by James B. Conant in *Shaping Educational Policy*, the compact will strive for better coöperation between the educational community on one hand and governors and state legislatures on the other. It will also provide a clearinghouse for educational data, develop proposals for adequate financing of education and make recommendations to federal agencies; but it will have no authority to make policy.

A steering committee that met in New York in December adopted a six-month budget of $147 000 and started to search for a $40 000-a-year executive director. Although the compact was adopted by educational and political leaders from every state, and most states have already extended their unofficial approval, it will not become effective until at least ten states ratify it. The Carnegie Corporation of New York and the Danforth Foundation of St. Louis are supporting the compact until state contributions are available.

Despite widespread criticism of the states for abdicating their educational responsibilities, many educators and public officials fear collaboration between politicians and the schools. Elvis Stahr, president of Indiana University, believes that the compact's constitution might not withstand political influence. He said at the December meeting that he did not think governors and legislators should formulate education policy. Criticism from another quarter has come from the National Association of State Universities and Land Grant Colleges, which questioned the need for the compact and stated that it would not adequately represent higher education. Nevertheless, the compact's modest beginnings are not expected to threaten any organization, and if it can contribute in any way toward greater state involvement in higher education and development of nationwide standards of graduate degrees, it will have more than justified its existence.

J. Herbert Hollomon discusses federal support of science

Few men in government are more persistent than J. Herbert Hollomon in urging that science serve the basic needs of the society that supports it. Appointed assistant secretary of commerce for science and technology by President Kennedy in 1962, Hollomon has consistently endeavored to use the resources of government to advance American technology. The recently enacted State Technical Services Act, which Hollomon conceived and supported through the Congress, will enable thousands of small businesses and industrial plants across the country to keep abreast of technological innovations.

But basic science at this time, and physics in particular, can scarcely afford to have federal support diverted to technology. We interviewed Hollomon and asked him if he thought it would be necessary to shift emphasis away from basic science and toward the application of technology to national problems, such as transportation and air pollution.

We have basic science bias

"I think it is extremely important to continue our support of basic physics, chemistry and, particularly, biophysics and biochemistry," Hollomon replied. "But I also believe we are biased toward thinking that science related to, say, the stimulation of transportation systems, is somehow not good science. Now, in a sense this kind of science is not as fundamental as nuclear physics, but it is nevertheless first-rate science.

"Basic is basic to the beholder, and applied is applied. For instance, we support some work in the National Bureau of Standards in plasma physics. This work is basic research. The reason we support it, however, is because we believe that plasma physics will contribute in some direct or indirect way to the measurement capability of the country. Now, does this make it basic or applied? The answer depends on who looks at it. I think it's much more important to look at research in terms of either the institution that does it or the institution that supports it, and not in terms of how basic it is. I really don't know what 'basic research' means, and I don't think anybody else knows. I can define it any way I want, and I can give you all sorts of figures on research activity that will be affected by slight changes in the definition of 'basic research'.

"Some intellectual activity that is important to understand the world in which we live is not concerned with nuclear physics or solid-state physics. It is concerned with other important problems, and it needs to grow at a more substantial rate that it has grown in the past. Now, since our R and D budget will continue to grow, I think the real question is what the rate of growth will be—not whether any pact of the budget will be cut back."

HOLLOMON

Do you think we have an effective decision-making process for the allocation of federal funds?

"To answer the question of effectiveness we have to answer another question—does the process operate? It *does* operate, but I feel there is something lacking in our system. As long as we have a rapid, indefinite rate of growth, no one really worries about allocation very much because the pie is growing—and as the pie grows, pieces of the pie grow along with it.

"The problem of allocation comes, however, when there are more things to do, or more interests, or more ideas or significant fields to work in than we can afford. I think that time is coming. Our system of allocation operates very well for the established fields, the fields for which there are scientific leaders. But it seems to me that mainly because of the project-grant system and

its dominance in the way we give out money, the system tends to put pressure on the young man who finds it difficult to get started in a field that's new, that may have great potential, or in which he lacks a reputation among his peers.

Academic integrity hurt

"To get a man started is difficult. Most of the decisions as to who gets money on a basic project, for example, are made by committees of peers or by scientifically oriented agencies of the government in Washington. Now this process makes sure that we support work of high quality, the best in the nation, and it's a good process. But it implies that the administration of University A can't make its own decisions as to what is important and significant in science, and that somehow we in Washington can decide better. That's a strange commentary, it seems to me, on our system—a system in which we heartily and deeply believe in decentralized decision making.

"I think we've done much to undermine the integrity of academic institutions just because the institutions were built before the great influx of federal funds—because they were built by local decision makers seeking funds and allocating them locally to local people by local processes. We have obstructed far too much the freedom of the university to make its own decisions concerning the use of federal funds. These decisions are made mainly in Washington. I do not think we should upset this process entirely, but I think we ought to moderate it.

Need new decision mechanism

"With these exceptions, then, we didn't have to worry about the relative importance of fields, as long as the pie was increasing, and a lot of money was increasing. Now it seems to me that we need to have a somewhat more effective mechanism of deciding among large expenditures. I don't know what the mechanism ought to be, but clearly the present means of allocation are not adequate. I think this is one of the great challenges we have; I think all of us feel a little uneasy about this problem. We certainly don't want to create a single agency to make these decisions. That would be inappropriate because then we would tend to do a monolithic kind of decision making. We want to maintain the pluralistic way of getting proposals and getting support. There's no question about that.

"On the other hand, we ought to look at science as a whole, and also we ought to moderate to some degree this pluralistic process. We have never looked at all of basic science as a package and asked how we are spending the money as a total. We have never determined whether the expenditure should be moderated to some degree on the basis of wise consideration, or on the basis of overall allocation. Not to change the allocation fundamentally, but to say, maybe, that high-energy physics is getting too big or too little a share. Maybe we ought to shave off a little into the basic science of understanding economics."

Would you favor a report from the president on the goals and costs of our science and technology, similar to the yearly economic report?

"In my view we will have to come to a system in which we look at the total activity and say, as wise men, that we ought to moderate the activity a little on the basis of national need. The people who ought to do this are the scientists themselves as well as political scientists and currently engaged people—in other words, people who care about it. Then of course the Congress should moderate these decisions.

"I don't know quite how it ought to be done, but I'm saying this: that there's nothing sacrosanct about science. When the President of the United States and the Congress decide on the allocation of federal money—contrasting health against the military against public roads against poverty against urban development—these decisions are made by complicated processes. The President of the United States, through the Budget Bureau and various agencies and the Congress, has to make trade-off decisions and compare the opportunity in one field against another.

"Until now we haven't moderated, really, the opportunity of the various areas in the R and D package at all, because the pie has been growing so fast. In my view, we should have some system of applying overall balanced judgment to change the opportunities to some slight degree. I think the "science" of our great national needs—this includes hard science, soft science and social science—is an important area to which we should give attention. We may have to do this even though there are inadequate numbers of people now to make appropriate proposals."

Do you think that scientists have a responsibility to justify their activities—to relate their use of federal support to certain practical goals of the nation?

"I think we do far too much of that, myself. We are going to support science in this country, as any wealthy nation will for certain national reasons. A great deal of inquiry into the world we live in is justified when a nation can afford it.

"As a consequence I think the physicist, like other scientists, should worry a little less about justifying his activity in terms of its practical consequences. But he should do a little more toward justifying it because of its contribution to a basic understanding of the world in which we happen to find ourselves. The rest of the citizens should take it more as an item of faith that basic inquiry is important to this society as a substantial activity. They should realize that we support it because it has made contributions in the past.

"I think there's a little bit too much justification of science in terms of practical ends. I don't think it's necessary, and we waste a lot of people's time. It indicates a feeling of inadequacy, a guilty need to become part of the national purpose. But no science in a society is supported just because of practical results."

Hollomon is a native of Norfolk, Va. He earned his doctorate at Massachusetts Institute of Technology in 1946, and before entering government service in 1962 he managed General Electric's general engineering laboratory. He is a fellow of the American Physical Society and has been honored by many professional organizations for his contributions to physical metallurgy.