

life's activities generally must surely be to strike a workable balance between tradition and departure, between the accepted and the original, in short, to equip student and executive alike for a profitable tussle between *routineering* and *pioneering*. How to restrain the knowledge that we have from becoming an obstacle to more knowledge that we might have is a nice problem in individual psychology.

Mr. Taylor's Method

Mr. Taylor succeeded, to a greater extent than any of his contemporaries, in lifting management practice from the realm of gossip to that of law—from whim to a procedure that should govern executive and operator alike. To reach the governing rule he went through an immeasurable process of detailed examination, discarding assumptions, indeed treating them as nonexistent, and by tireless building up of minute data, he formulated operating procedure that could be bettered only by an equal or even more painstaking examination. In no respect was Mr. Taylor's thinking less autocratic and more American in spirit than in his quest of the one best way to do a given task. That the spirit of his procedure has not always been followed in the practical application of it, that less of the painstaking quality and respect for all available sources of cooperation has sometimes marked the methods of installation, merely proves that the best of schemes can work no magic by itself, and that vigilant self criticism and apprehension of the dangers inherent in converting discovery into routine are among the tools for winning practical success.

A management program such as Mr. Taylor's has sometimes in practice been associated with an impatience of what was characterized as theory and irrelevant abstraction. With a program that was notably built on a defiance of assumptions, a host of assumptions now and again crept in, as one executive or another started out to install his new system of management. These assumptions had to do mostly with the economic aspects, or to use a vaguer phrase, with the human aspects of the installations.

The hater of theory and abstraction, that is to say, the uncritical practical man, so called, in reality never more pathetically loses himself in cloud and fog than when he fails to do his economic

thinking with something of that honesty, humility and rigor that he has learned to use in his administrative work. In management, both human and material forces challenge all that one has of skill, information, insight and power of adaptation. Theory is an ingredient in power of adaptation. One need have no fear of theory that is a result of the same mental processes that mark the shaping of material operating programs. What is mischievous is half baked theory, untested assumption, the prejudice that masquerades as judgment. No man is ever without his theories and speculations.

But in the scientific mind theory is, an honored guest; abuse of hospitality leaves its mark on the imperfectly made practical mind. The static, in his thinking cries aloud for correction. I have always been impressed by the speculative range of Mr. Taylor's mind—a large ingredient in the charm of his conversation and his outlook on industry and American civilization. That his urge to make work less wasteful made him seem at times impatient of any but the most direct routes need not blind us to the less tangible qualities that played a large part in shaping the mind of the man after whom this Society is named.

Benjamin Franklin was as practical a man as ever lived. It is not generally recalled that he was one of the most cultured and cultivated men of his times—an inventor, a business man, diplomat and philosopher; at home with tools, at home with men and at home with ideas.

In the discovery of radium by the Curies all the mental operations up to the use of pitchblende were inductive; after that every step taken by them was pure deduction based on their carefully reasoned a priori assumption of an unknown substance.

Maxwell foretold the existence of electromagnetic waves from his equations twenty five years before their demonstration by Hertz. Our radio age is his brain child; as our chemical and metallurgical civilization owes a debt that can not be paid to the modest self effacing Willard Gibbs, who more than a generation ago at Yale University worked out the basic industrial formulae of thermodynamic chemistry. Please note that Gibbs preoccupied himself not with manipulations so much as with meanings. To conventional thinking he sought to bring some of the art of thinking straight. This man known to his time, where

known at all, as a mathematical theorist and nothing else, appeared to a few of his enlightened contemporaries, as he now does to the wisest leaders of our industrial civilization today, as one of the few men who did the most to make that civilization possible.

"Inert Ideas"

A Franklin, a Gibbs, a Taylor, find that their hardest fighting must be done against "inert ideas." The untaught man has this advantage over the so called trained man who has not had his attention drawn to the mischief which inert ideas can work; the untaught man somehow puts to work such modicum of thought or idea as he may have. What he has is in working order. That is why you recall a talk with such a mind as an addition to the stock of wisdom and the language with which such a mind speaks as a reminder of the original strength of our common speech unthinned by bookishness.

Throughout my teaching years I could never, nor do I now, distinguish between a type of training supposed to make for culture and another for practical power. What these terms can possibly mean in a democracy I have yet to learn. Pedantry and snobbishness may suggest where the Chinese Wall may be found, but if we know what our proper business is we do not need to search far for the normal integrations between culture and special knowledge, structure and use, abstraction and application, theory and practice.

An Oxford professor whom I know, dealing with that most abstruse of all possible subjects, that of ancient manuscripts, was surprised to find among his interested auditors in a small lecture course that he gave a man whom I heard President Eliot describe, when he gave him an honorary degree, as the greatest living medical consultant. I refer to the late Dr. William Osler.

Mr. Taylor said in his address at the dedication of the University of Pennsylvania Engineering school in 1906, "I look back upon the first six months of my apprenticeship as a patternmaker as, on the whole, the most valuable part of my education." I wish that he had told us more about that formative period. He recurs to it now and again but rather sketchily. Very early he gave shape to that vitalizing impulse of his to convert a nation of amateurs into expert work-

men. And the vision he had of labor was the transforming one of turning the Biblical curse into activity which held some element of that joy taught by the monks of old. Technique, like labor saving machinery, helps toward such a release; so does practical appreciation of the intrinsic and varied qualities of manpower. William James said that the main object of education is to help us know a good man when we see one. A power to secure sound performance, finished work with minimum outlay, when coupled with the gift to enlist will-power, is the high-water mark of competent management. This calls for technique and something more. Experts in the discovered and experts in discovery are not often provided for in one and the same plan. In our view of the making of the practical man some provision has to be made for an understanding, a sympathy, with both types of achievement, and the capacity to work with them.

Carlyle's definition of religion is "the thing that a man does practically believe," a compound of faith and technique. A tag maker in the town of Framingham, Massachusetts, found a way to make tags and partners at one and the same time.

Facts and Philosophy

Your insistent fact hound may sometimes reveal himself to be a deeper visionary than he would care to admit. The man who made science teaching a national interest and joy in this country, who trained about every naturalist of note in the generation that is passing, was Louis Agassiz, whose museum in Cambridge is one of the world's greatest. He had use, he said, only for men who could bring him facts. He chided the theorist. Among his famous sayings was the one that he had "no time to make money." Time has had its revenge, I may say in passing, by making his son the developer of the famous Calumet and Hecla copper mines, and his gifted grandson, the present head of this company. If ever a man was an example of a shining faith, of a philosophy of human relations and service, it was this fact exacting teacher, inspirer and founder.

Whatever may be the concrete showings of the organizer and administrator, he betrays impoverishment in the extent to which he ignores the debt to the abstract thinker and theoretical experimenter; in the degree to which his own mind is