

PSYCHOLOGY

Hungers Show Body Needs

In Rat Cafeteria, Animals Pick Diet Best for Them; Deprivations Build Up Special Longings, Tastes Change

By MARJORIE VAN DE WATER

WAR has made the children of Central Europe love butter—when they can get it—the way American boys and girls delight in ice cream cones.

War hungers—longings for certain kinds of foods and unusual enjoyment in tasting them are predicted to follow this winter's shortages of some foods in war-ridden lands. They occur even in peace times when the diet is not properly balanced.

Psychologists and nutrition experts are studying these special food longings. From what has already been found, it seems that such special appetites depend not only upon quirks of taste, but upon more deep-seated needs of the whole body. It is a matter of chemical balance in the body tissues.

When we are deprived of some essential to our diet such as butter and butter substitutes, we grow extraordinarily fond of butter. The energetic child who burns up the sugar in the body rapidly is eager for candy.

Your knowledge of what is good for you has nothing to do with this longing for the very foods you need most. You never saw a vitamin—you may have no clear idea of what vitamin B does that is different from D or A. But when you are deprived of vitamin B you will de-

velop a special relish for food containing this "morale vitamin."

In the appetites of animals, nature provides an automatic sort of scheme for providing them with just the diet they require.

Mothers may raise an eyebrow at this. It may seem to them that nothing is so capricious and unpredictable as the appetites of husbands and children. But experiments with rats have rather clearly demonstrated that when Junior pushes away his oatmeal and demands a third helping of milk or orange juice, he is answering a real need of his body—provided of course that some previous unpleasant experience, some "scene" has not built up in him an artificial aversion to his cereal.

Rats have been used for new laboratory experiments on appetite, partly because rats so closely duplicate the food preferences and dietary needs of man. Experiments of the next year or so may

be expected to aid in planning the nutrition of a post-war Europe so that present deficiencies of diet may be made up with the least damage to the health of the people.

There is no such thing as hunger, it is now concluded. Instead there are a score of specific hungers. Absence of one of two necessities such as butter and butter substitutes or wheat from an otherwise adequate diet will produce these "hidden hungers."

The first clear demonstration of the wisdom of the body in selecting diet was made at Johns Hopkins University by Dr. Curt P. Richter. By an ingenious arrangement of food cups, he permitted his rats to have constant access to the various food elements known to be important to the diet. The animals took just as much or as little as they wanted of each type of food.

Faced with luxurious plenty of every type of food, you might think the rats would gorge themselves on the rat equivalent of chocolate layer cake, ice cream and candy, and push aside the spinach and carrots. No such foolishness



PROOF OF THE PUDDING

In this case it is in the healthy growth of the animal. Dr. Richter has checked up on what this rat has eaten by measuring what he took from each of his food cups. Now the scales tell that the rat was wise in his choices.

New Books on Popular Science

SCIENCE ON PARADE

By A. FREDERICK COLLINS

Explains to the layman the latest outstanding developments in the fields of: astronomy, aviation, radio facsimile, reproduction of speech, etc., and gives specific instances of each. Illustrated. \$3.00

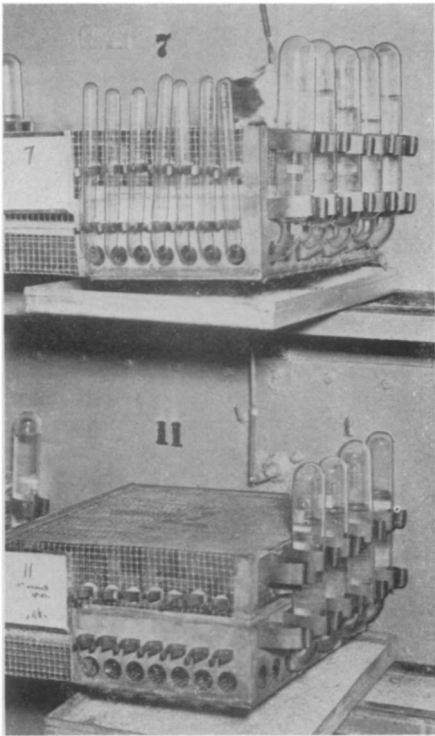
THINGS A BOY CAN DO WITH ELECTROCHEMISTRY

By ALFRED MORGAN

Presents over thirty easily done experiments and explains the use of this comparatively new science in the field of industry. Illustrated. \$2.00

At All Booksellers

D. APPLETON-CENTURY CO.
35 W. 32nd St., N. Y.



RAT CAFETERIA

Dr. Curt P. Richter has found facts that may help solve nutrition problems of the war. From the impressive array of bottles attached to his cage, the rat selects his own diet. He always has plenty of what he needs ready to his tongue. He can take what he wants and leave all the rest. Surprisingly, he picks a diet better for him than that worked out by nutrition experts.

resulted. In fact, the rats actually selected a diet better for them, in terms of growth and health, than the best approved diet worked out by specialists on rat diet.

Even more surprising was the discovery that rats who were sick were able to prescribe for themselves a corrective diet.

Diabetic rats, for example, avoided the sugar that would have hastened their death and were able to keep themselves alive by a self-regulated diet although the sugar was freely accessible to them all the while. Rats with no adrenal glands ate the extra salt they needed to stay alive. Those whose pituitary glands were not functioning properly regulated their water intake so as to preserve life.

It is the rat's tongue that saves his life, Dr. Richter concludes from his experiments. The tongue and its taste buds enable the rat to experience sweetness, sourness, saltiness and many other flavors in its food. This Dr. Richter proved

when the animals lost their tasting ability after nerve connections between the taste buds of the tongue and the brain centers had been severed.

With all the nerve connections cut those same rats deprived of adrenal glands who had been keeping themselves alive by taking all the increased amount of salt they needed, were now unable to make this wise selection of diet. They drank indifferently from either salted or unsalted water supplies. Lacking the necessary salt they died.

Watching the rat as he selects his self-controlled diet convinces you that it is taste that enables him to select the right food.

This same problem of how rats can select their food has been studied for a number of years by Dr. Paul Thomas Young, of the University of Illinois. Instead of making all kinds of food available to the animals at the same time, as Dr. Richter has, Dr. Young offers the different foods in pairs. Then when a preference has been demonstrated, each of these foods is presented with some other food until a sort of scale of preferences is built up for each animal at that particular time.

The rat, during this experiment, does

not run directly to the preferred food. He must get acquainted with both before he shows which is his choice. He will sniff at both before selecting either. Even after he is familiar with both foods, he will touch one with his tongue before turning to the more preferred choice.

Ordinarily rats, like children, prefer sugar to cereal. But they can be cured of this preference, temporarily, by feeding them on sugar. They become literally "fed up."

Deprivation also reverses the food preferences of rats. In one experiment, Dr. Young found that rats deprived of butterfat would prefer this food to either wheat powder or ordinary white flour. As the testing proceeded, the animals were fed increasing amounts of butterfat bite by bite. As their butter intake increased, their preference for it weakened until first the wheat and then both wheat powder and white flour were preferable to the butter. Finally a few developed a real aversion to the butterfat.

Application of this experiment to the nutrition problems of Europe is brought home by the news report telling of German invaders in Paris who can be seen walking down the streets eating butter alone as though it were candy.

What's your score in this SCIENCE Quiz?

- What metal can be changed into gold?
- Why will your watch lose time in very hot weather?
- Why are roses red?
- Why do explosives have such powerful effect?
- What causes a volcano to erupt?
- What keeps the sun hot?
- How does the central station get your telephone number?
- Can you "forecast" the weather by looking at the clouds?

You'll find the answers in this big, fascinating book which brings you up-to-date on the workings of science and how it is re-shaping the world about us. Over 300 illustrations and examples chosen from your everyday problems and experience unravel the mysteries of astronomy, electrical and radio communication, television, the atmosphere, weather, chemistry, geology and the other physical sciences. (666 pages)

\$3.75 at bookstores

SCIENCE in a CHANGING WORLD

By Gable, Getchell and Kadesch

PRENTICE-HALL, Inc. 70 FIFTH AVE., NEW YORK

But taste is not the whole story, Dr. Young is convinced. He points to an experiment conducted by Dr. M. F. Hausmann. Dr. Hausmann fed rats sugar and, on other days, saccharin. The rats liked both. But there is an interesting difference between saccharin and sugar. Although both taste sweet, only sugar adds calories to the diet. Saccharin passes through the body without nourishing it.

The rats, on days when they were fed sugar, voluntarily decreased the amount of other food they ate to compensate for the increased calories received from the sugar. But on the days when they got saccharin, there was no such reduction in food intake.

In another experiment, Dr. Hausmann gave his rats a cocktail party. The refreshments included food and water as well as the alcoholic drinks. The cocktails for the different rats varied in strength from 2 per cent., which would be equivalent to a pre-repeal beer, to 36 per cent., or as strong as the ordinary drink of whiskey.

The animals, he found, regulated their consumption of the alcoholic beverage, regardless of the strength of the drink, so that they always got the same absolute amount of alcohol.

More than that, they always reduced their food intake to correspond exactly to the amount of calories furnished by the alcohol they had taken.

In addition to the immediate taste of the food or drink on the tongue, the desire for more seems to be regulated by some deep-lying organic need which is dependent upon the chemical condition of the whole body.

Hunger is not a simple single result of an empty stomach, Dr. Young concludes after a careful review not only of his own but all other experiments in this field. He has demonstrated in his experiments at least 10 hungers.

The body may crave protein, fat, carbohydrate, water, oxygen, salt, phosphor-

us, sodium, calcium and the vitamin B complex. Obviously there are countless other cravings, as yet unexplored.

Satiation as to one or a number of these essentials will leave you still hungering for some of the others.

The chemistry of the taste mechanisms of the mouth is involved in such a chemical change in the body. It is through chemistry that your tongue is sensitized by deprivation to enjoy certain special foods just as thirst sensitizes you to water so that your "dry throat" will urge you to drink.

Dr. Young has also observed that when rats are deprived of some one article of diet, such as vitamin B, they become greatly excited and active when this particular substance is offered to them.

Study of the psychology of hunger, opened up by these attacks on the problem, offers an entirely new field for research which may have the utmost importance in connection with this war and with the post-war reconstruction of the world's health.

By watching the behavior of a rat deprived of butter, or of wheat, or of meat, psychologists may find a clue to what may happen to the minds of men so deprived.

Will they have to work under a tension, an unrecognized restlessness and anxiety, until this natural appetite is satisfied? Will it make them more militant, or will it make them inactive? Can other foods supply the psychological as well as the physiological needs ordinarily filled by the lacking articles of diet?

Rats, which have already in recent years played such an important part in solving problems of nutrition, may be expected to aid in an entirely new way in preserving man's mental as well as physical well-being.

Science News Letter, November 23, 1940

PALEONTOLOGY

Single Jawbone Discloses Existence of Unknown Birds

A SINGLE fossil jawbone of a long-extinct big bird, found recently in Alberta by Dr. Raymond M. Sternberg of Hayes, Kansas, becomes the basis of an entirely new order of birds, the Caenagnathiformes, in a technical revision of the birds of the world just published by Dr. Alexander Wetmore, assistant secretary of the Smithsonian Institution. It is placed just below the ostriches in the classification table.

The fossil came out of a bed of dinosaur bones and is itself so primitive that it may be reptilian rather than a bird.

However, Dr. Wetmore accepts it as such pending further information. The age of the deposit was Late Cretaceous, about 100 million years ago.

Another fossil bird family, the Paranyrociidae, belonging to the general class of ducks, geese and swans, is included because of one curious fossil found in South Dakota deposits about 30 million years old.

Fossil records of birds are far less complete than those of reptiles and mammals, Dr. Wetmore states. Vertebrate fossils are formed, as a rule, through the settling down of a dead body in the mud of a marsh, or through covering with volcanic ash during an eruption. This is far less likely to happen to birds than to the heavier-bodied ground-dwelling animals. Smaller birds especially, falling to the ground when they die, are usually either picked up by carrion-eaters or decay as they lie, even their delicate bones becoming shattered and scattered before they can become embedded under conditions suitable for fossilization.

In Dr. Wetmore's revision, the birds of the world are divided into 34 orders, comprising 202 families.

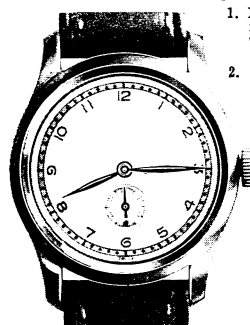
Science News Letter, November 23, 1940

Twenty common diseases of *animals* are transmissible to man.

\$5.00 Down Buys

The Newest ARISTO Timepiece A Self Winding Wrist Watch WATERPROOF

Outstanding Features



1. Motion of the wrist automatically winds the watch. You never have to wind it.
2. Beautiful WATER-PROOF case of Stainless Steel not only protects your watch from moisture but keeps out all dust and dirt. Guaranteed 100% waterproof.
3. Shock-resisting. The latest and best shockproofing features to protect the delicate balance staff and jewels. Not damaged by hard knocks and accidental falls. A really practical

4. High grade 17 jewel precision movement guaranteed like the Aristo Chronograph to give entire satisfaction in timekeeping, durability, and dependability.

For the first time we offer this fine Aristo Watch on our easy payment plan and at the special price of only **\$34.50**
Regular Retail Price.....\$45.00

ARISTO IMPORT CO., INC., 630 Fifth Avenue, Dept. LT11 New York City

Send ARISTO Selfwinding Wrist Watch at special price of \$34.50. I will pay \$5.00 on delivery and \$5.00 a month.

Name..... Age.....

Address

City..... State.....

Employed By.....

Address

Golden or Syrian Hamsters

(Subgenus *Mesocricetus*, Variety *Auratus*)

Science's new guinea pig

Breeders and Laboratory Animals
Quality Stock and Live Delivery
Guaranteed

HENRY BERGMAN

Telephone
5454

Main P. O. Box 70
Springfield, Missouri