

practically as their life's work. If they contemplate the probability of going out of government employ every four years and making room for a man of some other political complexion, or for some one who has rendered the incoming administration important political service, then no great or lasting progress can be made in government efficiency. We have before us two object lessons which illustrate, in a very remarkable way, the necessity for permanency in government positions. These object lessons are presented by the two most important manufacturing or engineering departments of the government, namely, the Ordnance Department of the Army, which controls the manufacture of the guns, ammunition, munitions of war, and supplies of all kinds for the Army; and the Navy Yards, which perform a similar function for the Navy.

At the head of each of these Departments we have, individually, an unusually fine set of men. It should be made perfectly clear to the public that, as a class, our naval officers represent a magnificent body of picked men, who are devoted to the government service, who are self-sacrificing, and who in their duties at sea are an uncommonly efficient and hard-working set of men. Too large a part of our people look upon our naval officers as rather ornamental men who fill easy berths. This is far from the truth. It would be difficult to find a more devoted, hard-working and upright set of men than compose a great body of the officers of our Navy. The writer has been fortunate in having been placed in close, intimate contact with numbers of these men for many years, because he was engaged in the Midvale Steel Works, in the Bethlehem Steel Works and Cramps Ship Yard, in the manufacture of the materials from which our big guns, armor plate, ships and the machinery in them, were manufactured, and in his whole personal experience he never met a single naval officer with whom there was even the slightest suspicion of corruption or in fact of anything but the highest motives. The same is equally true of our army officers. The writer has had more to do with the officers in the manufacturing department of the government, that is, the Ordnance Department, than with the line officers, but with all of these men his experience has been the same as with naval officers, namely, that they represent the highest type of American citizens. The criticism, then, which is being made of the Navy, as well as against the Army, is one of system and methods, and not of the personnel.

The scheme of management in all of our navy yards has involved bringing on shore from one to three years' all naval officers, and placing them in command of the navy yards as a whole; also of placing the detailed management of each of the shops, and even the subdivision of the shops under

naval officers, who come directly from sea duty. It is no reflection on these naval officers to say that these men, who are admirably trained and suited to their work on board battle ships, are utterly untrained and unfit to manage the industrial work which goes on in the navy yard. Any one of these naval officers would recognize the complete unfitness of, we will say, the best manager of a large machine shop to take command of a battle ship, and yet without hesitation these men, who have been trained to the command of battle ships; assume all of the responsibilities of the manager of a machine shop. Thus, it is perfectly clear that for success in managing any one of the large manufacturing departments of the navy yards, the man must make it his life's work, and must have been especially educated and trained to it, just as he should be especially educated and trained to the management of the battle ship.

In many respects, also, the training which the naval officers receive at sea largely unfits them to be at the head of an industrial establishment. The kind of discipline which must be maintained on shipboard, the methods, which must be used there in directing the 800 or 1,000 men on a battle ship, are almost directly opposed to the methods which must be used in the management of the men of a machine shop. Their habits of mind and the whole education which they have received in handling men at sea actually unfits them for handling men in civilian life, and this makes it almost impossible for them to learn very much about the management of a shop even in the two or three years during which they are detailed to this work. For this reason, while our navy yards have been in the past officered and commanded both in gross and in detail, nominally by naval officers, they have really been managed and run by the civilian foremen and quartermen, etc., who in our navy yards are distinctly the cheap second, third and fourth class men. And it must be said that it is next to impossible to get a really first-class foreman to accept service under naval officers in our navy yards.

Again, the fact should be emphasized that this is no reflection upon the individual character of our naval officers, but it marks the great, and, I suppose, essential difference in the types of management necessary for success in civilian life and in military life.

It may be said, then, of these naval officers, that they come to their jobs in the navy yards knowing practically nothing about their work, and that they leave their jobs in nine cases out of ten, after two or three years of service, with almost no knowledge of industrial work. Shore duty for men is an incident. Their real life's work and their ambitions and hopes for success, lie at sea; and very properly they look upon their shore duty in most cases chiefly as their opportunity to make the acquaintance of their fami-

lies and get in touch with the life of the country. They themselves realize the impossibility of becoming skillful in more than one profession, and practically do not make the attempt.

These cheap civilians who are really in command of our navy yards, unfortunately, have no interest whatever in promoting efficiency. In fact, they join with the workmen in the yard, and are universally backed up in this by the labor unions, in trying to make employment in the yards for the largest possible number of workmen, and in many, if not most cases, they assist the workmen in seeing to it that each man does a small day's work, instead of a large day's work, thus making room for more employes.

The Ordnance Department of the Army, on the other hand, presents a totally different object lesson. In this Department, the officers are selected from the line of the Army by competitive examinations, and they enter this Department expecting to devote their lives to the industrial problems rather than to the military problems; that is, to the scientific study of the design and manufacture of the implements of war, which becomes mainly an industrial problem. Thus the mental attitude of these officers differs entirely from that of the navy officers. Their ambitions lie towards promoting efficiency in manufacture. The present organization of this Department offers an ideal opportunity for the development and selection of men well suited to their work. At the end

THE PRINCIPLES OF SCIENTIFIC MANAGEMENT

By FREDERICK WINSLOW TAYLOR

By far the most important fact which faces the industries of our country, the industries, in fact, of the civilized world, is that not only the average worker, but nineteen out of twenty workmen throughout the civilized world firmly believe that it is for their best interests to go slow instead of to go fast. They firmly believe that it is for their interest to give as little work in return for the money that they get as is practical. The reasons for this belief are two-fold, and I do not believe that the workmen are to blame for holding these fallacious views.

If you will take any set of workmen in your own town and suggest to those men that it would be a good thing for them in their trade if they were to double their output in the coming year, each man turn out twice as much work and become twice as efficient, they would say, "I do not know anything

¹An abstract of an address given by the late Dr. Taylor before the Cleveland Advertising Club, March 3, 1915, two weeks prior to his death. It was repeated the following day at Youngstown, Ohio, and this presentation was Dr. Taylor's last public appearance.

of every three or four years (?) the young officers are obliged to go back to the line of the Army for a year's work, and unless they have made good in their work as manufacturers or designers they are not again taken into the Ordnance Department. On the other hand, if they themselves find that they are unfitted to work of this character, they can voluntarily return to the line. This insures the gradual selection of men especially picked for the manufacturing duties, and this primarily accounts for the fact that the work of the Ordnance Department under the Secretary of War, with General Crozier at its head, represents the only case in which government shops and government employes are able to successfully compete, as far as the cost of manufacture as well as accuracy and finish of the work is concerned, with corresponding manufacturing companies in civil life.

It should be emphasized again that the officers of the Army are of the same general calibre of men as those of the Navy, so that the utter failure of the Navy, the fact that the navy yards become a byword and a laughing stock in industrial life, is not due to a difference in the naval officer from the army officer, but is due to the difference of the systems in vogue in the two, and until we have permanent managers in our navy yards there is no hope whatever of any great increase in efficiency. This again illustrates the fact that you must lay your foundation by beginning with the men at the top, not with those at the bottom.

about other people's trades; what you are saying about increasing efficiency being a good thing may be good for other trades, but I know that the only result if you come to our trade would be that half of us would be out of a job before the year was out." That to the average workman is an axiom, it is not a matter subject to debate at all. And even among the average business men of this country that opinion is almost universal. They firmly believe that that would be the result of a great increase in efficiency, and yet directly the opposite is true.

THE EFFECT OF LABOR-SAVING DEVICES

Whenever any labor-saving device of any kind has been introduced into any trade—go back into the history of any trade and see it—even though that labor-saving device may turn out ten, twenty, thirty times that output that was originally turned out by men in that trade, the result has universally been to make work for more men in that trade, not work for less men.