



PHYSICS for ADVENTURE

SPEAKER: *W. V. Houston*

PLACE: *Washington, D. C.*

TIME: *April 28, 1950, about 9 p. m.*

SCENE: *Banquet room of the Mayflower Hotel at the dinner of the American Physical Society during its spring meeting.*

"When our good friend Karl Darrow conveyed to me the invitation to speak to you tonight, my first reaction was that nothing could be said in the ten minutes—which I feel is the ultimate limit I can maintain in an after dinner speech—which would signify much of what I believe is the present direction our physics research is taking, or convey very much of what solutions might be sought for some of our dilemmas. And perhaps this is the wrong place to think, at all. It has been my experience on these occasions that the dinner itself, and the desultory talk with one's colleagues, and old friends, constitute the chief enjoyment of the evening. We physicists are like the forthright customer described in a recent *New Yorker*, who, when asked by the head waitress at Schrafft's, 'Which way do you prefer to face?' replied, 'I prefer to face the table.'

"However, we may be able to get through this brief interval with minimal pain, if we can observe, with some detachment, the horns of the dilemmas which snag each of us, not as if they were isolated phenomena suffered by one man alone, but as problems like death and taxes, inevitable and common to us all.

"We have been engaged, since the founding of this Society, in what I know all of those even remotely touching the physical sciences would concede was the physics of adventure. It has been an adventure so stimulating, so keen, so deep, that it is difficult to describe to any one who has not experienced it.

"We now seem to have to be engaged in physics for survival. Having experienced the manic phase, we are now in the depressive. I think perhaps we could return to enough sanity, to comprehend that we may have embraced too readily the responsibility for all of the world's ills. We have, it is true, as physicists perfected weapons; we have not, nor will we ever have, initiated a war. And if we so succumb to foreboding that we become merely another society for the wringing of hands, we deny to our

country the very definite type of contribution we can give.

"Last week as I walked a little, in the early fragrance of the Rice campus spring, I tried to imagine a meeting of the Physical Society two decades from tonight, in this city, if physics for adventure is allowed to atrophy. It would not be unlikely, in that circumstance, that in two decades the Society might meet in a tremendous building of its own, located perhaps beyond the Pentagon and connected with it by an underground maze of safe, dry, but probably not too rapid transport. It is seemingly absurd, but perhaps not unlikely, that the Council might be in continuous session, to watch congressional trends, to obey administrative dicta, and to confer with united defense chiefs over continually recurring crises.

"You may say that such a state of affairs would not be the physicist's fault. But I shall say, to you at that dinner, if I am present, as I say at this one, that the true role of the physicist is a creative one. And it is his fault if he forsakes that role. His real contribution does not lie in governing, nor even in direct military aid to his country. His real contribution is a quite different one; it is in pushing farther ahead the horizons of men's minds.

"There is need, of course, and obligation to look to the fortifying of the state. Any reasonable man knows this. Defenses must be strong and offensive weapons keen. However, there was an old Hebraic rule of battle for a time of siege which is somewhat applicable to this day of ours. It was this: 'Never cut down the fruit trees to make the fortifications.' We need the fruits of science for our children, and theirs, if they are to live with less illness and less poverty. The fortifications must be made. The mili-

William V. Houston (pronounced Howston), has been president of the Rice Institute in Houston (pronounced Hyouston), Texas, since 1946, coming there from Cal Tech where he was professor of physics. He lists spectroscopy and spectral fine structure, and theory of the solid state as his fields of interest. In answer to the question of why he went into physics, he writes, 'In one sense, I more or less drifted into it; but this drift was aided by an interest in amateur radio, a first-class high school teacher of physics, and a cousin who was an electrical engineering student. The matter was finally determined by my stimulating contacts with A. A. Michelson and R. A. Millikan at the University of Chicago.'

tary application of science is itself a wry kind of fruit. But it is not the tree!

"There was an essay by David Cohn of New Orleans, in this month's *Atlantic*, about the desperate geographical plight of parts of Europe. Mr. Cohn asked his hosts in one country, who were discussing adding a wing to their house, whether they thought it wise to do so when it lay under Russian guns. 'We think so,' replied the hostess. 'Suppose we did not build the wing because of fear, wouldn't we then be defeated already? One defeat in my heart, another in my neighbors, and soon we should be defeated as a nation. So, we'll build the wing.'

"For it is the stubborn mind, as well as the firm faith in our democracy, that will make for survival. And suppose pacific means do fail, and the blow falls in three years time. Are we going to cower for two of them? Suppose by miracles of forbearance and diplomacy the crisis is staved off for sixty years. Are we to cower for fifty-nine of them? Three-score years are a man's life. It seems quite clear that the game of cowering is not worth the candle of alleged security. We risk our lives a dozen times a week by car, by plane, by subway, on foot. We do it without emotion, without fear. A certain amount of personal unconcern for oneself is necessary, to get any savor from life at all. One cannot help but believe as Victor Hugo did, 'To die, it is nothing; not to live, it is terrible.'

"A physicist's life is an intellectual adventure. This is indeed the basic motivation of his being.

"As an unavoidable outcome of commitments in the war, most of us have had to spend a large fraction of our time in recent days in organization and administration of research. Some of it is still imperative. But we are becoming increasingly aware that the bigger the organization, the smaller the fraction of effort devoted to its real objectives. I once thought of proposing a theory on the output of organizations. This might be: that the effectiveness of each individual in it is an exponentially decreasing function of the total number of members. So that the total output, although rising at first as size is increased, very soon reaches a maximum and falls rapidly toward zero.

"This is apparently true of research organization, so far as real physics advance is concerned. We can manufacture in groups, but a productive physicist must withdraw to study and to think alone. Research that is significant is usually from one man's

insight. After one man's insight, come many men's elaboration and execution. But the scientist, to be effective, particularly the younger one, must contrive to carve out of each twenty-four hours two, or three, or four, for the withdrawal to a sub-basement lab or a tower classroom, with three sharp pencils and a pad of scratch paper. The fun and the adventure in our jobs lie in this formulation of new concepts.

"In this connection, the Physical Society is the greatest possible help to the young scientist. When he comes out of his sub-basement room, anxious to discuss what he has observed and thought, it provides him with a sympathetic audience. His ten-minute papers are a fresh stream which our more finished symposia must never dam up. Group discussion and group execution have definite and stimulative value. But the physicist who does not go off by himself for a fixed fraction of each day to read, to study, to think, need not wait for 1970, when we may like sheep be herded into the safe corrals of government laboratories. He is already moribund. It is a fairly safe guess that the new windows on to the universe will be opened by this physicist with the three sharp pencils and a pad of yellow paper. A man with an idea can always borrow a cyclotron.

"There are a few Greek words cut deep into the first corner stone laid at Rice Institute. They are translated, with some difficulty, each autumn for the incoming class. They read: 'I would rather discover one law of nature than be King of the Persians.' They are the words of Democritus, of course, and while to the freshman, being King of the Persians wouldn't seem like much of a job, to Democritus it is apparent that it was the pinnacle of worldly fame. And one can come a little further down into the memory of our own modern scientific beginnings and say the same thing in essence. Who was the Lord Mayor of London in Kelvin's day? Who, in Maxwell's years, was the master of Trinity College? We do not care, because those things do not really matter. Sic transit gloria—but not for the man who discovers a law of nature. He has already begun to live forever."

