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A Year of National Military Service Can Be An Asset to America

By ROBERT A. MILLIKAN

WISE men, wise universities, and wise nations build their advances upon the foundation of the past. If they do not they violate the most fundamental law of evolutionary progress. Obviously, then, we want to go back to much, indeed to most, of the good life we had before the war. For what is the reason we all give for having entered this most terrible war in history? What is our reason for continuing to fight on with every ounce of strength we possess? Does not every one answer: "To preserve our great inheritance from the past, the free American way of life, characterized, first, by free representative local self-government, as distinguished from centralized control, political or economic, i.e., totalitarianism; and, second, by the opportunity to rise through individual initiative, energy and ability, as distinguished from equalitarianism, a philosophy which stands condemned by its historic failures as well as by the great Teacher in His parable of the talents."

We knew we were obliged temporarily to relinquish our freedom in order to fight totalitarian states. We decided to do it because we believe Americans have the capacity to go back to the American way of life after victory. Otherwise we should have joined Hitler at the start and let freedom go forever. It is now our job to recapture our freedom.

But what I am saying now is that we will not, we cannot, after victory recapture that life completely. For every intelligent American learned from Pearl Harbor, if he did not know it before, that our fancied security behind our two oceans was an illusion and that henceforth we must keep ourselves prepared and so organized as to enable us to meet possible external aggression. At a terrible price we have at last learned our lesson, namely, that isolationism and pacificism (in effect these two, despite their philosophical differences, are identical) only breed more wars.

If we are very foolish we will try to defend ourselves alone. If we are intelligent we will in some way combine our forces with those of other peace-loving people for the purpose of defending ourselves against the attacks of the international bandits. This amounts to nothing more than extending the policing type of function which every civilized nation on earth has found that it had to adopt, and to practice within its own borders, as the only historically justified way to hold in check the depredations of its internal bandits. We have now got to do the same to defend ourselves from the external bandit nations. This latter method should cost us much less than would any plan for going it alone.

But simply because we are one of the earth's richest and most powerful nations, our share in that policing, whatever form it takes, is not going to be small. Hence, after this war the United States cannot return to its former undefended condition. It must train and keep trained for service on land, on the sea, and in the air many more fighting men than it has ever had to maintain in the past.

In view of this situation, a bill is now before Congress that attempts to meet this imperative need by requiring of every American boy one year of military service, either in the Army or the Navy.

If this bill, sponsored by the secretaries of the Army and Navy, and vigorously supported, too, by General Marshall and Admiral King, becomes a law, there will be here one very important particular in which the life of every American boy will be notably different after the war from what it has been in the past. Further, this change would have significant repercussions upon undergraduate life at the California Institute of Technology. It is some of these repercussions that I should like to point out and discuss.

Admiral Jacobs, in charge of personnel for the whole Navy, told us here some time ago that so far as the Navy is concerned—and our part in this program is likely to be with the Navy—this year of military service would in general come immediately after completion of the 12th grade, i.e., at the graduation from the high school. This normally comes on the average a little after the passage of a boy's 17th birthday.

The boy to be trained by the Navy would be sent to one of the already existing naval training posts, like the Great Lakes Training Station, just north of Chicago. The first four months of his Navy service would be devoted to naval indoctrination, including discipline, drill, physical training, etc.; in Navy parlance it would be "boot camp" training. The second four months would

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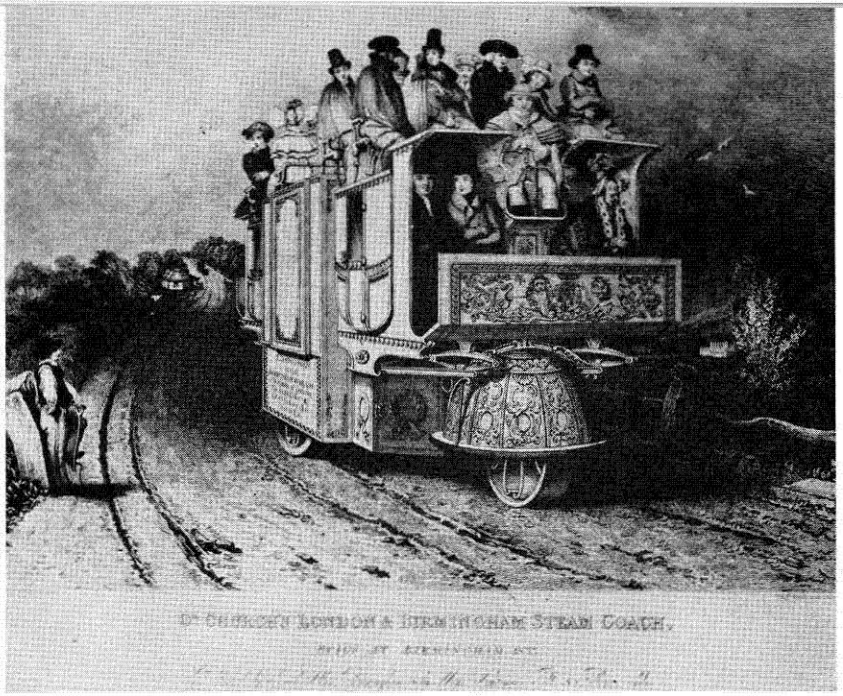

FIG. 4. Church's ornamental three-wheeled steam coach (1833). (From an engraving by John Cooke and Josiah Allen.)

of Stratford, England, built nine steam carriages of various types, all of which were mechanically successful. On April 22, 1833, one of these, named the *Enterprise (Fig. 3)*, was put into regular service between London and Paddington. This was the first mechanical vehicle especially built as an omnibus to be put into continuous service. Being more novel than the horse-drawn coaches, it was favorably received by the public.

Fig. 4 shows a curious coach built in 1833 by William Church. This coach, which ran for a time between London and Birmingham, had wheels with flexible spokes and very broad but elastic rims.

Further details of early road vehicles and their history will be found in the *Histoire de la Locomotion Terrestre*, by Charles Dollfus *(L'illustration*, Paris, 1936) and in the *Catalogue of the Collections in the Science Museum, South Kensington, with Descriptive and Historical Notes and Illustrations. Land Transport. II. Mechanical Road Vehicles* (London, 1925), from which much of the foregoing discussion was taken.

Military Service

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add vocational training of some sort for every boy, the trainee being permitted to choose the field of his training. At his volition this vocational training could be manual or commercial, just as a similar choice is open to enlisted men now in the Navy. The third four months the trainee would go to sea.

The American Association of University Professors has sent a questionnaire to university professors all over the country asking for votes on details of such a program, but closing with the question: "If you are opposed to universal military training, how do you believe that the national defense can best be safeguarded?" Otherwise stated, what other alternative is there? Granted that isolationism and pacificism, two attitudes which are identical so far as their war-effects are concerned—and those effects have been to prevent us from being prepared either to defend ourselves or to help other nations in putting down international aggression at its inception, as we ought to have done before Poland was attacked—granted that we have learned our history lesson and that these two attitudes are now dead, there then seem to be but two alternatives before us as to method, namely, either (1) to maintain a powerful professional army, navy and air force (the history of Rome and of continental European nations shows how bad an alternative that is) or (2) to train each citizen to take some part in the national defense and in the maintenance of a peaceful world.

Suppose, then, that some form of the universal service bill passes. Look at the values that, if it is properly done, can come from it to life in America and in particular to life at C. I. T.

First, that year of continuous training and toughening of the physiques of the whole manhood of America will tend to form habits of bodily care that can make a healthier America than has thus far existed, and a healthier and huskier group at C. I. T.

Second, on a preceding occasion I have expressed my own confidence in the moral value of the discipline which I found in a recent visit to Annapolis, the training in punctuality, in orderliness, in cleanliness, in gentlemanliness, in truthfulness, in honor, even in religion. Can there be any doubt that subjecting every boy in the United States for a year at the age of 17 to just this kind of training under Army and Navy officers and their chaplains would make a better postwar America and a better postwar C. I. T. than existed in prewar days? The freshmen who entered here at the age of 18 would come here fresh from a year of that kind of discipline.

Third, one main purpose of a *universal* elementary and secondary school system is to train every citizen in the duties, the responsibilities, and the art of good citizenship. Democracies having universal suffrage cannot possibly survive unless at least 51 per cent of the voting population have the background that enables them to cast reasonably intelligent votes. What an opportunity that year would give to teach with all the most modern movie techniques now available the meaning, the methods, and the responsibilities of American citizenship! Imagine, for example, the Chief Justice of the United States standing, in pictures, before all the boys of the nation and talking with them for an hour on the significance of law observance. Multiply that influence say only 50 times—one talk a week for a year by 50 of the most distinguished men of the nation—and what an inspiring course in the fundamentals of citizenship you could have.

Fourth, the giving of every boy in the United States the opportunity, while living under military discipline, to make a beginning in learning some manual or commercial skill could be made to begin at least to rectify

the weakest spot in the whole American educational system, namely, the lack of any sort of an apprenticeship system for providing the country with its own skilled workers rather than forcing us to import most of our skilled artisans from abroad, as we have done in the past.

I leave your imagination to fill out the picture. Great possibilities are certainly ahead. Will we have the intelligence to grasp and make the most of them? I should like to come back to this campus 20 years from today to find out.

Citrus Products

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industrial research program either on the so-called fundamental or the so-called practical side.

Pectate pulp is a product that resulted from research discoveries; after discovery uses had to be found for it. Sodium pectate, made by neutralizing pectic acid, has been known since 1825, as has pectin. They had similar colloidal properties, the pectic acid being perhaps less satisfactory for most purposes than the now highly successful pectin. By a simple change of process the Exchange found a pectate having much higher molecular weight which makes film-forming, viscous solutions. Moreover, it was possible to process the material without separating the cellulose, and the finished low cost material, when dispersed at the point of use, embodies both a highly colloidal sodium pectate and very finely divided cellulose.

But of what use is it? The uses are developing rapidly now, but at first considerable time was spent on some which did not materialize. One such was for quenching in heat-treating steels. Because of the low cost, controlled viscosity and non-inflammability, this appeared attractive and may yet be. However, oil well drilling mud treatment (to prevent water loss to porous strata) and paper coating (to prevent sticking of packaged synthetic rubber) have proven very much more practical than that young hopeful, the modified aqueous quenching medium.

VITAMIN P

An odd sequence of discovery occurred a few years ago regarding so-called Vitamin *P*. The Nobel Prize winner, Albert Szent-Gyorgyi, of Hungary, announced his discovery of this vitamin in lemons during 1936. Vitamin *P* was so named because it corrected excessive permeability of the capillaries and it alleviated hemorrhagic purpura. Several years earlier it had been discovered in California, in connection with spray drying of lemon juice (for cosmetic use), that an unknown constituent of the juice together with boric acid produced a brilliant yellow color. It was later found to be due to a certain group of flavones and of flavone derivatives, the same that are now considered the active materials in the Vitamin *P* substances. Here was a case of finding a color reaction for a vitamin years before the vitamin was discovered!

The research on citrus products has been accomplished in the aggregate by Government laboratories, State agencies, commercial firms, and the Exchange Research Department, which, as already stated, is the activity of a growers' cooperative and is guided by a Research Committee of grower-directors. Although the number of technically trained men employed in the Research Department has averaged about 12, and publication of results is not the objective of the work as it necessarily is in Federal and State laboratories, still the total number of publications refutes any notion that this is an industry where secrecy may have limited the progress. The present total of technical papers, bulletins and patents published is 222, covering a wide variety of subjects. It would be difficult to prophesy the future of citrus products but it can be expected to feel the influence of the same technical and scientific advancement which will guide all postwar industry.

C. I. T. NEWS

HERBERT HOOVER, JR., TRUSTEE

The California Institute of Technology announces that *Herbert Hoover, Jr., has been elected to its board of* trustees.

The son of Herbert Hoover and the late Lou Henry Hoover, Herbert, Jr., was born in London, England, and attended Stanford University, graduating in 1925 with a B.A. degree. In 1929 he won his M.B.A. degree at Harvard University. He was a member of the research staff of the Harvard Business School in 1928 and 1929, and from 1929 to 1931 he was communications engineer for the Western Air Express, followed by three years of service in the same position with Transcontinental and Western Air, Inc. In 1934 and 1935 Mr. Hoover was a Teaching Fellow at the California Institute of Technology.

Mr. Hoover is president of the Consolidated Engineering Corporation and the United Geophysical Company, both with offices in Pasadena, Calif. He is president of the United Engineering Company of New York and a director of the C. R. B. Educational Foundation. He also is a member of various professional societies, including the American Institute of Mining and Metallurgical Engineers, the Institute of Radio Engineers, and the Society of Exploration Geophysicists.

Mr. Hoover, a resident of San Marino, Calif., is married and has three children, Margaret Ann, Herbert, III, and Joan Leslie.

CHINA IN PEACE AND WAR
As related by E. Harrison King

THE alumni dinner meeting held at the Hotel Clark on the evening of March 8 had as its speaker E. Harrison King, instructor in hydraulics at the Institute. Mr. King vividly described China as he knew it while professor of civil engineering at St. John's University near Shanghai and as an internee in a Japanese internment camp following America's entry into the war in 1941.

Mr. King first told of the general Chinese background by comparing Chinese cities with Chicago, New York, and other American cities. The skyscrapers of Shanghai are high and numerous, reminding one of New York City. At the other extreme of comparison, Mr. King spoke of one city of 130,000 population near Shanghai which has no railroad or highway leading to or from it. The city has a wall and moat surrounding it, the moat joining with canals which permit small sailboats to reach the outskirts of the city. The only other means of transportation into the city is by cart and dirt path.

Mr. King commented that a few of the customs and methods of the Chinese are not understood and therefore not respected by many Americans. However, he stated, if these customs and methods were understood they would be recognized as effective and respectable. Mr. King explained that the attitude of the Chinese is that they can work their problems out in their own way