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dialectical materialism—the real challenge
of soviet science

By Dr. Karel Hujer



Karel Hujer was born in 1902 in Czechoslovakia. A graduate of Prague University with a Doctor of Science degree in 1932, he has done graduate work in France, at the University of London, and at the University of Chicago. In addition, he has also studied astronomy in India, China, Tibet, Japan, Mexico, Peru, and many countries in Europe. In 1935 he was invited to India by Mahatma Ghandi and stayed at Ghandi's ashram in Wardha where he lectured at the evening gatherings. In 1949 he returned to India at the invitation of Dr. Rajendra Prasad, president of the Republic of India. In 1957, at the request of the Prague National Observatory, Dr. Hujer returned to Czechoslovakia for a series of lectures on the advancement of American astronomy. He has taught at Iowa Wesleyan College and Michigan State College before coming to the University of Chattanooga where he is now in charge of the Jones Observatory. An author of many articles on astronomy, Dr. Hujer is a fellow of the American Astronomical Society and the Royal Astronomical Society of London; a member of the Astronomical Society of the Pacific and the Société Astronomique de France, as well as many honorary societies.

After the first Soviet satellite blazed the trail into outer Space, great concern was expressed in this country as to the status of American science and scientific education compared to that of the USSR. Since that time much has been written and continues to be written, almost to the degree of olarmism, on the marvelous advances of Russian science in general, and Russian physics in particular. This concern stands in odd contrast to the complete indifference paid Soviet scientific activity prior to Sputnik I. We need only remind ourselves that as early as April, 1957, Nesmeyonoff, president of the Soviet Academy of Science, announced that Soviet scientists were almost ready to launch their first artificial satellite. The world, particularly America, either ignored or failed to heed this announcement.

Only after the Sputniks began orbiting around Earth was this ominous American concern directed toward the startling Soviet

technological accomplishment. Yet in all the countless comments on the Soviet technology little reference has been made to the curious and perhaps all important aspect in which Soviet education most earnestly and meticulously exposes and interprets science: the Soviet teacher of science, whether he is a physicist, chemist, astronomer, mathematician, sociologist, or biologist, must know how to interweave his subject with that specific philosophical outlook or *Weltanschauung* known as dialectical materialism. Whereas scientific technology has an immediate, sensational, and ponderous impact on human society, dialectical materialism cumulatively builds up its influence with the lapse of time, the consequence of which portentously tends to supersede the effects of an H-bomb or the accomplishment of a trip to the Moon. Why? Because it is the idea which in the course of time shapes and motivates events in the physical and material world.

What is dialectical materialism? In what way is this doctrine closely interwoven with Soviet science and scientific instruction? At present this philosophical doctrine is the official, authoritative school of thought behind the Iron Curtain; and all students are inevitably channeled through its indoctrination whatever their particular scientific field may be. As an illustration, it is not unusual to find as a foreward to a serious Communist work on natural science *Die Entwicklung im Universum (Evolution in the Universe)* by Dr. Walter Hollitcher, professor of philosophy at Humboldt University in East Berlin, a quotation from Stalin:

. . . Everywhere, from astronomy to sociology, the idea that in the world there is nothing eternal, that everything undergoes constant change and

evolves, encounters constant confirmation. This means that we must look upon everything in nature from the standpoint of movement and evolution. This means that the spirit of dialectics permeates the entire contemporary science.

Dialectics, the reality of change caused by struggling opposites, although set forth in the nineteenth century by Hegel, as an idea has been known since the ancient Greek school of Heraclitus. For Hegel, however, dialectics was in the realm of theology and philosophy, the struggle of opposites being between the absolute, Divine Mind and the finite mind of man. Hegel's dialectics is, then, a dialectics of absolute idealism. Likewise, materialism, the belief in the primacy and objective reality of matter, had its birth in ancient Greece. Revived in the eighteenth century, it became fashionable among French materialists until it was shaped and refined into the popular system of Auguste Comte's positivism. This concept occurred in the midst of the golden era of physical science. The progressive drift away from Hegelian idealism began with Feuerbach, Bauer, and other young Hegelians and continued until the arrival of two outstanding personalities, Karl Marx and Friedrich Engels, who were to formulate an ideology that would shape the destiny of the twentieth century. The very fact that Marx and Engels appeared at that historical moment seems symptomatic, for they both claimed the scientific age to be the age of the proletarians.

As a reaction against Hegelian idealism, both Marx and Engels more than anyone else are responsible for the historic combination of dialectics with materialism. In their view science and the scientific method completely justified this union. It was in the middle of the nineteenth century, pregnant with scientific discoveries of the greatest importance, that Marx shaped his ideas. He believed he had discovered the key to human life in the economic categories in which his materialism took the form of economic determinism, an idea strangely parallel to the present view of the deterministic Universe of the physicist. Marxian dialectics takes the form of class struggle, and the social and historic existence of man becomes the measure of everything.

Marx, however, never thought of constructing an all-inclusive philosophical or ideological system and concept of the world.

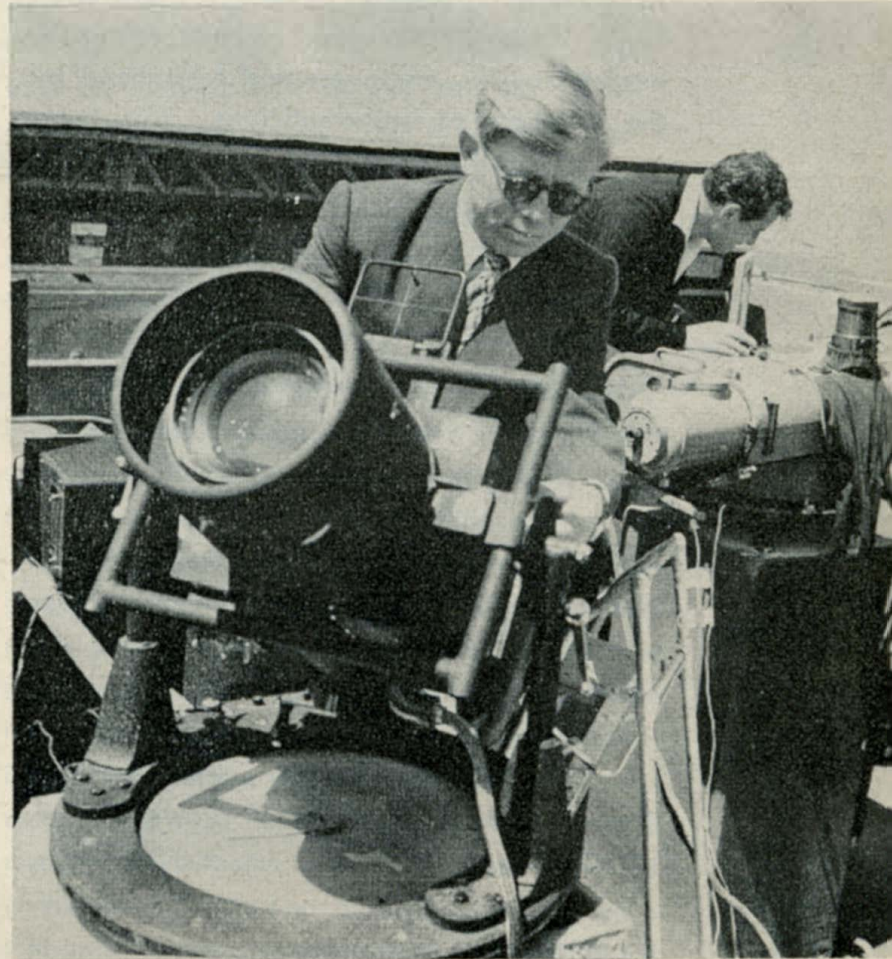
Such a concept was formed by his lifelong friend and supporter Engels and continued vaguely and cumulatively by various followers, Lenin being the foremost. Thus we have at present the dialectical materialism of the Marxist-Leninist version that directs the way in which science textbooks must be written wherever the Communists have political control. The Marxists are usually inclined to attach the adjective *scientific* to their system of philosophy. After all, Marx denied the need for any philosophy, and Engels declared that philosophy died as science grew. But it is evident that neither Marx nor Engels could foresee the fruits of their own labor. Apparently neither could have imagined an ominous, mushroom cloud which would arise on the horizon of the mid-twentieth century, a cloud which would prove beyond doubt that science without philosophy becomes a grave social menace—even for the most dialectical of materialists.

Nevertheless, when the socialist panacea of Marxist philosophy was firmly fixed in the Communist state, the picture of the world and of human society was described as perfect, logical, and unquestionable. Communist cultural planners and party liners shaped Marxism-Leninism into a final code and un-failing guide beyond which there could be no other appeal except treasonable diversionism. In other words, Marxism-Leninism became the one belief in the order of the Communist-Socialist society. According to one of its basic articles, there is no science except that science which serves and supports the Communist Party. In this way physical science, particularly astronomy, enjoys the greatest freedom in an otherwise rigidly controlled system because it is least open to the peril of interference from Communists cultural planning. On the contrary, it is physics or astronomy that is supposedly associated with the most effective means of propaganda for certain favorite Communist beliefs which the official party line considers as standard and

patronizing guidance for the human masses and the key to the promised land for the proletariat of the world. Thus in the USSR the social and economic position of a good physicist is equal to that of a cabinet minister and indeed may be a source of envy for his Western counterpart.

The inevitable question arises, then: What are these qualities of physics and astronomy that are so appealing to the Communist cultural planners? Let us briefly look at some of those qualities of physical science which bolster research to such a surprising degree in the Communist countries. Above all it is important to the state that the Universe is knowable and deterministic—in other words, that the Universe is dialectically materialistic. There is nothing supernatural about it. It is a Universe without God. This means that it is only a question of time before man solves all of the mysteries which have in the past been described as the handiwork of God. This, then, is basically the Communist Universe. But even more startling is the fact that the Western world holds a view of the Universe which is not too far removed from that of the Communists. It holds this view despite its apparent religiosity. Let us examine the origin of this materialistically philosophical point of view.

The formative period of Marxism belongs to the great age of physical science which flourished in the nineteenth century. Materialistic philosophy received fresh impetus in 1798 when Laplace published his sensational mathematical formulation of his hypothesis on the origin of the solar system, *Exposition du Systeme du Monde*. It is said that Napoleon, a jealous supporter of cultural activity in the growing empire, commented while he was preparing to bestow the title of marquis on Laplace that he could not find the name of God mentioned in the book. Laplace retorted: "Your majesty, I did not need him." This incident is typical of the attitudes found during the growth of the physical sciences during the nineteenth century. Another example is characterized by



This camera was installed at the Kazakh Academy of Sciences to take pictures of the third Soviet artificial Earth satellite. (Photo by I. Budnevich)

the astronomer Leverrier's deterministic calculation of the position of the unknown planet Neptune—a triumph of Newtonian mathematical physics. The idea was further exemplified in physics by Kelvin and Helmholtz and their deterministic and rather gloomy views that the total energy in the Universe would eventually be so diffused that the Sun's flow of heat to Earth would eventually cease. A picture was developed which saw the Universe as merely a complex machine, something which could in time be reproduced on a model scale by engineers and formalized by the equations of mathematicians. This, then, was the world view that nurtured Marxist theories and one which reached its intellectual climax in the middle of the nineteenth century with the work of such figures as Faraday, Maxwell, and Darwin.

Thus the triumphant march of science and the Industrial Revolution which logically followed had a tremendous impact on the formation of the philosophy and the social life of man. Together these two factors forecast a new and redeeming age in which man was to become the coordinator and finally the master of the laws of the Universe. This view is boldly set forth in the significant work *Life in the Universe*, recently published by the Soviet Academy of Sciences. It was written by two outstanding Soviet scientists, the biochemist A. I. Oparin and the astronomer V. G. Fesenkov. These two authors refer in a friendly and patriotic manner to the eighteenth century Russian scientist, M. V. Lomonosov; and they point to the fact that from the style of his writing Lomonosov was tributary to the masters of his time. Likewise Oparin and Fesenkov, in turn, are subservient to the new masters of this age when they quote from Engel's *Dialectics of Nature*, a work little known to Western scientists but a Bible for the Communist scientists. The views of Oparin and Fesenkov coincide with this context. Life, they feel, including any higher state of consciousness and subsequent qualities it involves, is only the natural result of the cosmic evolution of matter. Both authors maintain that life began in the complex vibra-

tions of ultimate particles of physical matter and that any idea that it had a divine beginning as the result of God's work is merely a relic of man's primitive mythology. The implication here is obvious, they feel; it is only a question of time and systematic research until man's intellect, a product itself of chemical processes, will discover these delicate vibrations and be able to create life in a test tube.

The continuing success of science and laboratory triumphs encourage this bold assumption. These omens have produced self-confidence, and the Marxist architects of social reorganization feel assured that the future belongs to them. This same belief is echoed by the present leaders of the Communist world, as witness the Kremlin belief that "time is on our side, we'll bury you." Despite all these self-confident boasts, the free world still asks: Is dialectical materialism the last word in human knowledge as the Marxists so fervently believe? Have we not seen many times throughout the broad sweep of man's history the proposal of similar, categorical manifestoes? And have we not also seen them pushed aside by circumstances and the very changes in the course of history? The briefest glance into the story of philosophy will show that dialectical materialism can claim to be only one of many philosophical systems that rose and flourished until they completed their function or role and then vanished into the dormant galleries of history and were recorded in the infinite annals of time. Each of these many systems, including among others the notorious scholasticism of the middle ages, contained an element of truth; but in each case the system itself was converted to evil when it became vested in power and the idea of infallibility and permanence. The Marxist dogmatists are already exposed to this historic peril when they speak authoritatively from the throne of their political sovereignty when they proclaim the intellectual and philosophical sovereignty of dialectical materialism. The situation is close to that of the scholasticism confronting Galileo in their dogmatic self-assurance and righteousness. Now the Marxists fail to profit

from the truth and the reality of historical truth, and thus they sow the seeds of their own philosophical destruction.

We cannot, however, be lulled into a sense of false security by a knowledge of the weakness of a philosophical system that now governs the lives of an essentially simple people. Marx never dreamed that his ideas, intended for an industrial civilization, could ever be planted in what was and still basically is a peasant Russia. But they were; and Russia is an extremely vigorous nation and so are the effects of an utterly Western philosophical system. Before the influence of the doctrines of dialectical materialism so avidly cultivated by the rulers of Communist dominions will spend itself, we have no less than half a century to look for immediate and unpredictable results for better or worse with residual vestiges lasting for centuries.

Here is something of a portentous nature to look for, and it is of great importance to mankind today. Although our terrestrial vanities may be concerned as to who will be first to reach the Moon, it is incomparably more important to know what our earthly mind will carry along into the wastelands of the lunar reaches: Will it carry the ideas of a semi-civilized and tribal caveman, or will it be those of a man who is admittedly his brother's keeper? In the meantime our only consolation rests in the logical conclusion of history that is forever valid for every civilization and for every individual: the truth that power corrupts. In our case, looking across the political barrier, we state that the authoritarian Marxists today, no matter how loudly they proclaim themselves the custodians of science and scientific progress, will ultimately perform by the very power they possess all the acts that invariably will choke the spirit of free scientific inquiry, the only true condition for the advancement of science.



Viktor Spitsin of the USSR Academy of Sciences is shown lecturing on inorganic chemistry in Moscow University. (Photo by D. Sholomovich)

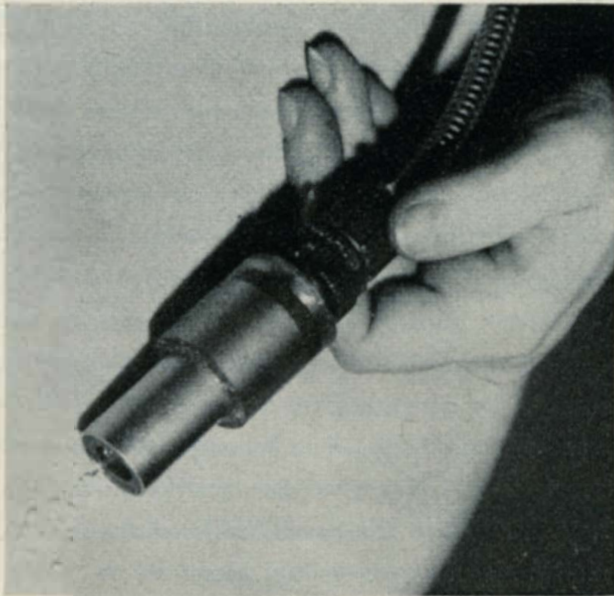
space reporter

GOOD FOR MAN, BEAST, AND ICBM

One more guided missile headache has been cured by General Electric's guided missile engineers. And they cured this one with that reliable old standby Bromo-Seltzer.

GE is developing nose cones for the Atlas ICBM and the Thor IRBM at its facility in Philadelphia.

To house recording instruments during test flights of these missiles, GE's engineers developed a spherical capsule which is carried in the missile nose cone and is ejected before the nose cone hits the earth. Electrically operated markers help engineers



locate the capsule. However, to function properly, these markers must be delayed for a few minutes before operation.

And here's where the Bromo-Seltzer comes in.

Bromo-Seltzer, packed around electrical wires, delays completion of the electronic circuit for the few minutes required for operation.

Considerable time had been spent in perfecting mechanical switches, none of which worked satisfactorily. The engineering headaches involved were extremely annoying until GE's engineers found the answer in the family medicine cabinet.

EXPOSURE: 5,000,000,000th OF ONE SECOND

Development of the world's fastest camera shutter, capable of taking photographs

with an effective exposure time of five-billionths of one second, has been announced by Electro-Optical Systems, Inc., of Pasadena, California.

Dr. A. M. Zarem, president of the company and developer of the camera, said that it would prove highly valuable in helping to solve special problems in the study of intense explosions, of ultra-sonic shock waves, and of special nuclear reactions.

The novel feature of the camera is that it contains a hermetically sealed, large-aperture, wide-angle Kerr cell shutter which possesses no moving parts. It is pulsed electronically to obtain photographs of extremely brief exposures. Dr. Zarem said that with further development and refinement of techniques used, the camera may be capable ultimately of taking pictures with exposures of a fraction of a billionth of a second.

To illustrate the speed of the camera, it was pointed out that the satellite Sputnik, moving at approximately 18,000 miles per hour, would travel only one-and-one-half thousandths of an inch—a distance less than the thickness of a human hair—during the time of one exposure.

The camera was developed for the Samuel Feltman Ammunition Laboratories at Picatinny Arsenal, Dover, New Jersey.

The photographs show the electrical disintegration of three aluminum wires, each one-thousandth of an inch in diameter and one-quarter of an inch long. Explosion of the wires was photographed at three phases: 20-billionths of a second, 30-billionths of a second, and 40-billionths of a second after the discharge was started.

