

PSYCHOLOGY

One Test Not Enough to Measure Intelligence

➤ ONE OR TWO tests are not enough to measure the intellectual resources of an individual, Dr. J. P. Guilford of the University of Southern California said in the 1959 Walter V. Bingham Memorial Lecture. The lecture is one of a series established in 1954 on "Discovery of the Talented."

Intellectual resources are multidimensional, Dr. Guilford explained, and should be measured by multiple scores and profiles of scores instead of the one or two scores that have been customary.

The human intellect might be represented by a model consisting of a three-dimensional cube, each face of which would represent a way in which intellectual abilities differ from one another. One variation pertains to the kind of mental operation performed as, for example, evaluation, memory or cognition. Another pertains to the kind of material or content on which the operation is performed—for example, symbolic or behavioral. A third dimension, or face, pertains to the kind of product resulting from the operations, such as relations or implications.

Dr. Guilford's theoretical model contains five kinds of operations, four kinds of content, and six kinds of products. These add up to 120 different hypothetical intellectual abilities. Since the model was originally conceived, it has successfully predicted the finding of at least ten of these factors.

The Bingham Lecture series honors the late Dr. Walter Van Dyke Bingham, a psychologist who pioneered in the recognition and measurement of various kinds of talent, particularly in the scientific and technical fields. It was established by Dr. Bingham's widow, Millicent Todd Bingham.

Science News Letter, April 25, 1959

BIOPHYSICS

Better Computers Result From Human Brain Study

➤ STUDIES OF the human brain are expected to show scientists how to build better computers.

Brig. Gen. B. G. Holzman, commander of the Air Research and Development Command, Office of Scientific Research, told the World Congress of Flight at Las Vegas, Nev., that studies of a beetle's eye have already provided a schematic wiring diagram for "a radical new type of absolute air-speed indicator." He said research in human neurobiology and neurochemistry may provide clues to building better computers.

Maj. Ralph O. Griffin, director of resources, European office, Air Research and Development Command research program, described European experiments being supported by the Air Force along these lines:

Dr. Sem-Jacobsen of Norway is recording brain waves by means of electrodes placed on the heads of jet pilots in flight.

Prof. J. Z. Young of London University is training octopuses to recognize the dif-

ference between similar letter-like shapes. He then destroys parts of the brain.

A machine whose capacity to perceive and remember shapes approaches that of the octopus has been developed. The octopus is believed to use an analyzing system for pattern recognition that is simpler and more economical than those so far proposed for the job by man.

Studies of the brains of ants, beetles, and animals are also expected to produce results directly applicable to computer design.

Dr. Jouviet of France, experimenting with both human and animal subjects, has determined that concentration on a particular object can block out other senses. Thus a pilot concentrating on radio communication may become temporarily blind to approaching objects or unable to hear a warning bell, see a red light, or smell smoke or fuel fumes in his cockpit. The impulses from his sensory organs do not get through to the brain. The experiments will have a bearing on future instrument design, warning signals and duty assignments.

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OCEANOGRAPHY

Origin Proposed for Metal-Rich Sea Deposits

➤ THE VALUABLE metal-rich "pebbles" found on the ocean floor were formed by living systems.

This suggestion for the origin of manganese-rich deposits on the sea floor has been made by Drs. John W. Graham and Susan C. Cooper of the Woods Hole Oceanographic Institution, Woods Hole, Mass. The oceanic deposits have been found by other scientists to contain sufficient quantities of metals that mining them could prove profitable.

In addition to manganese the sea floor nodules contain appreciable quantities of nickel, cobalt, copper and iron, for each of which there is a large industrial demand. Their origin is unknown but some scientists hold they were formed by inorganic instead of biological processes.

Drs. Graham and Cooper believe the nodules were formed when an unidentified organism made its home on the outer coating of the larger organisms known as Foraminifera after the latter had died. The mysterious organism, which the scientists are now trying to isolate, was attracted to the Foraminifera coating because it was rich in protein.

The unidentified organism had the ability to extract and thereby concentrate the valuable metals from sea water, the scientists report in *Nature* (April 11). It used the sea water for food.

Supporting their theory of biological origin for the nodules is an analysis of light tan mud dredged up from the floor of the Atlantic near Bermuda where the ocean is nearly three miles deep. Chemical tests showed the metal-rich material was formed as a surface deposit on the Foraminifera, not through capture of manganese-rich sea particles by living Foraminifera.

Science News Letter, April 25, 1959

IN SCIENCE

BIOLOGY

Domestication May Increase Birth of Twins

➤ MAN IS behind the chimpanzee so far as having twins goes.

One reason for this, two biologists report in *Science* (April 10), may be that twinning is a newly acquired character resulting from man's domestication of the chimp.

Detailed studies of the number of twins and the gestation period for a colony of captive chimps show a recent increase in the number of twins born. Only one pair of twins was produced during the years 1930 through late 1951. This figure, one pair of twins from 92 births, is about the same for man. However, since 1951, five additional pairs of twins have been born in 28 births. The chimpanzees now seem to have an over-all twinning rate of five percent.

The reasons for the increase are not clear, report Drs. L. J. Peacock and C. M. Rogers of the Yerkes Laboratories of Primate Biology, Orange Park, Fla. Domestication may explain the findings that chimpanzees and man, both primates, no longer produce twins at roughly the same rate.

Possibly domesticating the chimps has led to a selection of genetic factors resulting in multiple births. Or other factors may have increased the rate of twinning.

Science News Letter, April 25, 1959

BIOLOGY

Use of Gelatin May Make Dating More Accurate

➤ THE RADIOCARBON dating of ancient bones, important technique in anthropology and geology, may be made more accurate by a new development reported by Drs. F. Marott Sinex and Barbara Faris of Boston University School of Medicine.

They have isolated gelatin from 12,000-year-old deer antlers and this gelatin, which was 96% pure, was used for dating.

Tests of the age of old objects using radiocarbon dating have usually depended on the carbon content; charcoal is the substance most extensively used.

Chief difficulty has been the contamination of the ancient sample with more modern carbon. Ancient bones are porous and are capable of absorbing organic material from the soil. Charcoal is a complex organic material which presents a large surface area that may absorb other organic substances.

Gelatin is not likely to be contaminated in such a way by extraneous carbon, the investigators report. Details of how the gelatin was extracted from the ancient antlers are reported in *Science* (April 10).

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E FIELDS

PHYSIOLOGY

Antibody May Be Link To Atherosclerosis

► THE EXISTENCE of an antibody against mast cells, body cells found in bone, muscle and other connective tissue that play an important role in carrying fat, was revealed to scientists at the American Physiological Society meeting in Atlantic City.

Mast cells liberate the anti-clotting compound heparin which in turn, stimulates the production of an enzyme, lipoprotein lipase, that acts to help carry fat through the blood. Earlier research has shown that older persons with atherosclerosis have fewer mast cells than young persons or those who do not have atherosclerosis.

Rabbits were immunized with mast cells from rats, Drs. Y. S. Lewis and D. E. Smith of Argonne National Laboratory, Lemont, Ill., said. From three to five days after the last of seven injections of mast cells, the rabbit serum revealed the presence of an antibody.

Peak antibody production was achieved in about ten days, the scientists reported, when all of the mast cells in the mesentery, intestinal membranes, and 50% to 100% of the skin and ear mast cells were destroyed.

Some ten to 20 minutes after exposure to antiserum, the granules of mast cells in the living animals displayed rapid, small oscillatory movements. While only a few granules were involved at first, within minutes all cells were showing the same movements. Many mast cells suddenly broke open and the granules were released into the tissue, the scientists said.

Science News Letter, April 25, 1959

NUTRITION

Too Much Milk May Mean Trouble for Human Body

► SOME DOUBT has been cast on just how important a quart of milk a day may be in maintaining health.

Results of animal studies point to possible dangers when levels of calcium intake exceed one gram a day in humans or one percent of the diet in animals, Dr. G. K. Davis, University of Florida, told a symposium on the effects of high calcium intake.

One quart of milk contains one gram of calcium.

Apparently, Dr. Davis said, high calcium intake is associated with various disturbances involving the kidney and the absorption of other nutrients. One of the most commonly associated disturbances is the formation of urinary stones.

Laboratory studies indicate that some forms of anemia and goiter, for example, may result from too much calcium and

too little of the other important nutrients. Just how this happens is not known, Dr. Davis said. Proper balance is essential, however.

If an individual has low or marginal amounts of iron or iodine, the animal studies indicate that high calcium may actually cause anemia or goiter. In one study reported to the symposium, rickets were produced in laboratory rats with low phosphorus and four times as much calcium as phosphorus. When the amounts of those nutrients were "in balance," the course of the disease was arrested.

In discussing the research, Dr. D. M. Hegsted of Harvard University suggested that evidence in favor of calcium is lacking as is evidence against calcium. He said it might be wise to take the "pressure off" calcium as the major nutritional requirement in the United States. Today the recommended daily requirement is 0.8 gram of calcium.

This requirement was established on the basis of the body's balance of calcium, the amount taken in compared with the amount excreted. However, Dr. Hegsted believes this may not be adequate evidence that this amount is needed, but is rather a reflection of our eating habits. Studies in other countries indicate that the calcium in the human body can be in balance at an intake of 0.3 gram a day.

The symposium on calcium was held as part of the 43rd annual meeting of the Federation of American Societies for Experimental Biology in Atlantic City.

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PUBLIC HEALTH

Paralytic Polio Increases 60% in 1958-59 Season

► THE NUMBER of paralytic polio cases for this past season increased 60% over the 1957-58 season year, U. S. Public Health Service data show.

Thus, the 1958-59 poliomyelitis disease year, which closed this March 28, witnessed a substantial increase in the incidence of the crippling form of this disease as compared with the previous year.

During the 1957-58 season, a total of 5,587 cases of all types of polio were reported. The past season, 1958-59, was slightly higher, with 6,110 cases.

Only 35.9% or 2,005 of the 1957-58 cases were paralytic, while 52.5% or 3,206 of this last season were paralytic. Thus, although the total number of cases for the last season increased only 10%, the number of paralytic cases within that number was boosted 60% over the 1957-58 seasonal report.

July through December remained the months that witnessed the heaviest tolls of paralytic, non-paralytic and nonspecific polio for both years, the latest statistics reveal.

The incidence of all three types of polio dropped during the months from January through March in both years. This past season, however, the number of paralytic polio cases alone for these low months equaled the entire number of cases recorded in the same time period for 1957-58.

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ASTRONOMY

Unseen Companion of Double Star Found

► A SMALL UNSEEN companion of zeta Aquarii, once thought a double star, has been discovered from observations of wobblings in the orbits of the two larger stars.

The invisible star has a mass about three-tenths that of the sun and a visual magnitude of about 12. It revolves around the fainter star of the system in about 25 and a half years at a distance some nine times that from the sun to earth.

Discovery that zeta Aquarii is a triple system, made by Otto Franz of Dearborn Observatory, Evanston, Ill., is reported in the *Astronomical Journal*, a publication of the American Astronomical Society.

Science News Letter, April 25, 1959

PHYSIOLOGY

Lymphocytes Show Role In Cell Differentiation

► NEW CELLS from bits of old cells seem to be part of the story of how the living body maintains a flexible supply of white blood cells, suited to any emergency.

There is a close relation between the break-up of lymphocytes, large white blood cells that help protect the body against disease and infection, and development of new lymphocytes, Dr. M. Hill reports.

Apparently there is a continuous re-use of the remnants of these important cells. Studies with mice show simpler, reticular cells become lymphocytes as dead lymphocytes are "eaten," or destroyed by phagocytosis, in the body's "clean-up process."

Dr. Hill, now at the Institute of Biophysics, Czechoslovak Academy of Sciences, Brno, subjected mice to various kinds of stress: irradiation, injection with formaldehyde and with hydrocortisone. The mice's spleen lymph nodules were examined.

As the lymphocytes disintegrated, the cell protoplasm in the nearby reticular cells changed and their nuclei became enlarged. Eventually, in some cases of stress, the enlarged cells developed into more differentiated ones, usually immature plasma cells, but sometimes large and medium-sized lymphocytes.

These results and other research suggest that some substance, a "humoral factor," as yet unknown, is produced when lymphocytes disintegrate, Dr. Hill concludes.

It is probably derived from the white blood cell's nucleic acids or nucleoproteins and has the ability to maintain immature cells' characteristics at a normal level. However, when greater numbers of lymphocytes break up, as under stress such as brought on by infection, there is more of this "factor." New resting cells become immature ones.

The reverse can also happen, Dr. Hill says. Where there are fewer lymphocytes and thus decreasing production of the factor, immature cells "dedifferentiate" into reticular ones.

Details of the research appear in *Nature* (April 11).

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