

been found that rodents, particularly gophers, have the disconcerting habit of chewing on the lead sheath, thus making holes which admit moisture.

LOOKING FORWARD

During the last few years there has been a tremendous growth in toll circuit requirements, particularly between the West Coast and the large centers in the East, due principally to activities in connection with the war effort. Whereas there were only 167 toll circuits con-

necting the West Coast with the East in 1940 this figure grew to over 1,200 at the end of 1945, and it is expected to be over 1,500 by the end of 1946. Almost half of these circuits terminate in southern California. Although the war has ended, continued increasing demand for telephone circuits is expected, but at a slower rate than during the war period. Coaxial cable is a very useful tool for meeting such heavy demands. As previously described, it may also serve to provide for a nationwide network of interconnecting television stations.

Is International Control of Atomic Energy Feasible?

By RICHARD M. NOYES

A report of the Joint Conference of the Committee on Atomic Energy of the Carnegie Endowment for International Peace, the Federation of Atomic Scientists, and the Commission to Study the Organization of Peace, held in New York City, January 4 and 5, 1946.

This article was written before the issuing by the State Department of the Lilienthal report on international control of atomic energy. This excellent report discusses many of the problems raised below and through the use of "denatured" plutonium envisages the possibility of somewhat larger power developments than were contemplated at the New York conference.—Editor.

EVER since the news of the atomic bomb broke on August 6, 1945, we have all been reading and hearing an undiminished flood of comment and discussion regarding its ownership and control. Such discussion constitutes the vital essence of democracy and is not to be disparaged, although it soon becomes apparent that many people are trying to reach conclusions without sufficient factual background.

With the avowed purpose of studying the possibility of atomic control in terms of existing technical and political situations, a knowledgeable group of men met in joint conference in New York City on January 4 and 5. The conference was arranged by the Committee on Atomic Energy of the Carnegie Endowment for International Peace, the Federation of Atomic Scientists, and the Commission to Study the Organization of Peace. It was organized as a round table discussion in which men from various bomb sites (such as Los Alamos, Oak Ridge, and Chicago) met with professors of law and economics who had been special consultants on missions to foreign capitols and to the United Nations Conference at San Francisco. As a representative of the Association of Pasadena Scientists, the writer had the rare privilege of attending the conference. It is impossible in a short article to present an adequate summary of two days of highly intensive discussion, but a few of the more important points can be mentioned.

During the first session the scientists led the discussion of the question whether control of atomic energy installations would be technically feasible, provided it were politically possible. At subsequent sessions the current international political situation was reviewed, and the necessity for modifications in the Charter of the United Nations was discussed at some length.

The mining engineers presented the most optimistic report of any at the entire conference. Guided by mining experience with gold and diamonds, and the history of the international control of the narcotic trade, they reached the conclusion that it would be feasible for a staff of moderate size to check operations of known uranium mines and to account for virtually all of the ore removed. This work, they reported, to be completely effective should be supplemented by periodic aerial sur-

veys for indications of mining activity at new sites, and spectrographic analyses of samples from all mines handling large tonnages of ore, in order to insure that uranium was not being extracted as a by-product.

Discussion of atomic power installations was limited to consideration of those handling separation of uranium isotopes by gaseous diffusion, and to the manufacture of plutonium in piles.

Although the leaders of the discussion were obviously hampered by their inability to reveal pertinent information, the general belief was expressed that a diffusion plant would be very difficult to construct in secret because of the necessity for large numbers of key items, but that a plant could probably be operated without detection once it was constructed. The scientists believed that it would be almost impossible to prevent a moderate diversion of fissionable material in a diffusion plant supposedly operating legally under international control. Because of these conclusions, the need for the initiation of international control at the earliest possible moment was emphasized.

The final decisions with regard to plutonium manufacture were very similar to those for diffusion separation, except that it was considered less likely that a hidden plutonium plant could operate without detection. It was recommended that at least for the next generation, no country be allowed piles capable of producing a total of more than 25,000 kilowatts of atomic power. Such installations were deemed adequate for research, and medical and small-scale developmental uses, and it was believed impossible to divert enough of this material to produce a decisive number of bombs.

It was the general consensus of opinion that although inspection and control of no one material or process could be completely effective, illegal manufacture of atomic bombs could very probably be detected by independent procedures. Provided that international inspection and control of several of these procedures were politically possible, it was believed that there would be no possibility of a nation's manufacturing a decisive number of bombs in secret.

The second session of the conference was devoted to reports on attitudes of various governments, especially of the members of the "Big Three", to the current situation. The last two sessions were concerned with what could be accomplished within the framework of the United Nations Organization and how the Charter should be modified in order to accomplish control.

It was pointed out that the United Nations Organization as such had no authority to institute inspection procedures in the territories of any of its members, but only in those areas assigned as dependencies under the

trusteeship plan. It was also emphasized that at the present time piracy was the only crime for which a man could be tried in the court of any and every nation, and that international control of atomic energy would require a modification of international law to permit the control commission to institute legal proceedings against individuals rather than against states. If any plan for inspection and control of atomic energy were adopted it would have to be in the form of a treaty ratified by the individual members and not in the form of a binding regulation passed by a majority of either the Assembly or the Council.

The final conclusion reached by the conference was that a nation bent on aggression could not be stopped by the present system, and that to enforce atomic control it was necessary to have a limited world government in the sense that there must be a legislative assembly with no veto, limited taxing power, and the authority to institute legal proceedings against individuals. Such regulations would apply primarily to control of atomic energy but would probably have to apply to other problems as well. It was judged that Britain might accept such a situation (on the basis of public statements by Mr. Eden and Mr. Bevin) but that the United States and Russia might raise objections.

The conference obviously did not solve any of the world's problems, but it did serve to indicate the technical possibilities and limitations on control of atomic energy and the nature of the political changes necessary to make such control possible. By thus defining the situation to be faced, the conference served to clarify our thinking on this matter which so vitally concerns us all.

SAN FRANCISCO CHAPTER MEETING

Reported by Ted Vermeulen '36

A RECORD attendance of fifty-four alumni in the San Francisco Bay area took part in a dinner meeting Friday, March 29, at the Hotel Claremont in Berkeley. The address of the evening was given by Edwin M. McMillan '28, professor of physics at the University of California, who had an important part in the atomic bomb development at Los Alamos and also worked on radar and on submarine detection during the war. Dr. McMillan discussed the nature of the different nuclear particles now known and the types of the different nuclear particles now observed.

The following alumni were present:

R. E. Alderman '25	B. B. Johnson '31
M. A. Baldwin '27	W. J. S. Johnson '35
S. A. Bamberger '33	R. C. Jones '37
J. Y. Beach '36	A. E. Jurs '38
A. S. Bishop '43	P. H. Kafitz '42
R. H. Bishop '39	H. E. Larson '27
R. B. Bowman '26	G. E. Liedholm '31
W. H. Claussen '32	J. F. Mayer '40
R. B. Connelly '39	F. J. McClain '34
E. G. Crawford '33	J. F. McGarry '31
J. D. Davis '34	W. W. Moore '33
H. H. Deardorff '30	A. E. Myers '29
W. L. Dickey '31	D. S. Nichols '28
Ed Dorresten '24	A. Polgar
L. H. Erb '22	D. J. Pompeo '26
Virgil Erickson '37	W. G. Reynard '31
E. M. Farly '26	T. R. Sandberg '37
R. G. Folsom '28	R. M. Shultise '39
L. D. Fowler '23	C. P. Smith '34
T. O. Gerlishe '19	W. T. Stewart '41
N. L. Hallanger '34	F. B. Stitt '36
R. J. Hallanger '35	F. E. Strauss '33
J. J. Halloran '35	Ted Vermeulen '36
J. C. Harper '40	H. G. Vesper '22
D. A. Harries '23	W. A. Wickett Ex-'37
A. J. Hazzard '30	H. M. Winegarden '24

Howard Vesper invited the chapter to hold its annual sports day at his home in Oakland, "Cactus Rock", again this year. The date was set for Saturday, May 25, and alumni in this area are looking forward to this outing as an outstanding event of a successful year.

Symbols of a Changing World

(Continued from Page 8)

Emperor. This was the theme followed all the way from the battlefields to the little man in the street who died in the bombing raids.

Another outstanding operation of the war was the mining of the home waters surrounding the Japanese empire. Interrogation of the Japanese mine experts brought out the fact that they had no known method of sweeping these mines and that the loss of shipping was terrific. Ships were forced to sail over known mine fields. During the months of April, May, June, and July of 1945, mines sank 65 per cent of the shipping that was lost. Throughout the war Japan's lack of shipping had been a severe handicap.

It was evident, too, that the work of our submarines had been even better than we had hoped for. Our submarines sank 45 per cent of the entire tonnage that was lost by Japan during the war. The Japanese started with approximately 7,000,000 tons of merchant shipping, built 4,000,000 tons, and ended with approximately 1,000,000 tons of which 500,000 tons were damaged. It was evident that Japan had lost the war at least a year before she actually surrendered. On V-J Day, she had only 1,000,000 gallons of gasoline in the empire, with no prospect of getting any more. She had had no Navy for almost eleven months, since the second battle of the Philippine Sea. Of her 14 battleships, Japan had lost 12, including her best and newest, the Yamato and the Mushasi. She built 18 carriers and lost 18 during the war. She had but 4 remaining, only 1 of which was able to put to sea. Her losses included 33 cruisers, 157 destroyers, and 87 submarines. So it is readily seen that she had suffered complete destruction of her Imperial Navy, and there was practically no defense left or any method by which the Japanese could control the sea in order to import the necessary goods for sustaining the war effort. There was no love lost between Japan and Germany, although the Japanese were using many inventions developed by Germany. The Germans had made Japan pay through the nose for the trade secrets involved, and one of the experiences that made Japan most bitter against Germany was the discovery by the Japanese that our induction mines, which we had copied from the Germans and they had captured on the Shortland Islands, were duplicates of those that Germany had sold them.

It was apparent from talking with the Japanese scientists at the Imperial University at Tokyo that the Japanese military had made practically no use of their talents. The only exception to this practice was the Japanese Navy Department's request that the physicists at the Imperial University aid in solving the mine problem. However, as was customary, the entire problem was not given to the University but only a small piece, which was not sufficient for an intelligent attack of the problem. Throughout Japan only very few people were "in on" the complete plans for the war. No one trusted anyone, or if anyone did trust another, he didn't give him all the information involved. It was surprising to find senior captains of ships that had been in major engagements who did not know the entire battle plan.

The results obtained by our dive bombers at the battle of Midway were confirmed by interviews with Captain Aoki of the Akagi, which went down at the battle of Midway. The other three carriers, the Hiryo, the Soryu, and the Kaga, were also sunk in the same engagement. Captain Aoki stated that the Japanese were surprised