

BIOMETRICS

New Formula Gives Weight Of Whales if Length Known

WHALES can now be "weighed" without being taken out of the water, or even being harpooned. All you need to know is their length. That, multiplied by itself a certain number of times, and the result multiplied by a constant, gives the weight, according to a mathematical formula worked out by Dr. Leonard P. Schultz, curator of fishes in the Smithsonian Institution.

Dr. Schultz has worked out formulae for various types of whales and also for the larger "streamlined" fishes. He has found that there is a constant relation between length and weight, though the figures used in the formula differ for each kind of whale or fish.

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BIOLOGY

Sex Determination Possible If Sperms Can be Sorted

BOY or girl? The everlasting question, that always raises itself when a new addition to the family impends, is paralleled by the more matter-of-fact, cash-based one of male or female that haunts all farmers and stockmen at calving or lambing time. If a practical method could be worked out for pre-determining sex it would have revolutionary effects both in human society and in the livestock industry.

Dr. Arthur Walton, of the Cambridge University school of agriculture, reviews work that has been done thus far in search of an answer to this everlasting question. He reaches the conclusion that although no way of controlling the sex ratio has yet been found, the attempt is by no means hopeless.

Clue to sex determination lies in the "x" and "y" chromosomes in the spermatozoa. If an ovum is fertilized with a spermatozoon bearing an "x" chromosome, the offspring will be female. If it is the "y" chromosome, the new animal will be male. Sperm from the male parent always contains approximately equal numbers of both kinds of spermatozoa, thoroughly mixed. It has therefore always been a matter of chance, what the sex of the offspring will be.

Obviously, if one could somehow separate the two kinds of spermatozoa, and use "x" or "y" kind according to the results desired, the problem would be solved. That is just where the difficulties begin. Various experimenters have

tried all kinds of methods; passing an electric current, swirling in a centrifuge, treating with various chemicals. But the "x" and "y" have stubbornly remained mixed.

Nevertheless, Dr. Walton considers it worth while to continue trying: "There is some evidence that under certain conditions as yet unspecified, there is a differential mortality of one or the other of the two sorts of spermatozoa. If subsequent research can elucidate these conditions sex control by means of gametic separation and artificial insemination might become practicable."

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FOODS

Use of Food Lockers Lowers Meat Cost

IN NORTH and South Carolina during watermelon season it is the practice of many families in small towns to have a few melons cooling down at the community ice plant awaiting proper gustatory disposal. Although no fee is charged and the practice would have to be discontinued if it ever became too prevalent, this custom makes use of what is becoming known in the Middle and Far West as the "food locker."

Food lockers started, just as the melon instance indicates, as a sideline with the ice plants. But now the practice has been put on a commercial scale and one can rent a food locker just as you might rent a safety deposit box at your bank.

While vegetables and fruits furnish some small part of the revenue of companies managing food lockers, the great bulk is in the cold storage and freezing of meat. Many plants furnish services in butchering, chilling and aging of meat along with such other packing house operations as curing, smoking, rendering of lard and grinding.

In fact, if you can afford to buy a whole carcass of beef you can have it processed completely for you and preserved until you can use it. At normal prices and yields from live beef, it is reported that the cost of the average run of beef cuts will be about 15 cents a pound to the food locker patron as compared with an average price of 26 cents a pound at retail.

To the farmer a whole beef is no new thing in his meat consuming habits but to a city dweller a marked change in family buying and eating habits is needed. Moreover, a plan has to be worked out for a satisfactory use of the less desirable cuts of meat.

Science News Letter, February 11, 1939

IN SCIENCE

MEDICINE

Diabetics Must Know The Answers—127 of Them

MANY persons boast they "know all the answers," but for diabetics, of all people, this boast must be true. The diabetic patient's life, health and happiness depends largely on his really knowing the answers—127 of them, the Mayo Clinic specifies.

This (127) is the number of questions which patients attending the Clinic's diabetic school are required to answer before they are willingly dismissed. There can be no coaching from the sidelines, either, when the patients are asked to answer these questions.

Diabetes is a condition in which the body fails to take care of sugar normally. Usually this failure is due to deficient insulin production by the islands of Langerhans in the pancreas. To make up for this deficiency, the diabetic patient gets insulin. Too much insulin, however, is as dangerous as too little. The dose must be nicely adjusted to the amount of sugar the patient gets from his food.

Allowances must also be made for the amount of sugar he can take care of without any outside insulin, since his body may produce a little of this hormone, even if not enough. This factor may vary and if it does, the insulin dose must be varied, or the patient is headed for trouble—either diabetic coma or the reverse condition of insulin shock.

The patient has to know about this in order to appreciate the need for being alert to danger signals. He also must know how to recognize and watch for these danger signals, and how to make the chemical tests for one of them. The diabetic patient must also know how to measure the dose of insulin—no simple feat—and how to inject it hypodermically. He must know how much of which foods to eat, down to the last teaspoonful. He must be prepared to apply certain special first aid measures for himself when danger threatens. Finally, as he gets older, he must learn how to care for his feet so as to avoid gangrene.

Science News Letter, February 11, 1939

E FIELDS

PSYCHOLOGY

Men Differ in Abilities To "Transfer Training"

"ONE MAN is just as good as another—and sometimes more so!" This famous Irish bull is brought to mind by a ten-year research just completed by Dr. F. L. Wells, of Boston Psychopathic Hospital, in which he found how different men are, one from another, in ability to profit by experience and in ability to transfer learning from one sphere to another.

Equal opportunity by no means insures equal achievement, Dr. Wells concluded from his study which is summarized in the *American Journal of Orthopsychiatry*.

Comparing intellectual endowment with money in a savings account, Dr. Wells said:

"Let pupil A have ten dollars on deposit; pupil B, twenty. Although each account has the same 'opportunity' B's account will increase twice as fast as A's. The longer this equality of opportunity operates, the greater will be the disparity.

"Similarly, if B has a superior intellectual 'endowment' he must, given equal learning conditions, increase it faster than A. Just as his learning would accelerate if starting equally, he learned at the higher interest-rate of a better school.

"Equality of opportunity can mean equality of development only if the endowments at the starting point are the same. That they are mentally far from being so when school years are reached is common knowledge. How far this difference would level out if equal 'opportunities' existed from birth, is much disputed. Only extremists have claimed, in effect, that they would level out altogether."

Just as men differ in their ability to make use of what they learn in one field to help their success in another, so also types of work differ in the extent to which such transfers can be made.

Work of an extremely intellectual type, putting a high premium on ability to generalize and to form mental conceptions is facilitated when the individual has had previous training in similar types of mental labor.

Work involving simpler motor skills is profited less by previous training in other skills. In fact, highly specialized training in one skill may actually make more difficult the learning of a new one.

Science News Letter, February 11, 1939

ENGINEERING

New Generators Run Sealed in Hydrogen

STREAMLINING is the current trend in everything from totally immovable objects like a bathtub to the newest of the airplanes.

In the former, streamlining is debased from its original scientific definition into a style mood. In the latter, streamlining serves a real scientific purpose. The smooth contours have the functional objective of decreasing wind resistance.

If the atmosphere of the earth were of hydrogen, however, instead of nitrogen and oxygen and the sprinkling of the lesser and rare gases, there would be little need of streamlining even in airplanes.

Hydrogen's low density, compared with air, makes it possible to move objects through it with hardly any loss due to wind resistance.

All this would be so much imaginative fiction if there did not exist, in the world, a little, man-made realm where the atmosphere is intentionally composed of hydrogen for just this very purpose; the lessening of losses due to atmospheric resistance.

The application of hydrogen's lessened drag is in the new high-speed turbine-generators which are now being built. Back in 1921 Dr. Willis R. Whitney, the now-retired director of research of the General Electric Company, built some small generators in which the turning parts were enclosed in an atmosphere of hydrogen.

For some years the application to large generators lay dormant because no suitable seal to keep in the hydrogen could be found for a practical application. Since 1937, however, this problem has been solved and 21 units, aggregating more than a million kilowatts of power, have now been installed.

The advantages of hydrogen are many, writes Dr. Chester W. Rice in the *General Electric Review*. It practically eliminates losses due to wind resistance. Its high heat conductivity aids in cooling the units. The absence of oxygen eliminates fire hazard, prevents deterioration of the generator windings due to oxidation and eliminates the destructive effects of corona losses.

Science News Letter, February 11, 1939

PHYSICS

New Radio Apparatus Uses Waves Only 4 Inches Long

TELEVISION and aeronautical radio will be given a great impetus by the invention of the "klystron" ultra-short wave radio apparatus at Stanford University. It sends and receives on wavelengths as low as 10 centimeters (4 inches) at efficiencies not hitherto attained. It is hailed as "the most important advance in radio since the invention of the audion tube in 1906 by Lee de Forest."

Invented by Russell H. Varian and developed by a Stanford group, including Varian, his brother, Sigurd F. Varian, Profs. William W. Hansen and David L. Webster, the klystron grew out of the rhumbatron, an electric resonator intended to smash the atom.

Flight Capt. Sigurd Varian was a Pan-American Airways pilot when he visualized that the rhumbatron, developed by Prof. Hansen, could be applied to radio communication for airplanes. Taking leave of absence from his Pan-American job, he organized the Stanford group for the research which is now successful.

Two rhumbatrons, called the "buncher" and the "catcher," form the heart of the klystron, so named from the Greek "klyzo," meaning waves breaking on a beach, which is what the apparatus does.

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PHYSICS

Thunderless Lightning Described by Scientists

THE POPULAR belief that all lightning flashes except heat lightning, are accompanied by thunder claps is not always true, declares Dr. Karl B. McEachron, high-voltage expert of the General Electric Company.

The absence of thunder with heat lightning is well known, but it is generally thought that a distinct lightning stroke from the skies to the earth always has a peal of thunder with it. This is true in most cases, says Dr. McEachron; but studies now show that for "slow" lightning there often is no accompanying thunder. Slow lightning is a discharge which takes one or two tenths of a second to build up, whereas the lightning producing thunder takes only a few millionths of a second to do its work.

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