

directly into acid in the process, has been put into operation at Nashville.

The use of the blast furnace was first suggested in 1868 but was deemed commercially impracticable at that time. Hence for thirty or forty years the manufacture of phosphoric acid was carried out in the electric furnace.

In 1917, the Bureau of Soils of the Department of Agriculture became interested in the subject because of the desire for producing a concentrated phosphate fertilizer. The Bureau went on the theory that ordinary silica sand heated to a high temperature in the presence of carbon was capable of expelling phosphorus from the rock. An oil fired furnace gave promising results and inspired chemists to work toward the development of the present blast furnace burning coke under an enforced air blast.

Several furnaces were built by Mr. Easterwood and his associates before the ninety-five foot monster at Nashville came into being. Many difficulties had to be overcome of both a chemical and engineering nature. As finally developed the process consists of burning briquettes composed of phosphate rock, silica sand, and coke to phosphorus pentoxide and treating the product with water to form the phosphoric acid.

The acid, because of its chemical properties, must be shipped in rubber lined cars. The last step is its conversion into phosphate compounds for fertilizers, food purifiers, and drugs.

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#### ICHTHYOLOGY

## Fish Spins on Tail Over Sea Surface

**A** FISH that seems to walk on its tail is one of the new mounted specimens on exhibition at the Philadelphia Academy of Natural Sciences. It is a ribbon bill fish that can spin along upright on the surface of the sea for several hundred yards and thus appears to be walking on its tail.

This fish is the "whippet" of the so-called "hound" fishes—a long, thin creature that spends its life on or near the surface of the sea, skimming along at a rapid pace and every once in a while "walking" as above mentioned. It is not far removed from flying fishes, which appear to use their fins as wings and present a most beautiful sight when seen in large numbers in tropic waters.

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#### PSYCHOLOGY

# Unpredictable Human Factor Attacked by Psychologists

## 300 Studies Reviewed by Dr. Watson Begin to Penetrate Mystery of Man Which Obscures Events of the Future

**T**HE SUCCESS or failure of NIRA, as well as the other magnificent or trivial projects of mankind, depends in the last analysis upon the nature of man himself. The human factor, most unpredictable of all elements, enters inevitably into all calculations for the future of civilization.

The integrity of individual bank officials has a most far-reaching effect upon the credit relations and business of the nation. The courage, honor, decisiveness, and leadership of public officials are basic to good government. The cooperation, self-reliance, optimism, persistence, and industry of John Doe are essential to democracy.

### Man a Mystery

Yet man still remains a mystery. Shall we depend on Smith to run the Chicago office for us? Can Brown be relied on to make good his note? Is Jones lying when he says he will renew the contract? The man who knows the answers to such questions has a great advantage.

Scientists are now prolific in research to provide tools for measuring the hearts of men. Dr. Goodwin Watson of Columbia University, reviews in the *Psychological Bulletin* more than 300 studies which psychologists have published on this subject during the past two years.

Rating scales and "behaviorgrams" for measuring reputation, which is the outward sign of personality, have received a generous share of attention. Studies of neurotic tendencies reveal the fact that this abnormality so common to man has no apparent relation to school success, professional success, ability in art, or pacifistic attitudes.

Priests in training in a Catholic seminary were found to have the introvert's personality, centered within the self rather than on the outside world. Like neurotic tendencies, introversion tests are remarkable for their lack of relation to other factors of personality. The recent studies show that they have no signifi-

cant relation to art ability, hypnotizability, choice of friends, social adjustment, susceptibility to caffeine, delinquency, or school grades. The notion that the introvert is more studious but cannot get along with other people thus topples.

One psychologist has made a study of human happiness and has found that among 500 young men, the happier were steadier in mood, in better health, better adjusted sexually, more sociable, more interested in religion, more approving of their work and work associates. Others found that job insecurity and disagreeable supervisors were the main thorns in the work situation.

Moral knowledge was found not a function of age, and the traditional finding was confirmed that there is no relation between moral knowledge and delinquency.

Scales have been devised for measuring the attitudes of individuals and groups toward all sorts of matters, including God, the law, capital punishment, foreign nationalities and races, prohibition, Communism and birth control. The movies serve to change these attitudes, it was found.

### Individual Character?

One psychologist has attempted an analysis of human relationships as displayed when a number of persons cooperate in a common task.

"The promising feature of our present situation is the attention being given to the careful observation of conduct in more or less controlled situations," comments Dr. Watson. "Ratings come to be more and more observations of actual behavior and less and less based upon imaginary traits. . . . There is a slight increase, although not yet approaching the most desirable point, of studies in which groups of persons are examined in their interrelationship, recognizing that character does not exist in isolated individuals, but is a function of a social situation having a certain structure."

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