

## PHYSIOLOGY

# Tissues, Rather Than Blood, Fight Invasion by Germs

Discoveries That Reverse Usual Medical Thought Bring \$1,000 Prize to Professor Kahn of University of Michigan

EDITOR'S NOTE: The annual \$1,000 prize for a notable paper delivered before the American Association for the Advancement of Science at its winter meeting just closed in Boston was awarded to Dr. Reuben L. Kahn, director of the Laboratories of the University Hospital and assistant professor of bacteriology at the University of Michigan, for his paper entitled, "Tissue Reaction in Immunity: The Specific Reacting Capacities of Different Tissues of an Immunized Animal," which is reported herewith.

Prof. Kahn has already received previous honors for his internationally known Kahn test for syphilis. He was born 46 years ago at Kovno, Lithuania, and is a naturalized citizen.

**A** NEW idea of how the human body fights its defensive battles against disease invasions was presented to the American Association for the Advancement of Science by Prof. Reuben L. Kahn, of the University of Michigan, who reported evidence that skin, muscles and other fixed tissues, and not the blood, are the "shock troops" in our continual struggle to keep healthy.

Usual medical thought considers the protective forces against germ invasion centered largely in the blood and other body fluids in which are found phagocytes, or bacteria-eating cells. Skin and muscle are usually considered hypersensitive to the same germ that, because of protective immunization, is subdued by the blood.

Experimenting with rabbits treated with much the same sort of serum that is so successfully protecting thousands of children against diphtheria, Prof. Kahn finds that skin and muscle as well as blood receive immunity when the living body is given protective treatment. In fact the skin, probably because it has been the armor of the body throughout the ages against attack by germs and other harmful agents, is ten times as effective as muscle, brain or blood in combining with and subduing the invading material.

Immunity is an ability to detect and then anchor, or combine with, an invading substance; and the great serv-

ice rendered by a tissue is this combining with the dangerous substance in order that it may not spread throughout the body with disastrous results. Prof. Kahn explained that in a germ disease this combining capacity of the tissue may determine whether the trouble is localized or whether the organisms run riot throughout the body. Sometimes the ability to protect is not evident from the blood yet the skin is on its protective job. This is the case sometimes in Malta fever and in boils caused by staphylococci.

The inflammation of infection, as in a boil, is really something to warrant rejoicing because it means that the invading organisms are being destroyed and eliminated.

Further studies by Prof. Kahn promised to explain some puzzles about infection and give information that physicians may be able to use in actual treatment of disease, enabling them to fight germ diseases more successfully than at present.

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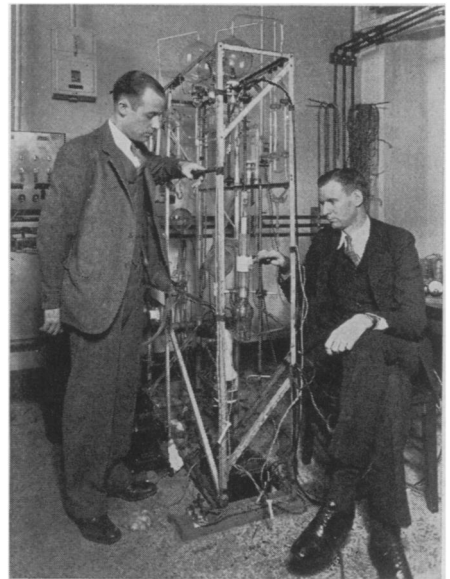
## HEREDITY

# Only 48 Ancestors Really Count in Your Heredity

**O**F ALL your ancestors, no more than 48 really count so far as your hereditary traits are concerned, it appears from a discussion of the contribution of genetics to anthropology given by Prof. C. H. Danforth of Stanford University at the meeting of the American Association for the Advancement of Science.

"It used to be thought that all of one's ancestors in any generation contributed about equally to his heredity," Prof. Danforth said.

"It now appears that, on account of the limited number of human chromosomes, at least one grandparent of the



## PLENTIFUL PROTONS

*Drs. Lamar (left) and Luhr (right) examine their apparatus which makes protons nine times more abundantly than previous devices.*

## PHYSICS

# Proton Production Improved For Bombardment of Atom

**A** PLENTIFUL supply of atomic bullets for shooting at other atoms in the hope of transmutation and atomic energy release is assured by a recent Massachusetts Institute of Technology discovery.

A source of protons that (Turn Page)

sixth generation back contributes nothing whatever and may as well not have existed so far as direct heredity is concerned.

"Following this line of reasoning we are led to conclude that those racial groups which show a high degree of uniformity or the frequent recurrence of particular types have really descended from only a few genetic ancestors, however numerous their genealogical ancestors may have been."

The influence of genetics on anthropology may be seen in the change in attitude toward the origin of racial differences, Prof. Danforth pointed out.

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is nine times as prolific as any previously known was devised by Drs. Edward S. Lamar and Overton Luhr, working in the new Eastman Research Laboratories. Protons are the positively charged kernels of hydrogen atoms and the most effective projectiles known to science for atom smashing.

Their new source is an electric arc operating in hydrogen at low pressure between an incandescent filament and a neighboring metal electrode. Ordinarily such an arc would produce ions of which about ten per cent. would be protons and the remainder molecular ions. However, by surrounding the arc with a third electrode maintained at a negative potential of a few hundred volts,

the percentage of protons produced is immediately increased to approximately 90 per cent. Dr. Lamar and Dr. Luhr are hopeful of still further raising the percentage.

The new proton source will be applied to the 10,000,000 volt Van de Graaff direct current generator recently tested at M. I. T.'s research station at Round Hill, Mass. Dr. Karl T. Compton, M. I. T.'s physicist-president, who collaborated in investigations out of which the Lamar-Luhr discovery arose, explained that protons speeded at 7,000,000 volts in the Van de Graaff generator are as effective as ordinary charged hydrogen molecules sped by twice that voltage, 14,000,000 volts.

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#### PSYCHOLOGY

## Child Prodigies Lose In IQ As They Grow Older

**D**O EXCEPTIONALLY bright children keep their intellectual advantage over their fellows after they are grown?

The answer would seem to be in the negative, to judge from an investigation being conducted at the Graduate School of Education, Harvard University. A report of progress of this investigation was made to the American Association for the Advancement of Science by Prof. Edward A. Lincoln.

The intelligence quotients of superior pupils, as measured with the Stanford Binet test, drop substantially during a period of five or more years, and girls lose more than boys, Prof. Lincoln found. The pupils who were re-examined after a lapse of only two years did not show as great a loss; thus apparently it does not occur early in the school career.

### Late Talking Explained

Intelligent children who do not learn to talk until they are 3 to 5 years old and then continue to use "baby-talk" are very likely suffering from a short memory span for sounds, members of the American Association learned from an address by Samuel D. Robbins, director, Boston Stammerers' Institute.

Memory span is measured by having the child repeat after you a group of numbers. The average child of three can usually repeat three digits correctly, but cannot repeat four correctly as often as once out of three trials.

Sixty per cent. of the children examined by Mr. Robbins because they were a year or more late in talking were found by him to have short auditory memory spans.

"Since language is learned by sound imitation, children who have a short memory span are at a great disadvantage in acquiring it," he said. "Although they may learn to understand many of the most common words they hear spoken in the home, they are often unable to reproduce words containing three or more different sounds until they are from three to six years of age, depending on how much their auditory memory span is retarded.

"As most words in common use contain three or more sound units, these children are unable to reproduce ordinary words. The task of repeating a word after another person seems so hopeless and impossible to them that they will not even attempt it."

"Children who are handicapped with short auditory memory should not be taught words containing more sound units than the length of their auditory spans," Mr. Robbins advised. "If it is necessary that a child learn a word or syllable containing more sound units than the length of his auditory memory span, this must be built up from shorter units within the child's span, as 'eat, t-r-eat, s-street, street-s.'"

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#### CHEMISTRY

## Odors Described By Numerical Tagging

**"A** ROSE by any other name would smell 6523."

This revised version of a famous saying occurred to many scientists at the meeting of the American Association for the Advancement of Science when they viewed a flavor and odor chart devised and exhibited by Ernest C. Cricker and Lloyd F. Henderson, associated with Arthur D. Little, the Cambridge, Mass., industrial chemist; for 6523 is the odor formula for the rose.

Other smells can be given numerical labels of this sort and these can be used to designate them just as numbers are convenient in tagging convicts and motor cars.

Each digit expresses one of four components in odor sensations, which in order of writing are fragrant, acid, burnt, and caprylic. The numbers indicate intensity on a scale of eight. The meaning of caprylic may be understood if it is known that the word is derived from "goat."

Mothballs, or naphthalene, in this code rate 4564, while the familiar gas of rotten eggs, hydrogen sulfide, is 5346. The sweetest smell reduced to this odor code so far is that of vanillin, 6021, and that may explain why so many of us like vanilla flavoring.

A rather terrible smell, strangely used as a basis for some of the most expensive perfumes, is skunk-like civet, 5777. But the scale failed when the chemists attempted to express the still more disagreeable smell of butyl mercaptan.

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#### ECONOMICS

## Formula Devised To Gage Gasoline Demand

**A** NEW mathematical formula makes it possible to predict more exactly the effect of a change in prices or taxes on gasoline consumption. Announcement of the formula was made before the Econometric Society meeting in Philadelphia by Victor Perlo and Dr. C. F. Roos of the Division of Economic Research and Planning of the NRA.

In their statistical study, the two mathematicians studied the factors which affect gasoline consumption, not merely in the United States as a whole, but in local, state variations.

A one cent increase in the price of