two sets of concepts match and that there could be no maps in Pleroma, but only in *Creatura*. That which gets from territory to map is news of *difference*, and at that point I recognized that news of difference was a synonym for information.

When this recognition of difference was put together with the clear understanding that *Creatura* was organized into circular trains of causation, like those that had been described by cybernetics, and that it was organized in multiple levels of logical typing, I had a series of ideas all working together to enable me to think systematically about mental process as differentiated from simple physical or mechanistic sequences, without thinking in terms of two separate "substances." My book *Mind and Nature: A Necessary Unity* combined these ideas with the recognition that mental process and biological evolution are necessarily alike in these *Creatural* characteristics.

The mysteries that had challenged biology up to the epoch of cybernetics were, in principle, no longer mysterious, though, of course, much remained to be done. We now had ideas about the general nature of information, purpose, stochastic process, thought, and evolution, so that at that level it was a matter of working out the details of particular cases.

In place of the old mysteries, a new set of challenges emerged. This book is an attempt to outline some of these, [in particular, to explore the way in which, in a nondualistic view of the world, a new concept of the sacred emerges]. It is intended to begin the task of making the new challenges perceptible to the reader and perhaps to give some definition to the new problems. Further than that I do not expect to go. It took the world 2,500 years to resolve the problems that Aristotle proposed and Descartes compounded. The new problems do not appear to be easier to solve than the old, and it seems likely that my fellow scientists will have their work cut out for them for many years to come.

The title of the present book is intended to convey a warning. It seems that every important scientific advance provides tools which look to be just what the applied scientists and engineers had hoped for, and usually these gentry jump in without more ado. Their well-intentioned (but slightly greedy and slightly anxious) efforts usually do as much harm as good, serving at best to make conspicuous the next layer of problems, which must be understood before the applied scientists can be trusted not to do gross damage. Behind *every* scientific advance there is always a matrix, a mother lode of unknowns out of which the new partial answers have been chiseled. But the hungry, overpopulated, sick, ambitious, and competitive world will not wait, we are told, till more is known, but must rush in where angels fear to tread.

I have very little sympathy for these arguments from the world's "need." I notice that those who pander to its needs are often well paid. I distrust the applied scientists' claim that what they do is useful and necessary. I suspect that their impatient enthusiasm for action, their *rarin'-to-go*, is not just a symptom of impatience, nor is it pure buccaneering ambition. I suspect that it covers deep epistemological panic.

¹ Square brackets indicate an insert by MCB. [[Back to text](#)]

² *Naven: A Study of the Culture of a New Guinea Tribe from Three Points of View* (Cambridge, England: Cambridge UP, 1936). 2d ed., with additional "Epilogue 1958" (Stanford, Calif.: Stanford UP, 1958). [[Back to text](#)]

³ See C. Bateson, "Social Planning and the Concept of Deutero-Learning," Steps, 159-76 (Chandler ed.), and elsewhere. [[Back to text](#)]

⁴ Alfred North Whitehead and Bertrand Russell, *Principia Mathematica*, 3 vols., 2d ed. (Cambridge, England: Cambridge UP, 1910-13). [[Back to text](#)]

⁵ Carl Gustav Jung's *Septem Sermones ad Mortuos* was privately published in 1916. There has been a more recent British edition (Stuart and Watkins, 1967), but the work is most accessible as a supplement to some editions of *Memories, Dreams, Reflections*, ed. Aniela Jaffe (New York: Pantheon, 1966 and later editions only). [[Back to text](#)]

⁶ See my essay "Form, Substance and Difference," in Steps, 454-71 (Chandler ed.). [[Back to text](#)]

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