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EXECUTIVE SECRETARIAT

ROUTING SLIP

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Remarks

STAT

D/ Executive Secretary

3 February 1984

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The Director of Central Intelligence

Washington, D.C. 20505

Executive Registry
84- 0176/2

2 February 1984

NOTE FOR: DDI

FROM: DCI

Someone in your shop may be interested in the attached books on parapsychology.

William J. Casey

Attachments:
Three books

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The Director of Central Intelligence

Washington, D.C. 20505

2 February 1984

Dear [redacted] STAT

Thanks very much for sending me the material on parapsychology. We do follow the field and the Soviets put a fair amount of effort into it. Psychobiology is still another frontier which I have not yet scanned but thank you for bringing it to my attention.

On to victory!

Yours,

William J. Casey

[redacted] STAT

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19 JAN 1984

STAT

January 10, 1984

The Honorable William J. Casey, Director
Central Intelligence Agency
Washington, D.C. 20505

Dear Bill:

In the early 1950s a cliché developed in the private foundation field that among many other responsibilities "foundations should be the risk bearers of philanthropy." The A. W. Mellon Educational and Charitable Trust of Pittsburgh [redacted] took this seriously enough that in 1952 it began the support of research being conducted by Professor Robert A. McConnell at the University of Pittsburgh in the field of "Psi Phenomena" which encompasses the controversial areas of extrasensory perception, psychokinesis, precognition, and mental telepathy. Upon dissolution of the Trust in 1980 sufficient funds were allocated to support this work until Dr. McConnell's retirement in June 1984.

STAT

Dr. McConnell is a physicist by training. During World War II he established a reputation in electronics. Rather than continuing in this established and rewarding field, he decided to pioneer in the risky, suspect field of Parapsychology. McConnell believed these phenomena involved a physical force, but how to isolate it, describe it, and reduce it to repeatable experiments?

The culmination of his career labors has been the publication of three books:

1.) Encounters with Parapsychology - 1981

2.) Introduction to Parapsychology in the Context of Science - 1982

3.) Parapsychology and Self-Deception in Science - 1983

In Volume 1 above, page 41, McConnell describes the work of L. L. Vasiliev and Parapsychology in the Soviet Union (1962). I have asked McConnell to send all three books to your office. I realize you have no time to review these but hope your secretary will forward them to the proper scientist in your R & A branch for addition to your Psychology and Parapsychology research materials.

For your reading, however, I have enclosed a photostat of the last chapter in Volume 3 above, page 117, "Parapsychology - The wild card in a stacked deck: A look at the near future of mankind." This is possibly the best brief summation of our current human dilemma I have read. Dr. McConnell first presented it at a lecture at

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Cambridge University in August 1982. Some sentences from Military Predictions: "A new military philosophy will evolve. War will be seen as psychological rather than physical conflict....Supposedly, by armed force one destroys the enemy's will to resist. Thus, military force is a physical tool to achieve a psychological purpose. By the year 2000, it will seem strangely stupid that so blunt and counterproductive a tool could have been used for so long as the primary instrument of war.....The leaders of the industrialized countries will become less concerned with unusable weapons of mass destruction and more interested in psychological warfare.....The next frontier of science is psychobiology."

I hope it is not too late to wish you a New Year of victories.

Sincerely,

STAT

enclosure

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PARAPSYCHOLOGY THE WILD CARD IN A STACKED DECK: A LOOK AT THE NEAR FUTURE OF MANKIND

R. A. McConnell

Foreword

This paper was prepared for delivery in shortened form as an invited lecture at the August, 1982, combined celebration at Cambridge University of the one-hundredth anniversary of the Society for Psychical Research and the twenty-fifth anniversary of the Parapsychological Association.

In this paper I attempt an informal synthesis of a range of topics, each one of which is complex and controversial, and all of which, taken together, will largely determine the course of history. For brevity, I use examples coupled to generalizations and I ignore ecological problems, such as species extinction and ocean pollution, whose effects will not be seriously felt before 2000 A.D. What I offer is not authoritative opinion but an invitation to the reader to ask questions and to think for himself.*

Introduction

It is well known to my fellow parapsychologists that I am without discernible psychic ability. When I enter the laboratory front door, psi phenomena† hustle out the back. Occasionally, I have caught them peering curiously at me through a window when they thought I was not watching, but I must say that ours has not been a very satisfying relationship for a physicist trained in engineering electronics.

Hence, although I speak to you today as one who is fully convinced—by his own experiments and by the observations of others—that psi phenomena do occur, I want to assure you that the predictions I shall offer do not depend upon psychic precognition but upon logical inference.

One can measure the courage of a futurist by the length of his reach. I shall talk about this decade and the next, which will carry

*As a compact introduction to the physical constraints upon our future, I suggest W.J. Davis *The Seventh Year: Industrial Civilization in Transition*. (W.W. Norton, 1979)

†Extrasensory perception and psychokinesis.

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us to the end of the twentieth century. I believe that what occurs in these few years will be as momentous as all that has happened in the 400 years since Queen Elizabeth the First. So steep is the curve of history that, if parapsychology is not dominant by the year 2000, it may disappear forever as a science. These are two of many surprising conclusions that I reached while preparing this lecture.

I shall begin by reviewing some of the certainties of the next 18 years, with which most of you, I am sure, are already familiar.

Energy Principles

Energy is not the only determinant of man's future, but it is pivotal, as I shall briefly explain. Energy is the capacity for doing work. Controlled energy moves ourselves and our cars; heats and lights our homes; digs and processes ores; creates steel, aluminum, plastics, and glass; runs our factories; makes the fertilizer for our fields; and plants and harvests our crops. Energy, flowing freely in nature, determines our climate and supports plant and animal life.

Energetic systems obey the inexorable laws of thermodynamics. Hence, an understanding of physical science is essential for knowing what in the future is inevitable and what might be avoided. In the final analysis, it is these laws upon which most of my predictions are based and that give those predictions their measure of certainty. The first law of thermodynamics says that energy and mass can be stored and transformed but not created. The second says that there is a natural tendency toward chaos, so that order in one place can be achieved only at the expense of disorder somewhere else.

There are three ultimate sources of energy on the earth: geothermal, nuclear, and solar. Controlled leakage of heat from the earth's core will supply less than one percent of expected energy needs in the year 2000 and, hence, for many purposes, can be ignored. Nuclear energy, recently liberated by man, offers special problems and special opportunities, some of which I shall mention later. In the past, and for the future, the sun has been, and will remain, our principal source of energy.

Of solar energy currently incident upon the earth:[1]

30% is reflected back to space.

47% is absorbed and appears only as heat.

23% maintains the water evaporation cycle.

2/10 of one percent moves the wind and the waves.

A mere 2/100 of one percent goes into photosynthesis, which created fossil fuels and makes possible most plant and animal life.

1. (Notes start on page 141).

Energy Resources

Where do the industrialized countries of the world get their energy? About 92% comes from the fossil fuels: coal, gas, and oil. Only 5% comes from renewable sources: water, wind, and wood. About 3% comes from nuclear fission.

One thing is certain. We cannot continue indefinitely to use fossil fuels at our present rate. This is shown in Figure 1, which portrays the rate of fossil fuel production, worldwide, throughout the history of man. Each mark on the x-axis is one thousand years. At a glance it can be seen that we are living in a very special age that can neither continue nor repeat. We are near the beginning of a rise in fossil energy production that started 250 years ago and that could reach its peak in another 150. This curve assumes that we shall shift emphasis from oil and gas to coal without restriction within the next 50 years. For reasons to be mentioned later, I do not think that will happen. Instead, the production of fossil fuels may peak early in the next century.

To understand the nature of the energy situation, we should look closely at the curve of Figure 1, which has the typical shape for the production of any nonrenewable resource. At its beginning, such a

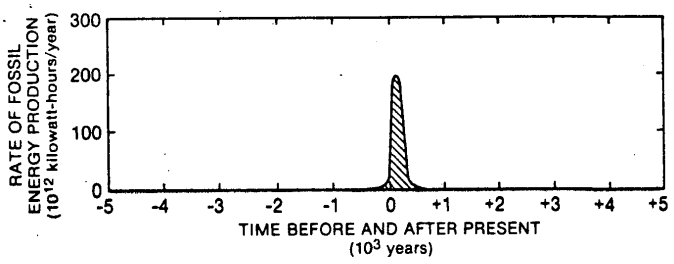

Figure 1. Fossil fuel production throughout history. (M. King Hubbert. *U.S. Energy Resources: A Review as of 1972.*)

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curve rises more or less exponentially because of positive feedback. Eventually, any exhaustible resource becomes scarce, the cost of production increases, and the amount of production peaks and then falls away. As it melts toward zero, the production curve for a nonrenewable resource may become negatively exponential. Regardless of its exact shape, the area under the curve represents the total recoverable resource, whether it be oil, coal, or copper.

If we want to predict the future production of any important raw material taken from the earth, the first thing we might ask to know is the year of peak production. Is it still ahead, or have we passed it? The second thing to know is how fast the curve is rising or falling.

In the last 20 years geologists have developed approximate ideas about the production curves for many natural resources. Consider fossil fuel production as shown in Table 1. Oil production in the 48 United States reached its peak about 1970. Worldwide, oil production will peak about 1995. The largest fraction of the world's energy still comes from oil. It is evident that this fuel will be desperately short from now on.

Gas is an ideal fuel for almost every purpose but moving vehicles. At our present rate of consumption, there seems to be enough of it to carry us into the next century.

For the longer run, there is coal, together with oil shale and tar sands. Unfortunately, the extraction of these solid fossil fuels creates wastelands and uses vast quantities of fresh water, which is in short supply. In addition, it is now evident that the burning of hydrocarbon fuel is increasing the carbon dioxide in the earth's atmosphere by a measurable amount each year. I shall discuss that later.

What are the prospects for nuclear fission, for which there are still abundant uranium reserves? The physical barriers to the further development of fission power would seem to be capital and operating costs and difficulties in handling and storing radioactive materials. Most technically sophisticated scientists now agree that nuclear fission is a scientific success but an engineering nightmare and that it must be abandoned as quickly as possible. Even the bravest now doubt that the Devil can deliver on His half of our Faustian bargain.

Nuclear fusion and nuclear fission have quite different prospects. Fusion is, in fact, the only long-range hope we have for a future, energy-rich civilization, but it is not yet known whether it will be technically and economically feasible. In any case, fusion cannot

Table 1
Fossil Fuel Production
(Speculative)

	U.S.A.		Remainder of Industrial World	
	Peak Year	Fraction of Total Energy (1970)	Peak Year	Fraction of Total Energy (1970)
Oil	1970	44%	1995	62%
Gas	1990	33%	2015	5%
Coal	2050	18%	2100	28%

make an important contribution to world energy consumption until well into the twenty-first century. It will be of no help in the next 18 years.

The two most promising energy sources today are conservation and the rays from the sun. Together with fusion (if it becomes practicable), these sources might form a satisfactory basis for a technological civilization reaching into the indefinite future.

If the long-range energy prospect is not hopeless, you might be tempted erroneously to assume that energy problems will not be very important in the next 18 years. Social tensions are created by the difference between expectations and realizations. Expectations arise based on past experiences and upon observation of what others have achieved. A forced shifting to new energy sources and the resulting general but unequal decline in standard of living can be expected to result in great differences between the expectations and realizations in large segments of society and to cause, in turn, profound and ubiquitous social unrest.

Food Production

As shown in Table 2, the only grain exporting countries of any consequence are the United States, Canada, Australia, and New Zealand. Before World War II, all main areas of the world except western Europe were self-sufficient in food. Today, largely because of population growth, over 100 countries depend upon North American grain. Judging from the trend shown between 1970 and 1980, what will the situation be ten years from now?

To answer that question, let us ask another. How do Canada and

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Table 2
ANNUAL WORLD EXPORTS (+) AND IMPORTS (−) OF GRAIN IN MILLIONS OF METRIC TONS.
(L.R. Brown, *Science*, *214*, 998 [27-November 1981)

	1934 to 1938	1970	1980
North America	+5	+56	+131
Latin America	+9	+4	−10
Western Europe	−24	−30	−16
Eastern Europe and USSR	+5	0	−46
Africa	+1	−5	−15
Asia	+2	−37	−63
Australia and New Zealand	+3	+12	+19

the United States produce so much grain? The answer lies in their possession of four major advantages:

1. Great areas of flat land with fertile soil, matched nowhere else on earth.
2. A long growing season with adequate precipitation. That is what the Soviet Union does not have.
3. Farm machinery and the ability to maintain it.
4. Fertilizer and gasoline.

The last two items depend upon energy. Before 1910, farms were without electricity and gasoline. Consequently, fuel and fertilizer energy input was close to zero. Today, in the United States, it takes 10 calories of outside energy to produce one food calorie.[3] That 9-calorie subsidy has been coming from fossil fuels, which will be more expensive in the future.

This situation can be summed up in one sentence. We have come to the end of the agricultural revolution. Those who look to a second "Green Revolution" for salvation are almost certain to be disappointed. All of the grain hybrids so far developed require energy-intensive cultivation.[4]

LAND FOR FOOD

Energy cost will not be the only factor limiting future food production. Over the last 20 years, worldwide, the net land under cultivation has been increasing at an average rate of one-half of one percent a year. Now that cheap energy for clearing land and

for irrigation is gone, the rate of increase is dropping fast. There is much unused land, but most of it is poor for farming.[5]

Up to now, 10% of all arable land in the U.S.A. has been lost by urbanization. In Florida, which produces half of the world's grapefruit and one-quarter of the world's oranges, all prime farmland will be devoted to other purposes by the year 2000 if present trends continue.[6]

Meanwhile, arable land over most of the U.S.A. is being degraded by overuse, by salinization and waterlogging from irrigation, by wind and water erosion, by chemical fertilization, and by strip mining. It has been estimated that one-third of the top soil of U.S. croplands has been lost by erosion.[7]

In croplands the world over, the depth of topsoil is usually less than 25 centimeters to start with. New topsoil forms by natural processes at a rate of perhaps 1.5 tons per year per acre. Acceptable rates of erosion range from 1 to 5 tons per acre per year. In a 14-year Missouri experiment, land planted sequentially to corn, wheat, and clover lost an average of 3 tons per acre per year through erosion; while for comparable land, planted continuously in corn, the loss to erosion was 20 tons per acre per year.[8]

Crop rotation is no longer practiced on most large farms in the United States. In southern Iowa, for example, the cost of reducing topsoil loss to acceptable levels was found to be three times the short-term benefit of ignoring erosion. Farmers, acting individually, cannot afford to save their land.[9]

In nonindustrialized countries, as the population density rises, land is degraded by various mechanisms that generally proceed by positive feedback to total desolation. If present trends continue, by the year 2000 "desertification" by over-grazing will have claimed additional pastureland equivalent to a square 3000 kilometers on a side.[10]

For reasons such as these it seems certain that the land available for growing food will increase only a little by the year 2000 and that its average productivity will have decreased.

WATER

Much has been printed about the worldwide depletion and contamination of fresh water supplies. I shall confine my illustrational comment to the U.S.A.

Underground water stored in past geological ages currently supplies 50% of U.S. drinking water and 20% of all fresh water needs.

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In west Texas the latter figure rises to 75%. As a result of ground water withdrawal in excess of its natural replacement rate, many areas of the United States are suffering from salt water intrusion, surface subsidence, or simply a disappearing water table. In some areas of California where ten years ago water was available at 20 feet, it must now be pumped from 1800 feet.[11]

In 32 counties of the west Texas High Plains where 6 million acres are watered from 70,000 wells, it is projected that irrigation will largely cease by 1995 owing to increasing energy costs and falling water levels. Thereafter, the land will be useful only for dryland farming.[12]

Contamination of both underground and surface water is a problem of growing severity. The dumping of industrial wastes into rivers and lakes in the United States has affected wildlife and in some cases rendered surface water unfit for human consumption. The chief poisonous chemicals have been mercury, insecticides, and chlorinated hydrocarbons. Phosphorus from fertilizer runoff and sewage, including detergents, is destroying lakes by eutrophication.[13]

Ignitable, corrosive, reactive, or toxic liquid wastes are produced in the U.S.A. at the rate of 35 to 50 million metric tons per year. For the most part, this waste is injected into abandoned wells or stored above ground. In either case, in time, much of it enters the underlying aquifers. There are 25,700 industrial liquid-waste impoundment sites in the United States, of which an estimated 50% contain hazardous chemicals and 70% are without lining. Concentrated chemical wastes too hazardous to be disposed of by leaking into streams, by injection into wells, or by open storage, have been loaded into steel barrels and left to rust unattended on vacant land. In one site in Kentucky 100,000 drums were found to have been dumped in a 17-acre field by one waste-disposal company.[14]

Because of industrial wastes, most of the states east of the Mississippi River and some to the west have major problems with ground water contamination. On Long Island, New York, dangerous levels of organic chemicals forced the closing of 36 wells supplying two million people. In San Gabriel Valley, California, it was necessary to close 39 wells supplying domestic water to 400,000 people. The extent of the water contamination problem is unknown and discovery is often only by accident, because some of the most dangerous chemicals are tasteless even at admittedly toxic levels.[15]

These excerpts from the fresh-water conservation literature suggest that before the year 2000, because of overuse and contamination, water for agricultural, industrial, and domestic purposes will become a major economic concern in large areas of the U.S.A. where heretofore it has been regarded as in unlimited supply. The rising real cost of water will contribute significantly to our falling standard of living.

Acid Rain

Industrial air pollution only ten years ago was regarded as a local problem to be solved by high smokestacks and windy weather. Now we have discovered that sulfur and nitrogen emissions from high stacks can affect areas a thousand kilometers away. Acid rain from coal burning power plants in the Ohio River valley is damaging forests and lakes in New England and Canada.[16]

The Adirondack Mountains of New York State have 217 sizeable lakes. In the 1930s the acidity of these lakes ranged in pH mostly from 6 to 9 and only 4% had a pH of less than 5. By 1975, 51% of all lakes showed a pH of less than 5, and 46% were devoid of fish.[17] In Sweden, 15,000 lakes are now fishless due to acid rain.[18]

By the year 2000, either conditions downwind from industrial areas will be much worse than they are now or methods of controlling noxious emissions from power and chemical plants will have substantially raised the cost of living.[19]

Carbon Dioxide

It is now certain that the carbon dioxide content of the atmosphere of the earth is increasing as a result of the burning of fossil fuels. In the last 20 years carbon dioxide in the atmosphere has risen worldwide at the rate of one-quarter of one percent per year.[20]

A substantial body of expert opinion predicts that this carbon dioxide increase will raise the earth's temperature because of a "greenhouse" effect in the upper atmosphere. A typical estimate for the rise in temperature by the end of the century is 1° Centigrade on the average, and 3° or 4° in the polar regions. Thereafter, if this warming continues, the Arctic ice pack will melt—perhaps sometime in the next century. It is believed that such melting will be irreversible because, with a decreasing albedo, more of the sun's rays will be absorbed in the Arctic areas, thus providing positive feedback for further temperature rise.[21]

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If the Arctic ice pack melts, there will be major worldwide changes in temperature and rain patterns because of the loss of weather-driving power in the polar-tropical heat engine. In my own thinking, I assign a probability of 0.8 to the proposition that most of our coal reserves can never be used without precipitating a world catastrophe.

Forests

Forests are usually thought of as useful to man as sources of lumber and fuel, but they are even more important in their ecological function. Particularly in the tropics, where rains can be seasonal and torrential, forests slow the flow of water, thereby preventing floods and the loss of soil and providing dry-season irrigation. The cutting of forests is the first step in the destruction of the river systems that they feed.

One-fifth of the world's land surface is now covered by dense forests. Between now and 2000 A.D., industrialized countries are projected to lose only a little of their forests. Nonindustrialized countries, however, will lose 40% of what they now have as they clear the land for fuel and farming.[22]

One example of the problem can be studied in the Himalayan watershed. About 500 million people in India, Pakistan, and Bangladesh live in the alluvial valleys fed from the Himalayan highlands. The Himalayan forests control the monsoon floods and make life possible in the lower valleys. However, the mountain people are increasing in number by 2% a year. They see no choice but to cut down the forests to allow food planting and animal grazing, thereby slowly converting forest ecosystems into alpine barrens. Meanwhile, downstream, where the bulk of the people live, the effects are alternate flooding and lowering of the water table, and the silting of reservoirs. As a result, the once rich alluvial plains are losing their productivity even while their populations are continuing to grow. It is an unfolding tragedy from which no escape is foreseen.[23]

Prodigality's End

Is the future really as bleak as I have painted it? Are those of us who love technology completely out of place from now on?

Let us suppose that nuclear fusion can provide us with all the energy we need, and that we abandon carbonaceous fuels and drive our vehicles with hydrogen made from water. Can we continue as an industrial civilization?

Table 3
U.S.A. Depletion Parameters for Some Important Metal Ores.

(Data are by R. A. Arndt and L. D. Roper as reported in L. D. Roper: *Where Have All the Metals Gone?* Blacksburg, Virginia: University Publications, 1976.)

	Half-gone Date	Gone by 2000 A.D.
Gold	1916	95%
Lead	1958	70%
Mercury	1916	80%
Platinum	1941	90%
Silver	1938	80%
Zinc	1968	70%
Aluminum	1966–1986	60–90%
Iron	1962–2021	40–80%
Nickel	1972–2010	40–85%
Tungsten	1962–1981	65–95%

For the answer to that question let us look at the United States reserves of some of the metals that are needed for a technological way of life. At the top of Table 3, I have shown some highly depleted metal ores about which we have relatively precise knowledge. At the bottom, are moderately depleted ores for which we cannot yet make accurate predictions.

Even though United States metal ores are largely gone, severe worldwide metal shortages will not occur until the next century. The immediate importance of these impending shortages is that they signal a time of change. The price of metals is rising sharply, both because rich ores are becoming scarce and because the energy to extract them is rising in cost. As the real price of metals rises for the industrial world, our standard of living must fall.

Physically speaking, industrial civilization represents order in a chaotic world. To maintain that order, the second law of thermodynamics requires a continuous input of high-temperature energy and low-entropy raw materials. Our roads would be gone in ten years if they were not constantly repaired with asphalt, which is a byproduct of oil and coal. At present rates, the average United

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States citizen consumes 20,000 times his own weight of raw materials in his lifetime—excluding food and water.[24] One hundred years ago consumption was less than one-tenth as great. We have, in the vernacular of the farmer, been living high on the hog. All too soon, we shall be down to the feet and tail.

What I have tried to convey so far are three ideas:

1. The earth's capacity to produce food will be about the same in the year 2000 as it is today. Thereafter, food production will decline through degradation of the land and a shortage of water.
2. The real costs of the material things it takes to run an industrial civilization are escalating, with no end in sight. Real costs (as opposed to paper-money costs) bear an inverse relationship to standard of living.[25]
3. What Lord Clark called the Age of Heroic Materialism will soon be over.[26] We must prepare for a future totally different from the present.

In this paper up to now, I have pictured the physical constraints under which we shall exist in the year 2000. I have said nothing yet about people—how they will live and what use they might have for parapsychology.

Population

The accompanying Figure 2 shows the relative rates of population growth for the industrialized and nonindustrialized countries of the world. If these rates are sustained to the year 2000, the world's population will be one-third larger than in 1982 and will be growing at the rate of 100 million per year. Ninety percent of this projected growth will be in the poorest nations. At present, the nonindustrialized population is larger than the industrialized by 3 to 1. By 2000 A.D., this ratio will be 4 to 1.

These projections from the U.S. Census Bureau are optimistic in that they assume that food production can be increased by the use of fertilizer, mechanization, and pesticides, regardless of cost, and they neglect altogether the possibility of worldwide political disorder.

My own more pessimistic expectation is that the world population in 2000 A.D. will be less than projected by at least a half billion as the result of mass starvation and associated disease. I shall return to this question later.

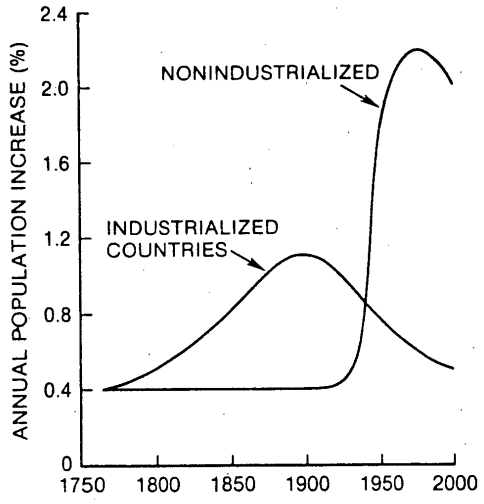

Figure 2. Trends of population growth in the industrialized and nonindustrialized countries. The rate rise in the industrialized population began with the invention of the steam engine. The rate rise of the nonindustrialized population began shortly after World War I, when the Rockefeller Foundation began its distribution of white man's medicine among primitive people. (Projections are from the U.S. Bureau of Census and assume no mass starvation.)

Money

A dear friend, who is a professional ecologist, expressed regret that I planned to include in this paper a discussion of financial relations between industrialized and nonindustrialized countries. "Money," he said, "is really a meaningless term when you are talking about species survival. The introduction of this highly disputable discourse on monetary policy weakens the total effect by raising issues that can only obscure the point you have made so well."

This comment challenged me to explain in a few words why I believe that consideration of international finance is essential for an understanding of the world situation. I said to him:

I am not discussing "species survival," but human survival.

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Homo sapiens differs from other species by engaging in complex symbolic communication. The present crisis, whatever else it may be, is obviously economic. The "symbol" used in economic communication is money.

Money is a tool for distributing the right to consume, for rewarding productivity, for encouraging the creation or consumption of capital, and for binding the past to the future. Money is an integral element of civilization and can often be more important than military power in determining who will do what to whom.

According to textbook economic theory, the money managers in a so-called free-economy can choose between full employment or monetary inflation, or can perhaps find a politically acceptable compromise with a little of both. That may have been true when energy and raw materials were cheap. No politician today dares to say what is obvious: From now on, except for brief interludes, we shall have both high unemployment and rapid inflation regardless of the party in power. This portentous situation would exist even if we were not trying to keep some of the nonindustrialized countries financially afloat. As it is, their deepening misery will contribute to our own.

The bankruptcy of a nation, although never publicly announced, occurs, in fact, when a nation can no longer pay interest and principal as they fall due. When that happens, the debtor nation takes out a new loan to replace the old. This is called "rescheduling" the debt.

Iran, Nicaragua, Peru, Turkey, and Zaire have passed into bankruptcy in the last five years. Bolivia, Brazil, Chile, Colombia, Egypt, Mexico, the Philippines, South Korea, and Thailand (as well as several East European countries) will suffer bankruptcy before 1990.

By what magic are such countries able to borrow more money? In the past, money was often lent by one sovereign country directly to another, but that had unsavory political implications. Today, wealthy nations may make outright gifts to the World Bank and to political allies, but the bulk of the new money needed to sustain nearly bankrupt countries is coming from private banks at unrealistically low interest rates.

Why would a banker lend money to a potentially bankrupt country? The answer comes in two parts. First, bankers expect that monetary inflation will allow such countries to pay their debts in depreciated currency. It is hoped that conditions will improve

enough so that by the year 2000 even the poorest countries will be able to repay what they owe if they can do it with ten-cent dollars.

Secondly, if anything goes wrong in the meantime, these banks know that their home countries will bail them out, either directly or through the International Monetary Fund. If Lockheed, Chrysler, and New York City were too big to be allowed to fail, so are Bank of America and Chase Manhattan.

The United States Federal Reserve Board has already tacitly agreed to save any large bank that is in trouble because of loans to nonindustrialized countries. Just before the Monetary Control Act of 1980 was passed, a joint committee of the U.S. Congress surreptitiously added the "obligations of . . . a foreign government or agency thereof" to the list of assets that Federal Reserve Banks may purchase from a private bank that is in danger of collapse.

In case you are wondering what motivates a banker to make bad deals with his depositor's money, the answer is not far to seek. On every promise to be repaid at a distant time in cheaper dollars, the bank takes its profit in present-day dollars.

As time goes on, it becomes increasingly clear that most of the nonindustrialized countries lack the cultural or genetic heritage needed to profit by the capital they have borrowed in attempting to industrialize themselves. In any case, they are now trapped forever behind the closed door of the Age of Cheap Energy. It is absurd to pretend that they can repay their principal indebtedness except at confiscatory discounts.

Under present policy, the debts of the nonindustrialized countries will eventually be paid by the citizens of the industrialized countries by the device of printing paper money. Meanwhile, the banks cannot lose. This arrangement can most kindly be called "collusive self-deception among bankers, economists, and politicians." Whether this is good or bad, I leave to you to decide. Its success depends upon its concealment from the voters, which is patently undemocratic and deceitful.

Competence

For many generations human knowledge has been growing quasi-exponentially, i.e., at a rate more or less proportional to existing knowledge. This fact and the availability of cheap energy have increased productivity and allowed the trade union worker to demand an ever rising material standard of living as his just due, while working ever fewer hours per week.

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The one thing most certain about exponential growth is that it must end. In the last ten years the curve of human knowledge has left the exponential track. To predict the future of science and technology, it would help to know why it took man so long to learn what little he knows and why the further growth of knowledge is faltering just when it is needed most.

The answer lies in the inadequacy of the human brain. If one thousand of the greatest scientists of the past had never lived, our energy-consuming culture would not exist. Their genius made possible an industrial civilization that is too complex for the majority of our citizens to understand. Now that this civilization is in trouble, its voting members have neither the competence nor moral courage needed to guide it upward—or so it appears in 1982.

Much of the remainder of my paper will be concerned with these two qualities: competence and moral courage; for they will determine not only what happens to the curve of scientific knowledge but also how the human experiment will end.

Competence is directly a matter of the brain and its body. Moral courage is a matter of the spirit. The discouraging fact—at least in America as I see it—is that both body and soul are being degraded rather than enhanced in this time of crisis.

As a consequence of both biological and spiritual factors, I believe that, even if by some good fortune we avoid nuclear war, the curve of human knowledge will have reversed its curvature by the year 2000. Here are some falling leaves that show which way the wind is blowing.

As most of you know, admission to United States universities is heavily dependent upon "Scholastic Aptitude Tests," administered nationwide to high school seniors by the Educational Testing Service of Princeton, New Jersey. These examinations are constructed and stabilized so that they provide a standard of scholastic achievement that has been unchanged for 30 years. The scores from these tests have a mean value in the vicinity of 500 and a standard deviation of roughly 100.

It is well known that the nationwide performance on these tests has been falling since 1963. I shall focus upon the eight-year period, 1972–1980, when the average score fell 29 points to reach 424 on the verbal test and fell 18 points to become 466 on the mathematical test. I have chosen these eight years for attention because the number of students taking the tests and the average socioeconomic status of U.S. high school students changed very little in that period.

This drop in scores was investigated by a blue-ribbon panel of educators and statistical experts. Their report[27] concluded that the drop reflected a serious decrease in scholastic skills that was primarily cultural and not directly genetic in cause. They suggested a variety of possible causal mechanisms, but they were unable to assess quantitatively any of them.[28] I believe that most of the probable causes of this score decline can be subsumed under the heading "moral degradation," a term that I shall define later.

Such a drop in the quality of training of our future leaders must lead to lowered productivity in science, business, and government and hence, contribute to a fall in our standard of living. To sharpen your thinking on this matter, you may care to reflect on the fact that in this eight-year period the number of students with verbal scores over 650 dropped 46%.

There is another downward trend in the quality of the American people that is somewhat slower but even more serious, namely, that caused by the difference in fertility between the upper and lower socioeconomic classes.

As shown by Arthur R. Jensen, 70 to 80% of the variance of the Stanford-Binet intelligence of the Caucasian population of the U.S.A. is of genetic origin.[29] The heritability of intelligence in other racial groups is unknown but presumably not much different. Social-class differential fertility is important because, between physicians and manual laborers, for example, there is a spread of roughly 40 IQ points, or 2.5 standard deviations.

The capacity for abstract thinking measured by the Stanford-Binet is not the only important personality trait, but it is crucial in an industrial civilization—and it is something that can be quantified with reasonable accuracy. Although the evidence is not always easy to examine, every other important human trait—and many, such as skin color, that are unimportant—are also largely determined by our genes. To argue otherwise is to deny Mendel and Darwin.

Geneticist William Shockley, a most unjustly vilified man with a profound concern for the suffering poor, has pointed out that in the 1970 United States census, Negroid rural farm women had on the average 5.4 children, while Negroid women college graduates had 1.9 children—a ratio of nearly 3 to 1. A similar differential fertility exists between lower- and upper-class Caucasian women.

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At the present time, 10 to 20% of Americans are so genetically impoverished that they are permanently unemployable in our complex civilization. This is partially concealed by the fact that, when unemployables cease looking for work, they no longer appear in employment statistics. These hopeless cases congregate largely in the cities. Welfare payments rob them of self-respect. They are growing in numbers. A similar problem exists in every industrialized country. As things are going now, long before 2000 A.D., this alienated subpopulation will tear our civilization apart.

In my opinion, current events compel the conclusion that even the leadership class of Western civilization is genetically inadequate for the task created by its geniuses. If we continue our present dysgenic policy of selective breeding of the poor, what will the outcome be?

Morality

How the people of the industrialized countries will behave from now until 2000 A.D. is predictable from their current behavior. I have suggested that the deterioration of high school scholastic performance in the U.S.A. indicates moral degradation. By moral degradation I mean a shift of emphasis from the reality principle to the pleasure principle. This includes shifts from temperance to profligacy, from providence to prodigality, from diligence to laziness, and from discrimination to promiscuity.

The signs of moral decay are everywhere in American society: in the brutalization of mass entertainment, in the growth of the narcotic trade, in the increase in violent crime, and—worst of all—in the dereliction of duty within the professions.

Only heinous and bizarre crimes are still reported in big-city newspapers. If you live, as I do, in a middle-class neighborhood in a relatively low-crime city, you can estimate what is happening by extrapolating from the street holdups, purse snatchings, car thefts, and house break-ins that have occurred within shouting distance of your own home over the past year. No one walks alone at night. If you do not have a gun in your house, you are grateful that most of your neighbors do.

It was not like this 50 years ago, but I do not think that people are inherently more wicked today. Rather, they have lost their fear of the law, their self-respect, and the religious beliefs that guided their grandparents. As a civilization, we have lost our values and are in a process of dissolution.

Starvation

The widely acclaimed *Global 2000 Report to the President*[30] appeared in 1980 as a 1200-page, 3-volume, cooperative study prepared by 13 agencies of the Executive Branch of the United States Government on the topics of population, natural resources, and environmental conditions in the year 2000. As stated on page 1 of volume 1 of that report, although world population will be larger by two and a quarter billion than it was in 1975, there will be no starvation.

I call this the miracle of the loaves and fishes. Let me explain how it is done—first the fishes. The following quotation is from page 7 of volume 1 of the *Report:*

> The Global 2000 Study food [sector] projections [2, 89] assume that the catch from traditional fisheries will increase as fast as world population; while the fisheries [sector] projections indicate that this harvest will not increase over present levels on a sustainable basis [2, 105].

Thus, by bureaucratic legerdemain, the miracle is accomplished. Let us go on to the problem of grain production.

Because it was known that the earth's arable land can increase by only 4% by the year 2000,[31] the miracle of the loaves was performed by increasing the yield per acre. Figure 3, from the *Global 2000 Report,* reveals the gimmick—which, as you can see, is a drafting tool called a straight edge.

On the y-axis, plot metric tons of grain per hectare. On the x-axis, plot time from 1960 to 2000. Up to 1977, plot the actual yields. Then lay down the straight edge and—*Voilà!*—the pen mightier than the plowshare. The farmer will pour out more fertilizer, pesticides, water, and fuel oil, while the plant geneticist will foment another Green Revolution, back-to-back with the first.

This linear extrapolation is wholly without supporting evidence. In light of the environmental and human limitations I have just discussed, it seems likely that, instead of rising gloriously to meet the 21st century, this grain fertility curve is about to level off and perhaps dive downward.

My expectation is that there will be mass starvation in many of the nonindustrialized countries. It has already begun in sub-Saharan Africa and in Bangladesh. It is reasonable to suppose that there will be more than 500 million premature deaths by starvation before the year 2000. At least one in four of those extra mouths is not going to be fed.[32]

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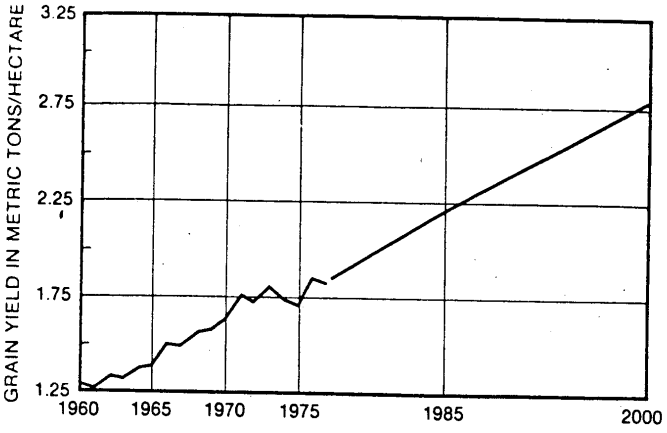

Figure 3. World grain production per hectare of land under cultivation, past and as projected to prevent mass starvation. (*Global 2000 Report,* Volume 1, Page 8.)

The prospect of the starvation of 500 million people in 18 years is hard to grasp. We cannot imagine 500 million countable objects, and most of us have never been hungry enough to imagine the details of death by starvation. What seems certain is that these deaths are unavoidable. Nothing we can do as individuals will make a difference, and, as a civilization, we do not seem to care.

I do not wish to belabor this point. I did not come to Cambridge to deliver a sermon. Lower mammals by the millions die of starvation every year on this earth. That is nature's way, and we care not a whit. Why should we feel differently about human deaths? That is a question of some interest to which I shall return later.

Political Predictions

Against this background, I offer the following predictions for the next 18 years:

Political terrorism, monetary inflation, unemployment, theft, rape, arson, murder, and riots by the poor will increasingly dominate life in Europe and the United States.

Starvation and disease will dominate life in the nonindustrialized countries that are without oil reserves.

Europe will become dependent upon natural gas from the USSR and, as a result, will lose its political independence while providing the high technology that the Soviet Union, as a totalitarian bureaucracy, cannot produce for itself.

The Soviet Union will become internally unstable as the people of the Russian Soviet Republic are increasingly outnumbered by the other Soviet Republics. This is already a matter of prime concern to the Soviet ruling elite.

Because of its cultural heritage and the nature of its centralized political power, the international behavior of the Soviet Union will be more unpredictable than that of any other country of importance.

China, because of its isolation, can be expected to try peacefully to solve its own problems.

Small wars and the threat of total war will be constantly present.

Democracy as we know it, will disappear everywhere except in Australia, New Zealand, and possibly in some of the Scandinavian countries.

The nonindustrialized nations without oil reserves will remain as politically impotent as they are today.

When it is realized that their problems are unsolvable, starvation in the nonindustrialized countries will be ignored except as it affects the industrialized world.

Starvation will lead to mass migrations. One of the most important political problems faced by the U.S.A. will be the uncontrolled illegal immigration of aliens. Already today, in extended commercial areas of Los Angeles, San Antonio, Miami, and New York City, one hears no spoken English.

Scientists will search for a suitable chemical contraceptive for incorporation into the food given to those countries that have not controlled their numbers.

The major internal tensions in Europe and the United States will be between the "haves" and the "have-nots," i.e., between the smart and the stupid. An increasingly technological civilization will place an increasing premium upon intelligence. The economic gap between the competent and the incompetent will continue to grow despite government transfers of wealth to the genetically disadvantaged.

Military Predictions

As the interdependence of the industrialized countries increases and as class struggle intensifies, the distinction between external

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and internal foes will become less clear. Armies will become police forces. Anarchy, rather than international war, will be most feared. It will be increasingly recognized that an industrial nation's internal troubles are always psychological, whatever else they may be.

A new military philosophy will evolve. War will be seen as psychological rather than physical conflict. After World War II, the British, French, and Dutch empires were dismantled, not by military force, but by psychological warfare waged by culturally inferior societies. Ayatollah Khomeini tried to explain this to the American people, but we are slow learners.

The object of war is not the destruction of economic wealth but the subjugation of people and the imposition of exploitative trade relations. In the coming Age of World Poverty, trade will be increasingly coercive. Imperialism, or slavery at a distance, may occasionally require the systematic eradication of those cultural elements in satellite lands that cannot be psychologically subdued. Counterforce may be needed to destroy concentrations of military power borrowed from industrialized countries by demagogues in poor countries. However, the use of military force is only indirectly related to the objective of war. Supposedly, by armed force one destroys the enemy's will to resist. Thus, military force is a physical tool to achieve a psychological purpose. By the year 2000, it will seem strangely stupid that so blunt and counterproductive a tool could have been used for so long as the primary instrument of war.

As international dependence grows, it will be recognized that, even aside from nuclear retribution, one cannot destroy one's enemies without destroying one's own economy. The leaders of the industrialized countries will become less concerned with unusable weapons of mass destruction and more interested in psychological warfare.

The distinction between psychological values and psychological weapons will gradually disappear. Psychological values will become weapons, and the use of psychological techniques as weapons will create values.

The militarily minded will believe that war between balanced powers, such as the U.S.A. and the USSR, can still be won by revolutionary technology based upon advances in pure science. To learn how the next war might end, travel to the frontier of science

and gaze out with imagination into the unknown. In 1939, nuclear fission was a newly discovered laboratory curiosity. Six years later, it gave us Hiroshima.

The next frontier of science is psychobiology. The previous frontier, physics, has produced a military stalemate that will be broken either by nuclear oblivion or by psychological supremacy. Some are saying that the next war will be won by the nation that first understands the machinery of the brain.

Parapsychological Predictions

Before I discuss the possible importance of parapsychology in the year 2000, let me summarize what I predict will be the technical status of the field at that time. I shall give what I regard as reasonable extrapolations from present knowledge. These judgments represent my estimate of unfolding reality, regardless of whether I like it or not.

1. By 2000 A.D., if not sooner, we shall have what critics will generally agree are repeatable experiments in extrasensory perception and psychokinesis.

2. We shall have a useful, middle-level theory of psychokinesis and perhaps of extrasensory perception.

3. A majority of both physicists and psychologists under the age of 30 will accept extrasensory perception and psychokinesis as established natural phenomena.

Long before 2000 A.D., among professional parapsychologists it will be generally agreed that:

4. Within a favorable cultural setting, perhaps half of all children can demonstrate near-perfect scores in free-response picture-drawing ESP tests, but this ability is difficult to preserve beyond adolescence.

5. There are a few people who can levitate small objects for several seconds.

6. Psychokinetic control of some hysterical-neurotic subjects is possible from a distance by operators who have special psychic ability and who use what today are called hypnotic techniques.

7. What is now called prayer is to some degree effective—whether for good or for evil—and does not require the invocation of a supernatural entity, but is strongly dependent upon the psychic endowment of the practitioner. In other words, it may make good sense to ask a living saint to pray for you.

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What impact, if any, can the embryo science of parapsychology have upon the future of mankind? The answer is to be found, not in our present knowledge of psi phenomena, but in the needs those phenomena promise to fill. I see two broad areas in which parapsychology might change the immediate course of history: one military; the other philosophical.

Among the many conceivable military applications of parapsychology, I shall mention only one. As previously described, I believe that the concept of war is about to undergo a dramatic change, with a shift of emphasis from physical force to psychological manipulation. Attempts will surely be made—if they are not already underway—to use psychokinesis to control the minds of enemy personnel. On the basis of present knowledge, I see no reason to doubt that mind control by psychokinesis is possible in principle. Of one thing we can be sure: if psi phenomena are useful, they will be used by the military, whether or not the scientist approves.

I am not much interested in what the military sees as progress. Far more important are the possibilities for human ethical advancement. What are the philosophic implications of psi? These offer the only hope I know—and slim it is—for a continuation of the human experiment.

What parapsychology offers is not the promise of a scientific validation for the detailed beliefs of any religion but, rather, the possibility of an understanding of the nature of human consciousness. Upon such understanding we might perhaps build a code of ethics to which all could subscribe.

What does it mean that throughout history the phenomena of parapsychology have been in the province of religion? Perhaps organized religion is nothing more than the cultural expression of psi phenomena, and the truth behind religion may be waiting for discovery by science.

We live in desperate times when we know not how to prevent a half billion deaths by starvation, nor even whether those lives are worth saving. I have called parapsychology the "wild card" in our future because its potentialities are unknown. What I do know with certainty is that, as a species, Homo sapiens is doomed unless we experience a moral rebirth within the next several decades.

[redacted] I can imagine no basis for a new religion except self-knowledge through science.

As parapsychologists we have been asking: What are the natural relationships between people? From our research we already know that those relations extend beyond the interpersonal isolation of Cartesian dualism. Yet it is upon Cartesian dualism that Western civilization was built. I think we may safely conclude that our philosophic outlook will be changed by parapsychology, and with it, our ethical standards. However, I am not about to write the textbook for a new philosophy. That is for you to do in the laboratory.[33]

NOTES

1. M. King Hubbert. *U.S. Energy Resources, a Review as of 1972.* [Part 1, prepared for the U.S. Senate Committee on Interior and Insular Affairs. Serial No. 93-40 (92-75).] U.S. Government Printing Office, 1974. (Out of print. However, see *Science, 213,* 156, or see L.C. Ruedisili and M.W. Firebaugh. *Perspectives on Energy: Issues, Ideas, and Environmental Dilemmas.* Oxford University Press, 1975.)

2. The date, 1970, was predicted in 1956 by M. King Hubbert (*U.S. Energy Resources, a Review as of 1972*). Subsequent offshore and Alaskan drilling may shift the date of peak U.S. production to 1985.

"The first reaction of the petroleum industry to [Hubbert's] prediction was one of incredulity and dismay; the second was an attempt to prove it could not be so." (p. 68) As Hubbert wryly remarked (p. 70): "There is some basis for the surmise that [my] innocuous drawing [showing the complete cycle of crude oil production in the U.S.A.] did more to increase (on paper at least) the petroleum resources of the United States within the next five years than the combined exploratory efforts of the petroleum industry in the preceding century."

The referenced report is the saga of one man's determination to discover in advance, by graphical analysis, the true value of one of the most important statistical parameters in the evolution of the oil industry. The date of peak production in the U.S. was crucial for domestic producers because it marked the end of an era of expansion and the beginning of a time when a company the size of Gulf Oil would try to make ends meet by retailing clocks, jewelry, and other bric-a-brac through its monthly billing system. Hubbert's report can be read with profit by anyone interested in self-deception in science.

3. J.S. Steinhart and C.E. Steinhart. Energy use in the U.S. food system. *Science, 184* (19 April 1974), 307–316.

4. N. Wade. Green Revolution (II): Problems of adapting a Western technology. *Science, 186* (27 December 1974), 1186–1192.

5. United States Council on Environmental Quality and the Department of State. *The Global 2000 Report to the President, 2,* 97. U.S. Government Printing Office (1980).

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6. M.R. Cutler. The peril of vanishing farmlands. (A guest article by an Assistant Secretary of the U.S. Department of Agriculture.) *New York Times,* 1 July 1980, p. A19.

7. D. Pimentel, E.C. Terhune, R. Dyson-Hudson, S. Rochereau, R. Samis, E.A. Smith, D. Denman, D. Reifschneider, & M. Shepard. Land degradation: Effects on food and energy resources. *Science, 194,* (8 October 1976), 149–155.

8. United States National Agricultural Lands Study. *Interim Report No. 4: Soil Degradation: Effects on Agricultural Productivity.* p. 17 (1980 ed.). U.S. Government Printing Office. Stock No. 041–011–000726.

9. P. Rosenberry, R. Knutson, & L. Harmon. Predicting the effects of soil depletion from erosion. *Journal of Soil and Water Conservation, 35*(3), 131–134 (1980).

10. *Global 2000 Report, 2,* 277.

Although it has been suggested that desertification is often the result of cular weather changes rather than human misuse, the fact of its occurrence is yond dispute. (C. Holden. *Science, 205* [28 September 1979], 1357–1360.)

11. United States General Accounting Office. *Ground Water: An Overview.* ED–77–69. Washington, D.C., 1977.

David Sheridan (United States Council on Environmental Quality). *Desertication of the United States.* U.S. Government Printing Office (1981). Stock No. 1–011–00065–3.

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12. K.B. Young & J.M. Coomer. *Effects of Natural Gas Price Increases on exas High Plains Irrigation, 1976–2025.* U.S. Department of Agriculture Economics Research Service. Agricultural Economic Report No. 448. Washington, .C., February 1980.

13. T.H. Maugh, II. Restoring damaged lakes. *Science, 203,* (2 February 79), 425–427.

14. T.H. Maugh, II. Toxic waste disposal a growing problem. *Science, 204* (25 ay 1979), 819–823.

R. Jeffrey Smith. EPA sets rules on hazardous wastes. *Science, 207* (14 arch 1980), 1188.

15. United States Council on Environmental Quality. *Contamination of Ground ater by Toxic Organic Chemicals.* (January 1981). U.S. Government Printing ffice. Stock No. 041–011–00064–5.

16. R. Jeffrey Smith. Acid rain bills reflect regional dispute. *Science, 214* (13 ovember 1981), 770–771.

17. C.L. Schofield. *Acidification of Adirondack Lakes by Atmospheric Precipitation.* New York Environmental Conservation Department, Fish and Wildlife Division, 1976. (Project F–28–R04).

18. N.R. Glass, G.E. Glass, & P.J. Rennie. Effects of acid precipitation. *Environmental Science Technology, 13* (1979), 1350–1355.

19. It is not at all certain what choice will be made. When confronted with hard, simple, example facts, such as those concerning fish in Adirondack lakes,

the selectively educated mind will see those facts, not as a warning to consider the ramifications of an ecosystem thrown out of balance, but as the thumb-twiddling of impractical intellectuals—in this case, as an over concern with a certain quantity of fish. Mr. David Stockman, Director of the United States Office of Management and Budget, has general oversight of environmental regulation in President Reagan's administration. He said this: "I kept reading these stories that there are 170 lakes dead in New York that will no longer carry any fish or aquatic life. And it occurred to me to ask . . . well how much are those fish worth . . . ? And does it make sense to spend billions of dollars controlling emissions from sources in Ohio and elsewhere if you're talking about a very marginal volume of dollar value, either in recreational terms or in commercial terms." (*Science, 211* [20 March 1981], 1329.)

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G. Kukla & J. Gavin. Summer ice and carbon dioxide. *Science, 214* (30 October 1981), 497–503.

22. *Global 2000 Report, 2,* 117–135.

23. *Global 2000 Report, 2,* 319–321.

24. *Global 2000 Report, 2,* 384.

25. "Real costs" are measured somehow in terms of capital and labor and are distinguished from paper-money costs, which depend upon the use of the printing press.

26. Kenneth Clark. *Civilization: A Personal View.* British Broadcasting Corporation (1969). (A condensation of the scripts from Lord Clark's 1969 television series of the same name.)

27. Willard Wirtz (Chairman). *On Further Examination: Report of the Advisory Panel on the Scholastic Aptitude Test Score Decline.* New York: College Entrance Examination Board (1977).

28. My teacher friends disagree with this committee and say instead that the operational causes of the decline in scholastic achievement are (1) consolidation of neighborhood schools into large systems, (2) unionization of teachers, and (3) adoption of "modern" methods of instruction. These administrative mistakes have led to alienation and a breakdown in the socialization of children.

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29. A.R. Jensen. *Straight Talk About Mental Tests.* New York: Free Press (1981). (A comprehensive introduction for the educated layman by the leader of his field.)

30. My paper was written largely from independent sources, and I welcomed *The Global 2000 Report* as a means to validate my conclusions. It did not quite work out that way.

Global 2000 was prepared in response to a 1977 Presidential directive to study the "probable changes in the world's population, natural resources, and environment through the end of the century."

This objective was not met. As explained in volume 1, the task was subdivided and computer models were independently prepared without linkages. I quote:

> There has been little direct interaction among the agencies' sectorial models. . . . Difficulties also arise from multiple allocation of resources. Most of the quantitative projections simply assume that resource needs in the sector they cover—needs for capital, energy, land, water, minerals—will be met. . . . Some of the Study's resource projections implicitly assume that the goods and services provided in the past by earth's land, air, and water will continue to be available in larger and larger amounts, with no maintenance problems and no increase in costs. . . . In general, the agencies assume a continuation of rapid rates of technological development and no serious social resistance to the adoption of new technologies. . . . The Study assumes that there will be no major interruptions of international trade as a result of war, disturbance of the international monetary system, or political disruption. (pp. 6–8)

Volume 1 (only 47 pages) is essential reading. In volume 2, one might start with "Appendix B: Advisory Views, A Critique of the Study" (pp. 713–721), followed by "Other Global Models" (pp. 603–681). Chapter 13 (pp. 227–449) on the environmental impact of the Study's projections was prepared post hoc, entirely by private consultants, and is a valuable source for information about environmental problems. It makes clear the futility of multi-model, no-linkage analysis.

I was briefly puzzled that, although this report offers seemingly irrefutable evidence in volume 1 and in chapter 13 of volume 2 that there will be mass starvation by the year 2000, that fact is denied (volume 1, page 1). Then I realized that if the United States Government were to publish this truth, people everywhere would be polarized into two camps, each howling for the blood of the other. As it is, the unthinkable will not be thought, and people will exercise their anxiety upon more immediate problems.

Perhaps the most regrettable feature of the *Report* is its implicit recommendation, based upon an implied assumption. The recommendation is that we should consume all we want between now and 2000 A.D. The implied assumption is that on that date God will send space ships to carry us off to a new planet. To future historians this hope may be known as "the white man's cargo cult."

31. *Global 2000 Report, I,* 2.

32. There are dreamers who believe that a half-billion population shortfall in 2000 A.D. can be achieved, instead, by voluntary birth control among the poor countries of the world. If such an educational effort were to succeed, its effect on the reduction of starvation would be minimal, while its dysgenic effect could be calamitous. We have already learned in the advanced countries that it is the most industrious and intelligent who voluntarily control family size. It is not likely to be different in the backward countries.

33. One reaction from a colleague who read this lecture was: "Your final section leaves me disappointed. I thought you would have some dramatic solution to it all. You could at least apologize. A paragraph at the end would do it."

My reply: "Stand aside, old timer, and let others with more courage take the helm. Just be sure you tell them all that you have learned."

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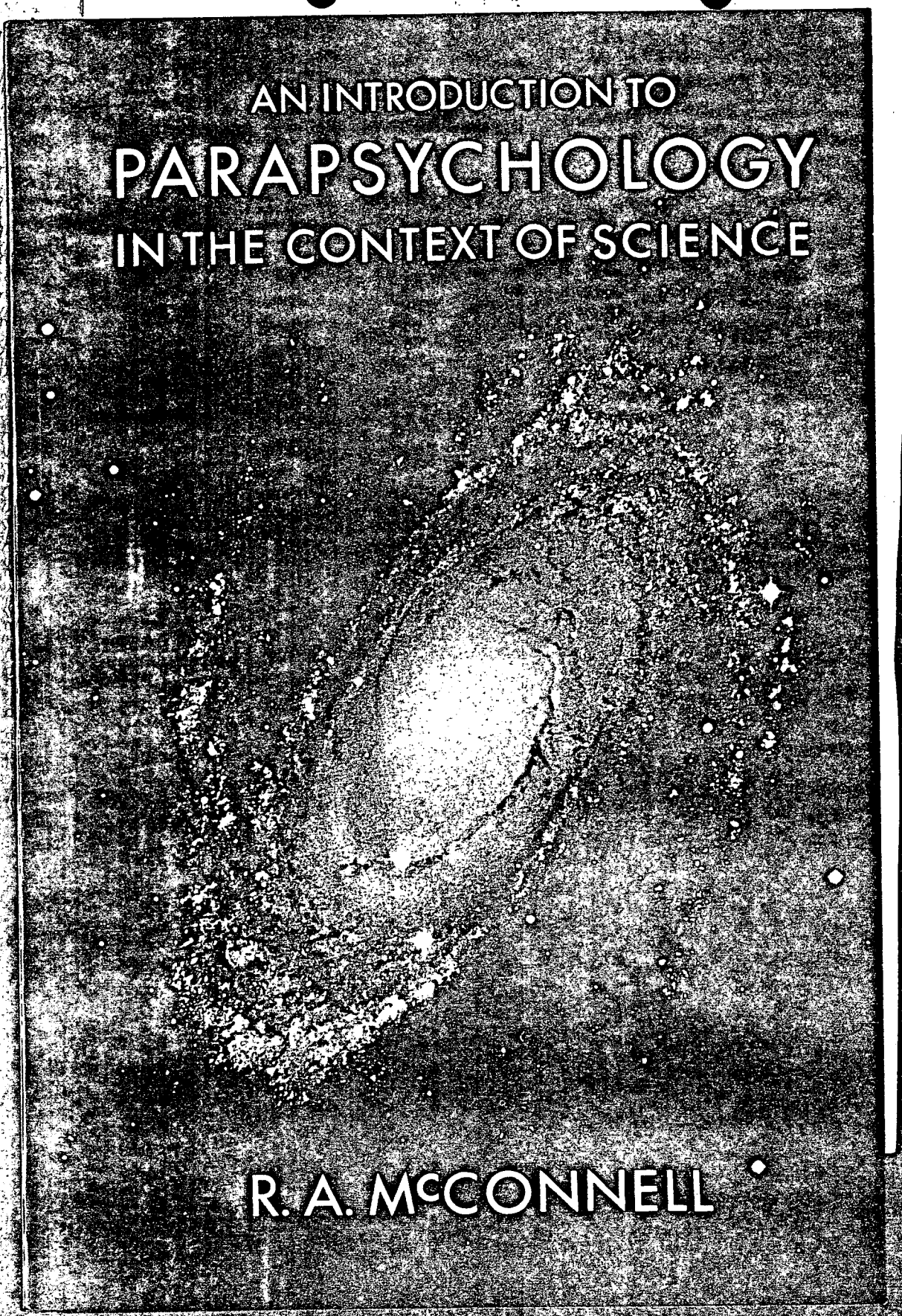
AN INTRODUCTION TO PARAPSYCHOLOGY IN THE CONTEXT OF SCIENCE



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PARAPSYCHOLOGY AND SELF-DECEPTION IN SCIENCE

edited by

R. A. McCONNELL

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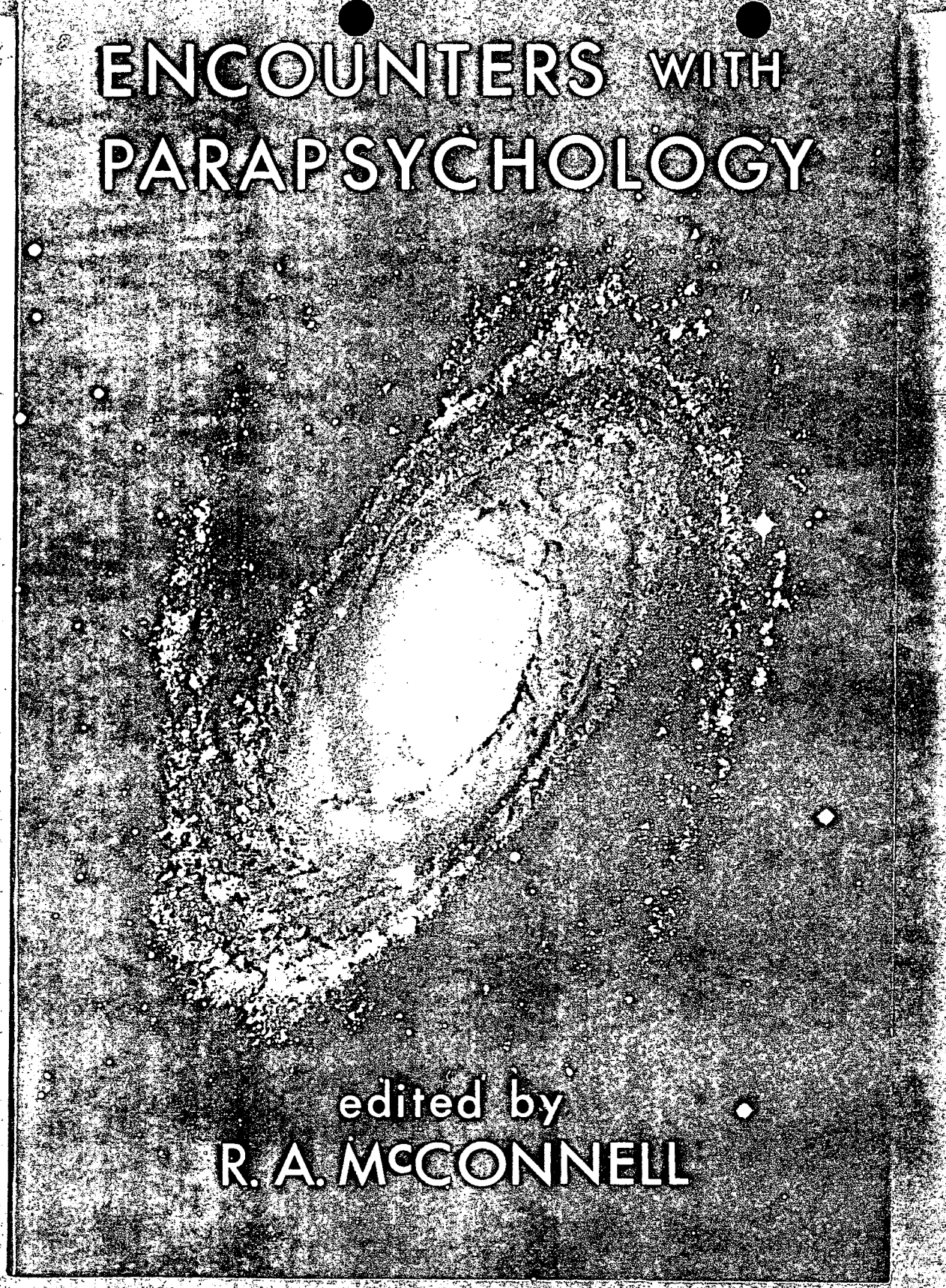
ENCOUNTERS WITH PARAPSYCHOLOGY



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