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THE CULTURAL PHENOMENON ALBERT EINSTEIN

On Monday, the eighteenth of April 1955 Professor Albert Einstein of the University of Princeton, New Jersey, U.S.A. died. At a quarter past one A. M., local time and date; it was in the papers the same day, all the world over.

And so, from that moment on, roughly speaking, Albert Einstein *is* no more. He belongs furthermore to the *past*.

Roughly speaking of course. For *strictly* speaking — Einstein taught us so fifty years ago — strictly speaking there *is* no such a thing as a “moment”. At least not in the old, Newtonian sense of the word: a mere nothingness $t = t_1$, you know, marching for ever through eternity, all the while chopping it up in two halves, “past” and “future”, with the nothingness called “present” squeezed in between. . . .

A strange conception, now I come to think on it, and rather difficult to grasp. For how am I to live in such a narrow “present” with not even half a second left to take a breath? A very nightmare, it seems to me.

Fifty years ago, I said. And indeed, it was in 1905 that Einstein delivered us from the t_1 -nightmare by his first publication on relativity theory and relativity principles. We were just about to celebrate the golden jubilee of the fact, when the tidings of his death appeared in the papers.

For it *was* a memorable fact, that publication, and I remember the shock it gave me as if it were yesterday. Memorable not only for its remarkable contents, but even more so for its far reaching consequences both in the field of physical and astronomical sciences and in that of the general cultural features of the historical period we live in.

As to the scientific significance of Einstein's work and ideas, it is sufficiently well known and recognized. His relativizing of the most fundamental physical concepts — first of all that of simultaneousness and localization, and but shortly afterwards that of matter and energy — enlarged the horizon of macro- and micro-physics alike and inspired number of his contemporaries to new researches and new discoveries.

Scientific research is *teamwork*, especially in our days. But scientific thinking is likewise teamwork, be it in a wider sense. In the sense of the celebrated word of Mach: "bei jedem Gedanken ist die ganze Menschheit beteiligt". Shortly: man's thought is humanity thought.

Unquestionably Einstein is the founder and the builder of the physical theory of relativity, but his startingpoint was Lorentz' transformation of space-and-time-coordinates and it was Minkowski who gave the finishing touch to the building: a triumvirate. Quantum theory and quantum mechanics are in first instance the work of another triumvirate: Planck, Einstein, Bohr, but when Einstein (in the same memorable year 1905 we marked above) created in principle the quantum theory of light, he could base it on Planck's universal constant.

And teamwork too was the soon following stormy development of the physical sciences. Heisenberg's relations, De Broglie's and Schrödinger's wave mechanics and so much more, up to the nucleus reactors and cyclotrons of our days and the recent explorations of the mollusc world (or better perhaps: of *our* mollusc world?) bij radar, radio and rocket.

Einstein was a phenomenal genius, but his ingeniousness culminated not in $E_0 = mc^2$ or in the ten g_{ik} 's, but in his bundling together the loose ends of the empirical knowledge of his "moment" and in applying to them the mathematical instruments at his disposal: tensor calculus and infinitesimal geometry. It was not in the first place his virtuosity in unraveling those threads and in handling that apparatus, but it was the broadness of his vision and the courageousness of his conceptions that enabled him to give a turn to the stream of thought of his lifetime that made the latest half-century a *hausse*-epoch of scientific triumphs. . . .

We won't speak of Hiroshima. Einstein hated the subject.

Thus far about Einstein as a scientist. But what about the cultural phenomenon he embodied?

Well, science is one of the facets of culture, and so the "muta-

tion" of our scientific world he evoked (Jeans spoke of "a hurricane"!) is one of the facets of that phenomenon.

Surely, but the *emotional* behaviour of mankind (a scientist as such *has* no emotions!) is another and probably a more primary one.

Abstract scientific theories very seldom penetrate into the sphere of public interest: as a rule we care more about the social and political disturbances of every-day-life than about the latest news from mollusc or nucleus worlds.

But Einstein's abstractions broke the rule. They were in the papers, not only on the occasion of his decease, but long before. If not exactly in 1905, then at least a few years later. A spring-tide of popular writings on relativity theory deluged the book-market, and they were eagerly read. With glowing and growing admiration and enthusiasm by the majority of the readers, especially by those of the rising generation. But not by all. Many a reader of the older fashion, though not understanding very much of that story of shrinking yardsticks and maddened clocks, could not restrain a feeling of reluctance and fear. He got the strong impression that that friendly and peaceful professor of theoretical physics was a dangerous man. That he mixed up all and everything, past and present, space and time, matter and no-matter, possibility and impossibility. And that, in so doing, *he unsettled every certainty*. And that *was* dangerous. For in the end it possibly could undermine even that most fundamental and most sacred base of all social order and social authority: the till now unshaken belief that a dollar is a dollar!

The culture-historical point is: whence that enthusiasm and whence that fear? And the answer needs must be: because Einstein's abstractions *have to do* with the social and political disturbances of our every-day-life. Because these abstractions have a social significance that reaches far beyond the lecture rooms of the universities and the laboratories of the scientific explorers. A symptomatic significance, only to be understood when seeing the relativity — viz. the graduality and mutual dependence — of all physical, sociological and ideological concepts.

For that relativity of concepts teaches us that the "certainties" human individuals and human groups trust in, are as mortal as these. And it makes us see Einstein's abstractions and their sensational influence on public opinion — would not young Israël make him its president? — as a symptom of the general character of the age we live in: the character of a period of transition and trans-

formation of the mental and the material life of mankind towards a new state of equilibrium.

The age we live in. Say, the age that unites the Bastille and Napoleon with Serajewo, the October days, Hitler and the H-bomb, and at the same time Jean Jacques and Lobatchewsky with Freud, Brouwer and Albert Einstein cum suis. Is not that age in a quite exceptional way an age of dying away of old certainties and originating of new?

It began with the dethroning of the *droit divin* and of the fifth postulate of Euclid and it ended with the death of absolute causality and of mathematical exactness, and with the birth of the subconscious and the worldpoint. Four new forms at least of energy were set into action: steam, electricity, oil and nuclear force, and then energy itself was put under the millstone.

Indeed, it was the best of times, it was the worst of times, to speak with Dickens.

Cultural history has known more mutation periods in which absolutenesses and relivenesses collided and it is impossible to count them on the fingers: the time of Lao-Tse and Kong-Fu-Tse, the "golden age" of Alexander and Aristotle — was not Protagoras' *metron-anthropos-slogan* a prelude to Einstein's first and second principle of relativity? — the outliving of the Roman imperium by Christianity, the Newton-Leibniz-episode are easy discernable turningpoints in the evolution of thought, but the scrutiny of the sharp-sighted historian may reveal many more and even — there are indications in that direction — detect a certain periodicity in them

If scientific research and scientific thinking of contemporaries can be characterized as teamwork, when stretched out over ages it is more like an estafette course: a reaching-over of the flame of understanding, and we have to honour in Einstein one of the chief torchbearers of our "section": enlightening the way that lays before us.

But then we have to rectify the proposition we began with: the cultural phenomenon Albert Einstein does not belong to the past, but to the future of humanity.

A future he believed in.