OBSERVER-SUBJECT FEEDBACK

The Dynamics of the Unobserved Economy

INAUGURAL LECTURE

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BY

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Mijnheer de Rector Magnificus,
Zeer gewaardeerde toehoorders,

The Cleveringa Legacy

The occasion of this lecture serves to commemorate a scholar's personal act of courage in defense of a lofty principle. On November 26th, 1940, Professor Cleveringa, then Dean of the Leiden Law Faculty, with bags packed in correct anticipation of his subsequent arrest, rose to this historic podium to denounce the edict passed by the German occupation forces, banning Jewish professors from Dutch universities.

Assuming the lectern left vacant by the deposed legal authority, Professor Meijers, Cleveringa simply and forthrightly labelled Meijers' expulsion "an illegal act," characterising it as "beneath contempt." He urged the audience which filled this building to dismiss these actions from their sight, "and gaze instead upon the heights, up to the radiant figure Meijers." He went on to extoll Meijers' extraordinary contributions to the legal system of the Netherlands, and then cautiously warned his students not to engage in political resistance against what he perceived to be overwhelming power. Yet the assembled group knew that Cleveringa had already given his tacit approval to a planned student strike. Those of you in this audience who personally witnessed that moving moment will attest to the fact that Cleveringa's

eloquent references to the unspoken feelings which then filled this hall, stirred the students to sing the Wilhelmus. The poignant sixteenth century prayer "Give me the strength to drive away the tyranny which has wounded my heart," brought tears and hope to the assembled. The subsequent student strike forced the closing of Leiden University and ushered in an era in which the unthinkable occurred.

Professor Cleveringa's death this past year has again left a great void at Leiden. Perhaps there is no more fitting tribute to a man, who, in his own lifetime became a symbol of the yearning for freedom, than to adorn his memory with the same simple language he chose, to describe his beloved mentor Meijers. "Deze Nederlander, deze nobele en ware zoon van ons volk, deze mensch, deze studentenvader, deze geleerde."

The founders of the Cleveringa Chair intended not simply to honor this individual. They correctly perceived that the recounting of a noble deed could revive its contemporary significance, lest it be allowed to fade away unnoted into the dusty domain of history. They also created a forum from which scholars could continue the effort to identify the salient problems of our own times, guided by the concerns and standards set by Cleveringa himself.

What relevance then can be gleaned from a backward glance on what is now history for the young and memory for the old? On rereading Cleveringa's speech today,

one can not help but be struck by the fact that after forty years it has become more difficult to fully appreciate the power and dignity of his understated prose. Our rhetorical sensitivities have perhaps been dulled by overexposure to the tumultuous, if oft less consequent, oratory of more recent times. Our generation of protesters enjoy the context of secure civil liberties, unchilled by the presence of a foreign oppressor. Unconstrained by that fear, and mindful of their parents' history, they perceive perhaps more clearly, the dangers which becloud the decade of the eighties. For in retrospect, we must admit that few imagined that Professor Meijers' academic removal was but the muted first step in the systematic destruction of 120,000 Dutch Jews. Fewer still foresaw the annihilation of six million or the full extent of the devastation that the following years of warfare loosed upon this earth. Yet some individuals whose personal lives were uprooted by the early swirls of the ensuing maelstrom did foresee, and describe, the inherent danger. In some remarkable passages written in 1937, Albert Einstein, reflecting on moral decay wrote:

> "The political and economic conflicts and complexities of the last few decades have brought before our eyes dangers which even the darkest pessimists of the last century did not dream of. Today we must recognize with horror that the pillars of civilized human existence have lost their firmness. Nations that once ranked high

> bow down before tyrants who dare openly to assert: Right is that which serves us. Arbitrary rule, oppression, persecution of individuals, faiths, and communities are practiced . . . and accepted as justifiable and inevitable. And the rest of the world has slowly grown accustomed to these symptoms of moral decay [1]."

My motivation in citing this quotation is both personal and professional. As a refugee from Nazi Germany, I owe my life to my parents' acuity in discerning danger and their courage in responding to the perceived threat. Millions of others did not share my good fortune. As a social scientist, I am haunted by the question of whether our tools of analysis are capable of detecting the telltale signs of yet another impending calamity. For Einstein's reflections have an eerie relevance for our own times. Similar fears are expressed with increasing frequency. Some are reminiscent of earlier times, others require a leap of imagination into the realm of the unfathomable. The portents of danger can no longer be denied.

The synagogues of Europe are again under attack. Acts of terrorism strike down world leaders with the same impunity with which they ravage the lives of casual bystanders. And these acts are increasingly viewed as "inevitable and justifiable." The *Realpolitik* of oil conveniently rationalizes the abrogation of moral and political commitments, and encourages the maddening accumulation of deadly armaments in the world's area of greatest

instability. There is a growing perception of political volatility, social unrest and economic malaise. Scientists warn of the fragility of the earth's environment. And we stand perched atop a nuclear tinderbox, which if ignited by a spark of accident or madness, could engulf the world.

How then are we to assess and respond to these apparent dangers? To ignore them condemns us to passively suffer their consequences. To exaggerate them as immediate threats, engenders a sense of helplessness and paralysis, for the instinctive protections of fight or flight have become irrelevant in a nuclear age. An informed social response appears our major hope, for the Cleveringa legacy attests to the fact that courageous individual acts, unsupported by overwhelming collective action, are remembered primarily as brave symbols of what might have been.

The Role of Social Science

My own reflections naturally turn to the role of the social science enterprise as it informs social action in a crisis ridden world. For social scientists bear part of the responsibility to observe, explain, predict and evaluate the complex currents of economic, social and political phenomena. As one trained in the era of the specialist, I am painfully aware of the growing need for the generalist. Our social system is so complex and interactive that we increasingly require the broader perspectives of those who seek to find common threads between the all too

isolated domains of social science. Our methodological approaches have for too long been modeled solely by the example of the physical sciences. We continue to search for behavioral regularities in human society on the basis of the physical scientists' successes in seeking out regularities in nature. But social systems are more complex than physical systems and perhaps more susceptible to instability, resulting from the caprice of human nature. We continue to fragment our inquiry into ever narrower compartments. Even as our specialized expertise has deepened, so has our myopia. I fear that the questions we pose are too often tempered by the manageability of the moment, rather than forged in the crucible of future challenges. For in spite of the remarkable contributions our separate disciplines have made, the state of our art is far from adequate to the task at hand.

The Crisis of Macroeconomics

The domain of macroeconomics serves to illustrate some of the problems we confront. In the last half century, economics has experienced the social science equivalent of the Copernican revolution. Armed with the conceptual insights of Keynes' *General Theory* and the observational telescope of national income accounting, we proceeded to model what we believed to be the relatively stable relationships underlying macroeconomic behavior. Aided further by the remarkable technical developments in econometrics and the advent of large scale computers,

we exploited the historical laboratory to the best of our abilities. Traditional scientific methods were used to test and refine our basic hypotheses. In the decade of the sixties, we believed that our models could simulate the consequences of alternative government policies. Our explanations of the past and our predictions of the future encouraged the belief that we could control the economy with automatic stabilizers and "fine tuning," an accomplishment which was prematurely heralded as the dawn of the "golden age of economics."

Yet as we survey macroeconomics today we find a discipline in disarray. The turbulent decade of the seventies witnessed the erosion of our predictive accuracy. Large scale econometric models, the formal embodiment of the state of the art of our discipline consistently overestimated the real growth of the economy and grossly underestimated inflation. Many of the world's most highly developed economies experienced major declines in productivity, declines which the most painstaking research has yet to explain. Governments' commitments to full employment were shattered by levels of unemployment, which in the sixties had been regarded as unthinkable. And in direct contradiction to prevailing theory, we witnessed the onset of "stagflation"—the simultaneous symptoms of high inflation, high unemployment and low real economic growth. Moreover, these symptoms of inexplicable malaise became pervasive, with little regard for institutional or national setting.

The open inflation of western market oriented economies was observed in their rising price indices. The officially suppressed inflation of planned eastern European economies was made apparent in growing scarcity and longer queues.

In short, the growing disparity between our theoretical predictions and the observations of macroeconomic activity constitute a series of anomalies which have thrown our discipline into turmoil. Ad hoc explanations have begun to proliferate in our literature. Such ad hoc categories as "supply shocks" which range from Peruvian anchovy harvest failures to the formation of the OPEC oil cartel are introduced to patch our leaky theories. Monetarists cite the failure of Central Banks to correctly implement their policies, while non-monetarists blame governments for adopting monetarist policies. Long standing demand management approaches to policy are suddenly politically swept aside by the asserted promise of a poorly specified and untested "supply side" economics.

The Confrontation of Theory and Evidence

Many will conclude that economics is in crisis. Yet the rapid accumulation of anomalous findings is also a tribute to our professional pursuit of what Thomas Kuhn has described as "normal science." According to Kuhn, the specialized and often mundane work of testing empirical hypotheses produces the anomalies which prepare the necessary if not sufficient foundations for new scientific

breakthroughs. If I am correct in interpreting the current turmoil in economics as a transitional period from which we may emerge with powerful new insights, then we must inquire where new perspectives are likely to emerge.

Many are anticipated in the brilliant writings of the foremost economic generalist Kenneth Boulding [2]. My adaptation of some of his ideas are most simply summarized by two quips. The first I overheard as a student in the corridors of the University of Chicago. "If the facts don't fit the theory, check the facts." The second is attributed to the great American humorist Will Rodgers. "The trouble isn't what people don't know, it's what they do know that isn't so." I conjecture that the paradoxes which now have become apparent in macroeconomics may not be primarily the result of the failure of our theories, but rather the failure of our facts. Because our profession has accepted the "facts" as given, it has had to rely on hasty modifications of theory in the effort to close the growing gap between the two. If we can identify among the facts, "What we know that isn't so," perhaps we can come to a clearer understanding of the dilemma, and move toward a resolution.

The "facts" which guide the perceptions of macroeconomists are the official government statistics which reflect economic activities in the *observed* sector of the economy. These statistics include measurements of income, consumption, investment and savings as well as indices of prices and unemployment. Such data generate

the questions which our profession seeks to answer, they provide the fodder for our forecasting industry and for our empirical tests. They serve as informational inputs for discretionary government policies and as thermostatic controls for our fiscal systems which are automatically linked to them. Small increases in unemployment rates or price indices now automatically trigger massive government expenditures. Any systematic discrepancies between the social indicators we officially construct and the actual economic activity they propose to measure will generate misguided questions, erroneous answers and fallacious policy.

Governmental agencies which collect and compile these data are typically the first to warn of their defects. Revisions of data are sometimes so massive that they overshadow "normal" growth rates of an economy. But in the age of data banks and high speed computers, these warnings are typically ignored by users. They rarely see, much less investigate the reliability of the fundamental data on which their ultimate conclusions rest. Econometric methods are capable of taking account of random errors, but they do not envision the possibility of systematic biases.

The Unobserved Income Hypothesis

In the hope of stimulating some alternative directions for inquiry concerning our perceived economic maladies, I put forward the unobserved income hypothesis. Most

simply stated, the hypothesis suggests that systematic biases have been unwittingly introduced into our social information systems, and that these errors have fundamentally distorted our perceptions of economic realities. I believe these biases are closely associated with a large and growing sector of economic activity which increasingly eludes the observational domain of official government statistics. This unobserved sector includes all economic activity which because of accounting conventions, non reporting or underreporting escapes the social measurement apparatus, most notably the national income system of accounts. The unobserved sector includes both market and non market exchanges, which utilize money or barter in both illegal and legal economic activities.

Conventional Keynesian and post Keynesian analysis sought to explain macroeconomic phenomena in terms of shifts between the government and private sectors of the *observed* economy. The alternative hypothesis suggests that a more comprehensive conceptual framework is required. This framework focusses attention on *total income* and on shifts between its *observed* and *unobserved* components. Unfortunately, the statistics on the observed sector have become so closely associated with what we perceive to be economic reality, that we have blindly accepted the medium of observation for the substance of economic activity. What we have failed to recognize is that observed social indicators are not

sufficiently comprehensive. Nor are they mere descriptions of a static social system. Since social indicators are increasingly used as informational inputs to the policy process, they themselves become outputs of the system they seek to describe.

If we fail to take specific account of the dynamic interactions between the system we wish to observe and the observations which the system generates, we will misperceive the nature of the system itself. Moreover, any attempt to control the system on the basis of mis-information will tend to destabilize it.

The Social Science Uncertainty Principle

What I am describing is a social science extension of the Heisenberg Uncertainty Principle in physics. Heisenberg's principle which deals with quantum theory, postulated that the very attempt by an observer to measure a particular attribute of a particle, disturbed the system so as to make measurements of other attributes impossible. Either the position or the velocity of a particle could be measured, but not both. The most pessimistic interpretation of the principle is that the unequivocal description of nature is impossible. An intrinsic barrier may exist to our ability to know. Einstein refused to accept the notion that reality was unknowable and argued that perhaps the indeterminacy was attributable to some hidden factor, which if discovered, would permit a deterministic account of nature. Einstein's optimism has

not yet been supported by quantum theory. If a "hidden factor" exists, it remains to be discovered.

Paradoxically, when the uncertainty principle is applied to social systems, the interaction between observer and subject makes the system both more complex and more readily comprehensible. In physics, the subject of study is an atomic particle with indeterminacy introduced by the presence of the observer. In social systems, the subject is a human being with cognition and volition. While the presence of the observer can affect the measurement and the behavior of the subject, the nature of the subject's response may well be predictable rather than indeterminate. Complexity is enhanced because information is itself an essential element in the dynamic evolution of social systems. The information gathered may itself be used by the observer to affect the system under study, and the dissemination of the information to the subject may further affect the subject's behavior. If the initial impact of the observer is to introduce distorted information into the system, this distortion may well be amplified by the feedback responses of both observer and subject. This observer-subject feedback, while complex, may nevertheless be comprehensible to the extent that human responses to the presence of an observer may be partially predictable. As we shall see in what follows, the ability to anticipate the nature of the human subject's response to observation, may itself provide a critical clue to the understanding of the social system under study.

If errors in observation are systematic and endogenous rather than random, conventional theories must be modified to include a meta theory of the production of information as part of the system's dynamics. Traditional specifications of macroeconomic theories contain implicit "correspondence rules" which equate theoretical constructions such as income and consumption to empirical measures derived from a national accounts framework. These correspondence rules are assumed to be invariant to the dynamic evolution of the economic system itself, whereas, the foregoing discussion suggests that the correspondence rules themselves must be behaviorally modelled before the system's evolution can be adequately described and tested.

Observer-Subject Feedback

To illustrate this *observer-subject feedback* mechanism in the context of the unobserved income hypothesis, consider government data collection agencies as observers, intent on collecting aggregate indicators of economic activity. Their subjects are individuals and firms who volunteer information through the vehicle of surveys, or self reporting. Reporting units perceive the observer as an agent of a government which taxes, regulates, subsidizes and transfers resources. Each of these perceived roles of government creates dis-incentives to complete and honest reporting. Simultaneously they provide incentives to alter economic behavior from what it would

have been in the absence of the observer. Subjects are motivated to underreport incomes, expenditures and employment, reducing their exposure to detection by "skimming", false invoicing, and going "off the books." They are also likely to shift their behavior away from taxed and regulated activities, toward non market and "do it yourself" activities, enhancing apparent eligibilities for subsidies and transfer payments.

To fully appreciate the nature of the distortions which may be introduced into our social information system, and their consequences, consider an economy whose total economic activity grows at some normal rate, but whose unobserved sector grows faster than the observed sector due to shifts from the latter to the former. The causes for such shifts may be increased tax burdens, increased costs of regulatory compliance or simply a generalized erosion of trust in government. As the observed sector activity becomes a smaller fraction of total economic activity, income statistics will display a reduced growth, falsely signalling the onset of a recession. This impression will be reinforced as unemployment figures are bloated by workers who shift to "off the books" activities but claim unemployment insurance benefits. At the same time, consumer price indices will overstate the true price level and perhaps inflation. Price statistics are gathered exclusively from the observed sector. They do not reflect the lower prices available in the unobserved sector. Since these prices are exclusive of income and sales taxes, they

may be 40-50% lower than observed prices. Higher housing prices which reflect unobserved home improvements also impart an inflationary bias to official price indices. Similar overstatements will appear in wage statistics. Finally, job search and secondary job activity in the unobserved sector is likely to reduce observed output faster than observed input, leading to declines in official productivity statistics.

The Dynamics of the Unobserved Sector

What I have just described is a normally growing economy which nevertheless exhibits all the symptoms of stagflationary malaise solely as a result of a statistical artifact. The economic patient is healthy but the social thermometer has gone awry. Before we draw too much solace from this diagnosis, consider the second round effects of observer-subject feedback.

Social thermometers trigger both governmental and private thermostats. Lower growth, higher unemployment and lower productivity induce both direct and indirect governmental actions which stimulate expenditures and transfers. Higher price indices via indexation induce higher wages, social security benefits and retirement pay. They also stimulate inflationary expectations which themselves bring on real inflation. Both traditional economic theory and common sense tell us that what may begin as a statistical illusion is soon transformed into a self-fulfilling unpleasant reality. Nor does the story end

here. Higher prices push people into higher marginal tax brackets thereby increasing real tax burdens. This in turn will induce further shifts into the unobserved sector and the cycle begins anew. When the tax base shrinks at the very time that government expenditures increase, government deficits grow, requiring higher interest rates to attract funds to finance the deficit and to compensate lenders for higher expected inflation. In open economies, exchange rates will be affected as well as the balance of payments. As citizens begin to perceive that governmental actions are exacerbating the economic disturbances, trust in government declines and social compliance is further damaged. Unfortunately, the dynamic feedback process which I describe has no invisible hand to wave it back to stability, for both the signalling and the incentive corrective mechanisms are flawed.

The failure to incorporate the observer-subject feedback process into our conventional conceptual apparatus may thus provide a partial explanation for our inability to correctly comprehend the macroeconomic instability which now characterizes so many of the world's most highly developed economies. In short, when *observer-subject feedback* is manifested in shifts from the observed to the unobserved sector, the first casualty is the social information system, as key economic indicators are systematically distorted. If this distortion is ignored, the second casualty is the economy itself.

In addition to stabilization and public finance implica-

tions, distorted data systems will also have perverse effects on income distribution policies, since shifts from observed to unobserved activities are likely to have very different consequences for different income classes. It is the poor and the rich who have the greatest incentives and the greatest opportunities to join the unobserved economy. Current welfare programs implicitly impose high marginal tax rates on additional incomes earned by the poor just as progressivity imposes high rates on the incomes of the rich. Occupational structure and differential patterns of tax withholding by source of income reinforce the conjecture that income inequality may be less severe than we believe it to be at the lower ends of the income distribution and more severe at the upper ends, with middle income groups of wage and salary earners bearing a greater share of the tax burden. Any system which increasingly redistributes incomes from compliant taxpayers to tax evaders and avoiders, regardless of their income level, is unlikely to maintain political consensus. Liberal democracies which traditionally depend upon the middle classes for support will find themselves ungovernable.

Empirical Evidence

Since much of the foregoing analysis rests on the empirical belief that there exists a substantial and growing unobserved sector, it is to this issue we must briefly turn.

It is obvious that any attempt to measure a phenomenon

whose *raison d'être* is to defy observation is fraught with complex conceptual and empirical difficulties. All estimates are likely to contain substantial errors, but this must not discourage estimation efforts since, "it is better to be imprecisely right than precisely wrong." Time does not permit me to review the technical details of the various estimation methods discussed elsewhere. However, I wish to summarize some of the preliminary and provocative findings which have encouraged me to pursue this inquiry.[3] Studies of the United States, Canada, Italy and the United Kingdom suggest that the monetary unobserved economy may well range between 10 and 25% of the observed income. Independent estimates of the non-monetary unobserved economy suggest that it might be of an order of magnitude of 30-50% of observed income. In short, the unobserved sector of economic activity might well rival total observed activity. Of even greater interest are the preliminary findings that the unobserved sector appears to have shown dramatic growth during the decade of the seventies, and this growth corresponds closely with the onset of the major perceived economic difficulties we have already described. Estimates of the monetary unobserved economy in the United States appear to be closely related to the forecast errors produced by major macroeconomic models, and are also correlated with residuals in productivity measures which are not explained by competing theories. Armed with these tentative estimates, it has been possible to investigate the importance of suggested causes

for the growth of this phenomenon in the United States. Once again, the results are highly suggestive. For contrary to the economist's belief that taxes are the single most important factor, the evidence suggests that the erosion of "trust in government" may be even more salient. Apparently, the political disillusionment produced by the Vietnam War and Watergate contributed substantially to the growth of the U.S. unobserved sector. A similar pattern of political and social dissatisfaction is now apparent in indicators of political attitudes in Europe. When political alienation interacts with economic incentives for anti-social behavior, threshold tolerances of social cohesion are likely to be exceeded, and we risk the rapid unravelling of a social fabric which may have taken generations to knit together.

Requirements of the Future

My fondest hope is that some of the ideas presented here concerning economics, will strike a sympathetic cord in the reflections of colleagues in related disciplines. For the implications of the unobserved economy suggest that social systems can not be analysed solely in terms of their isolated components. We require an integration of social science questions and answers, which focusses on the complex interactions between economic, political, social and informational processes. Observer-subject feedback affects our perceptions of reality in all social domains, since the study and evaluation of a social system will

change the system. Our own research is simultaneously an input and an output of the system we seek to describe. The philosophy of science has cautioned us to recognize that the facts themselves are "theory laden". Our past unwillingness to question the facts makes us subject to the first part of Kant's dictum that "perception without conception is blind". Similarly, a cynical retreat from the facts makes us capable of failing to recognize that "conception without perception is empty."

Our conceptions must be guided by the understanding that society's self image may itself be a fundamental determinant of the society's future. Fred Polak has eloquently argued that the salient factor which shapes the destiny of particular societies is the nature of the image of the future which prevails in them.[4] Those images in turn are consequently affected by the perspectives of the scientific community. If part of the economic malaise currently perceived in our midst is the result not of a fundamental breakdown in our economic systems, but rather in a distortion in our information systems, brought on by observer-subject feedback, then a more hopeful prognosis is justified, once the problem is correctly perceived. If the perception of economic malaise is unwarranted, its repeated assertion will nevertheless make it self fulfilling, with dangerous consequences for social and political stability. When internal pressures on governments grow and the social fabric comes unravelled, history attests to the fact that a scapegoat is

sought, often in the guise of an external threat. In a nuclear age, the amplification of external threats can be catastrophic. Unsupported optimism is untenable but false pessimism can be cataclysmic.

In 1939 Einstein observed that:

> "In these last ten years confidence in the stability, yes, even the very basis for existence, of human society has largely vanished. One senses not only a threat to man's cultural heritage, but also that a lower value is placed upon all that one would like to see defended at all costs." [5]

Today we are witnessing a similar erosion of confidence in a more dangerous time. If our pessimism is misplaced we must rush to restore realism, if it is well founded, I fear for the future.

Ladies and Gentlemen

This occasion reminds us that human dignity and hope must not be compromised even in the face of overt danger. Professor Cleveringa's actions served to illustrate that scientific scholarship can not be divorced from moral action. Similarly, we must be on guard that avowed moral action not become detached from informed scientific inquiry.

Rector Magnificus, Ladies and Gentlemen of the Faculty and University Board and members of the Cleveringa Curatorium

I wish to express my deep appreciation for the honor

bestowed upon me by your nomination, to permit me to follow in the distinguished tradition that has been established by former holders of the Cleveringa Chair. I wish to thank Her Majesty the Queen for appointing me to this position, and through her, to express my gratitude to the citizens of this country for not only permitting my parents and me safe passage to freedom, but also for sheltering other members of my family from persecution during the war. That I have now been granted this time to pursue my work under the generous auspices of Leiden University and the Netherlands Institute for Advanced Studies, creates a debt I can never fully repay.

Fellow Colleagues and Students

My perception and understanding of the challenges we face together has been broadened and informed by the opportunity to learn from you. I have been privileged to experience the intellectual excitement which has been generated by the melding of the American tradition of specialization with the European tradition of the generalist. That such interaction continues, protected by academic freedom, is both the hope and the promise of this occasion.

Ik heb gezegd.

NOTES

1. Albert Einstein, *Out of My Later Years*. Philosophical Library, New York, 1950. p. 9-10.
2. Kenneth E. Boulding, *Collected Papers*. Colorado Associated University Press, Boulder, Colorado, 1973.
3. Edgar L. Feige, "A New Perspective on Macroeconomic Phenomena: The Theory and Measurement of the Unobserved Sector of the United States Economy: Causes, Consequences and Implications". Presented to the American Economics Association, August, 1980.
4. Fred L. Polak, *The Image of the Future*. Sythoff, Leyden and Occana, New York, 1961.
5. Albert Einstein, op. cit., p. 6.