California Institute of Technology

Gell-Mann: Taking Einstein down.

the present collection of strong-force particles can be described by a simple-minded symmetry approach, he says, but better data are needed to see whether it really works. If the situation turns out to be more complex than it now looks, he says, there will be no way to analyze it.

Field theory, on the other hand, was the subject of a number of contributions at the meeting, and many of them were devoted to attempts to connect domains that used to be treated separately. Among these are attempts to bring gravitational fields into particle theory. Though there is no evidence of it, says Dr. Gell-Mann, it is probably safe to assume that the principles of Einstein's gravitational theory can apply in distances so small that "we can use it to talk of particles."

Another place where connection is being sought concerns the interaction between particles that do not respond to the strong force and those that do, as exemplified in the most recent high-energy collision experiments with electron and strong-force particles. Attempts to understand these experiments, says Dr. A. Tavkhelidze of the Joint Institute for Nuclear Research at Dubna in the U.S.S.R., seem to require a thorough revision of the mathematical bases of field theory. He and others who are working on the revisions find that the revised equations turn out to be quite similar to the mathematics being developed by those who, like Dr. Gell-Mann, are trying to apply gravitational theories to the domain of particle physics.

In a more ambitious move to unite group theory and field theory, Dr. Behram Kursunoglu of the University of Miami presented a theory that contains elements of both and has room under its umbrella for all the known particles and many unknown ones. There is room there, he says, both for "things that have been seen and things that have not been seen."

Dr. Kursunoglu was somewhat diffident about presenting his theory, but Dr. Nikolai N. Bogoliubov of Dubna characterizes it as "a new and original approach to understanding the problem of symmetry. Many applications may be expected."

To get what he calls "a master equation for all particles" Dr. Kursunoglu started with the basic equations of the field theory, especially the one for the photon which is basic to the highly successful theory of electromagnetic particles. "To paraphrase a former Secretary of Defense," he says, "what's good enough for photons is good enough for everybody."

These field theory equations, he finds, are compatible with certain symmetrical group-theory patterns which are both larger and more complicated than those used up to now in arranging the strong-force particles. Combining the patterns represented by the different field theories gives Dr. Kursunoglu a master pattern that he calls G symmetry.

Then he proceeds progressively to break the symmetry. Symmetry-breaking has already become a necessity in studies of the strong-force particles, where theorists have found that they had to allow some elements of their pattern to be slightly out of place in order to accommodate the particles as they actually exist.

This more or less regrettable necessity becomes a basic part of Dr. Kursunoglu's theory. By gradually breaking his G symmetry more and more, he predicts the existence and properties of different groups of particles, beginning with the strong-force particles when the pattern is only slightly broken, going to the electron and related particles when the pattern is badly broken and to neutrinos when it is completely broken. Finally the theory predicts particles that have never been observed, including gravitons, whose existence is also predicted by current theories of gravity, and particles associated with a new class of subatomic force not previously encountered in theory or experiment.

For the known particles the theory gives a formula for computing their masses that according to investigation by Dr. Kursunoglu's colleague, Dr. Arnold Perlmutter, is in excellent accord with experiments. So far, says Dr. Perlmutter, the theory does not include the interaction of the particles, that is, their effects on each other. So the next project before Drs. Kursunoglu and Perlmutter is to work the interactions into the theory so that it will predict not only the existence of the particles but also the things that they do to each other. □

PUBLIC POLICY

New broom at FDA

Less than two months ago, Dr. Charles C. Edwards, a one-time Mayo Clinic surgeon turned administrator, assumed the leadership of the U.S. Food and Drug Administration. While declaring, "I am not interested in dwelling on the alleged past failures of this agency," he nevertheless inherited an outfit with a long history of problems with which he must deal.

It is difficult to find anyone who is happy with the FDA.

The drug industry, which must win FDA approval in order to keep its products on the market or to put new ones on, is dissatisfied with the way the agency is implementing the 1962 Kefauver-Harris amendments. These demand proof of efficacy as well as safety for all drugs. In one case, involving the combination antibiotic Panalba, the Upjohn Co. is challenging FDA regulatory procedures in court (SN: 7/26, p. 76).

Not long ago, former commissioner Dr. Herbert L. Ley Jr. testified before the Senate on FDA's position on food additives, including monosodium glutamate and artificial sweeteners (SN: 10/4, p. 295). On the MSG question, he said there was no evidence of harm, only to learn later, from the press, that indications of hazard had been found by his agency's staff. Congress wondered just how FDA operates.

The agency's on-again, off-again attitude toward cyclamates also cast doubt on its operations and caused considerable embarrassment to Health, Education and Welfare Secretary Robert H. Finch. All three issues contributed to HEW's dissatisfaction with FDA, and to Ley's ultimate ouster (SN: 12/13, p. 552).

Within the agency itself, morale is low. FDA scientists do not enjoy the same prestige as other HEW scientists, including those in the Public Health Service and National Institutes of Health, and it is difficult to attract high-level investigators to FDA positions.

Edwards is the fourth man to head FDA in five years. Whether he can cure the agency's ills where others have failed is moot, but in an inaugural address to 100 top FDA staffers recently, he promised a reorganization that would tackle all of the agency's weak spots. Details of the shake-up will be announced shortly, but already the commissioner has indicated some problems he considers worthy of special attention.

One centers around a drug efficacy review completed by the National Academy of Sciences-National Research Council. Scores of products that

the NAS-NRC ruled ineffective by Kefauver-Harris standards have yet to be removed from the market (SN: 1/11, p. 33). Edwards declares that he will soon propose a plan for efficiently implementing the Academy's recommendations before all the legal issues are resolved. Panalba is one of the condemned products, and the legal battle surrounding it is whether FDA can regulate it out of existence without a prior hearing.

In another effort to improve FDA's operations, Dr. Edwards, backed by his immediate superior in HEW, assistant secretary Dr. Roger O. Egeberg, will give drug companies advance warning of his intentions to withdraw a product in order to allow what Dr. Egeberg calls "time for mutual planning."

On a yet broader scale, the new commissioner intends to review the 1962 amendments that so increased the scope of FDA's regulatory authority. "We may seek some revisions," he states. The drug industry has few complaints with the laws themselves, but would like to meet with the FDA to review the agency's implementation of them. The Pharmaceutical Manufacturers Association, representing 105 of the nation's largest drug manufacturers, has proposed a conference including FDA and PMA spokesmen, as well as a third, "disinterested" party. Though no decision has been reached, the industry feels a positive response is more likely now than it was before.

To avoid repetition of the MSG and cyclamate catastrophes, new procedures will be instituted for directing data on "crisis" items to top management, and decisions regarding drugs and foods will be made with what may be a conservative leaning.

"As the biological and physical sciences probe deeper and learn to measure values even more minutely," Dr. Edwards says, "our common concepts of what is acceptable as safe must change. The time has come for us to agree that the public health cannot be endangered for months or years while we attempt to accumulate all of the scientific data needed for an absolute determination of safety or danger." □

HEW

After the veto

Legislation authorizing funds for the Departments of Labor and Health, Education and Welfare under the fiscal 1970 budget has been pending since July 1969 (SN: 1/17, p. 57). The appropriation bill, which affects some 15 agencies under the departments, may become the hottest issue of the election year.

This week, President Nixon vetoed the big money bill on the grounds that it was inflationary, and sent it back to Congress for consideration.

The bill increased the President's original budget by $1.2 billion, more than $1 billion of which was funded for education. Health and research funds were increased as well.

The most controversial measure, and the biggest item, concerns the $600 million requested by Congress for the Impacted Aid Program, which provides education funds for those areas which have a high concentration of Federal installations. The President's budget originally called for $202 million.

In this area a compromise may be reached. Senate Republican Leader Hugh Scott (R-Pa.) predicts that the Administration will go along with a figure of $400 million. Mr. Nixon has made no statement to this effect, and thus far has only suggested a temporary solution that would fully fund children whose parents live on Federal installations and partially fund those children whose parents do not.

On other issues, President Nixon disapproves of the increase in spending for vocational education because "results in student performance have fallen far short of our expectations." On health care he charges that increases are for building community hospitals, despite the growing awareness that ambulatory care facilities are more urgently needed.

One piece of the legislation, though small compared to the other programs, is a $49-million increase in research funds for the National Institutes of Health over what the President requested. In the early speculation about possible compromises, the NIH increase has not been mentioned, but it might become an issue if the negotiations become tense.

There is a chance, however, that the whole bill may go down the drain. The departments have been operating at a level determined by last year's budget, as authorized by continuing legislation, which is up for renewal at the end of January. If the veto of the budget bill is sustained, the House may go along with the President's substitute proposals, but the mood is otherwise in the Senate, where wounded pride is more pronounced. Says a spokesman for the Senate Democratic Policy Committee, "The Senate may go so far as to send the same bill back to the President for another veto." In that case, with the 1971 budget due this week, the continuing legislation may be merely continued.

POLITICAL SCIENCE

Sharing wealth and authority

American politicians and political scientists are traditionally perplexed by the problem of achieving a satisfactory balance between the powers of the Federal Government and those of state and local governments. Nearly everyone has some objection to the continually expanding range of Federal authority and influence. At the same time, local governments often lack the resources to undertake large-scale public welfare programs, and responsibility for such programs usually lands upon the Federal Government by default.

In his State of the Union message last week, President Nixon faced the problem head-on and unveiled his solution. Sounding not the least bit perplexed, the President announced that the hour of a "new Federalism" had at last arrived. Under the new Federalism, he said, "after 190 years of power flowing from the people and local and state governments to Washington, D.C., it will begin to flow from Washington back to the states and to the people of the United States."

The President did not, however, specify how a reversal of the tides of power was to be accomplished. Indeed, the portions of the State of the Union message concerned with social welfare suggest that on a practical level the problem remains just as perplexing as ever.

Most of the social programs that the President mentioned in his speech will inevitably increase Federal spending, and consequently Federal authority. Whether the $10 billion pollution control program will amount to a real increase in Federal spending is still being debated. There is no question, however, but that Administration proposals to support local law enforcement agencies will be expensive: The Government expects to double its spending in this area for 1971. And proposed welfare reforms, which Mr. Nixon placed at the top of his list of urgent domestic priorities, will cost the Government an additional $4 billion annually, at least in their first few years of operation. The annual income of $1,600 for a family of four that the Administration proposes to guarantee may not sound like a large sum, but it is all the Administration feels it can afford.

Other social programs to which the President alluded in a more general fashion promise to be equally expensive. He deplored, for example, the present trend toward a heavy concentration of the American population in urban areas, and suggested that a new rural environment must be created "which will not only stem the migra-