

more so that a total of 750 splints could be sent out, 547 to Buffalo and the rest elsewhere.

Branch splint banks throughout the United States are now planned, and it

is hoped, Dr. Bennett said, "that before 1940 passes no child or adult stricken with infantile paralysis need wait for proper early splinting."

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PHYSIOLOGY—STATISTICS

Q and R Factors in Equations Betray Coming of Death

Gray Hair and Wrinkled Skin Not So Satisfactory As Warnings as Are These Statistical Clues

GRAY HAIR and wrinkled skin are not as satisfactory signs of old age and approaching death as Q and R. These letters are symbols of new equations devised by Dr. Henry S. Simms, College of Physicians and Surgeons, Columbia University, for shedding light on the aging processes. (*Science*, Jan. 5)

We do not grow old as a result of a random accumulation of degenerative changes, Dr. Simms' equations show, thus upsetting the present theory of the aging process.

"It is perhaps correct to say that there is an accumulation of degenerative changes," Dr. Simms states, "but that the process follows a definite mechanism such that the rate of change at any age depends upon the amount of accumulated change. Why this mechanism should be followed remains to be determined."

Q and R are functions which control the death rate after the age of 30 years. Q changes with age. There are indica-

tions, Dr. Simms states, that the change in Q affects mortality by increasing the death rate when disease is present, rather than by increasing the tendency to become diseased.

Changes in R may account for the faster increase in death probability of diseases of the blood vessels (heart and artery diseases) over the increase in death probability of certain infectious, digestive and nervous diseases. The nature of this R function is unknown, but Dr. Simms suggests that it may be some property of the blood vessel system such as arterial distensibility or capillary permeability.

A statistical correlation between senile debility and senile death rate has been found by Dr. Simms' mathematical studies. This suggests, he says, that the progressive debility in old age is caused by the same Q and R functions which control the death rate.

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ment. Heretofore physicians have tried to fight shock, first cause of death in extensive burns, by giving all the fluids the patient will take and urging him to take even more. This treatment, the Indianapolis physicians declare, may cause water intoxication severe enough to kill the patient.

An experience with this standard treatment in which the patient, a two-year-old baby girl, died led them to their new theory on burn treatment. Post-mortem examination of the child's body showed "a tremendous waterlogging of all tissues." Changes in the child's blood, including a striking deficiency of salt, also suggested that large quantities of fluid were harmful in treating burn shock.

The Indianapolis physicians were in the midst of animal studies of their new theory of burn shock treatment when a 15-year-old girl was brought to the hospital an hour after she had been badly burned when her evening dress caught fire from a lighted match thrown on the ballroom floor. Daringly, the physicians used the new system of treatment.

Morphine

Morphine, to relieve pain, removal of the charred remnants of her dress, and a one and one-half hour bath with salt water and green soap came first. About one pint of salt water with sugar was injected, and her drinking water, orange juice and the like were limited to about one quart a day. Meanwhile blood donors had been found and typed and eight hours after arrival at the hospital she was given the first transfusion of about one pint of blood with about one pint of salt water.

The young patient had a stormy illness. Her temperature was persistently high, and any manipulation caused chilling. She had altogether six large blood transfusions within four days, two of them consisting of blood plasma alone because tests showed an excess number of red cells in her blood. Because of her grave condition, the fifth transfusion was given "with considerable apprehension," the doctors report, and the sixth was given 24 hours later in spite of the fact that symptoms of reaction after the fifth one were growing worse. This was followed by a chill and rapid rise in temperature, and at this time the patient was not expected to live. She was placed in an oxygen tent and her condition slowly improved. Within one month she was able to go home and within two months her burns were completely healed and she was entirely well.

MEDICINE

Dramatic Success Reported With New Treatment of Burns

Transfusions of Large Amounts of Blood and Reduction In Amount of Fluids Given Patients Are Chief Points

THE DRAMATIC recovery of a young girl from severe burns following the first trial of a new transfusion treatment daringly given in the face of impending death is reported by Drs. H. M. Trusler, H. L. Egbert and H. S. Williams, of Indianapolis. (*Journal, American Medical Association*, Dec. 16)

Even though the girl was so gravely ill by the fourth day of treatment that

"all who saw her were convinced she would die," the physicians did not lose faith in their new system of treating severe burns. Their courageous persistence was rewarded by their pretty young patient's complete recovery.

Transfusions of large amounts of blood and reduction in the amount of water and other fluids given the patient are the chief points of the new burn treat-

"We believe that a state of irreversible shock was prevented," Dr. Trusler and associates state, "and that her life was saved by the repeated intravenous administration of properly balanced fluids, the most important components of which were blood and blood plasma."

They also stress the value of oxygen and describe the treatment of the burned area. In this connection, however, they declare that "no local application can be expected to save life after a large burn."

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great influence in changing the prevailing scientific opinion."

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ENGINEERING

Highway Jacked Apart To Make Divided Roadway

HOW a four-lane highway was "jacked" apart to make a divided roadway and thus reduced fatal accidents over 83%, was described at the meeting of the Highway Research Board of the National Research Council in Washington by Arnold H. Vey, traffic engineer of the State of New Jersey.

New Jersey took a popular four-lane highway and split it down the middle, jacking up separate concrete slabs and moving them sideways. Two roadways, separated by a dividing center strip, thus resulted.

A study of accident figures on this road in 1933-34, before the division, and for 1937-38, after the division, showed that fatal accidents dropped 83.3%. Non-fatal accidents decreased 48.5% and accidents involving property damage were cut 17.6%. The reduction for accidents of all kinds was 40.4%.

Particularly valuable was the new divided highway at night, for accidents were then decreased by 47.2% while during the day they dropped only 31.4%.

The cost for the unique jacking and moving job was \$50,000 per mile, Mr. Vey reported. By applying National Safety Council figures to the reduction in accidents, it was found that the saving in accident costs are sufficient to pay for the conversion in slightly over three years.

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MATHEMATICS

Mathematical Study Confirms Theory of Solar Radiation

Statistical Work of Dr. Abbot, Evidence of Periods Of Solar Activity, Is Now Confirmed at Harvard

POSSIBILITY of statistical error in the theory that there are significant periodic changes in the sun's radiation which predictably affect the earth's weather has been eliminated by a Harvard mathematician.

The findings, made by Dr. Theodore E. Sterne, Harvard lecturer on astrophysics, are believed to eliminate one of the major objections raised against the solar radiation-weather tie-up recently advanced by Dr. Charles G. Abbot, secretary of the Smithsonian Institution in Washington.

Dr. Abbot's deductions, based on years of solar radiation observations at stations spotted throughout the world, have been questioned as due to either statistical errors in analyzing the data, or systematic errors of observation. The Harvard research removes this first objection.

In his findings, Dr. Abbot discovered evidence for changes in solar radiation in periods of 7, 8, 9 $\frac{3}{4}$, 11, 21, 25, 34, 39 $\frac{1}{2}$, 46 and 68 months. Dr. Sterne believes that three of these periods may be due to statistical error—those of 7 months, 8 months and 34 months.

The other seven periods, Dr. Sterne has found, are not attributable to this and the Harvard mathematician has gone so far as to say that the odds against these seven periods being purely statistical error are about 30,000 to one, or even higher, running in some cases into the millions.

Dr. Sterne emphasized that his studies were concerned purely with the statistics of Dr. Abbot's researches and not at all with the question of observational technique.

The periods in question were worked out by Dr. Abbot during the 15 years

from 1920 to 1934 and are built on the average of solar radiation in many parts of the world three times each month. Dr. Abbot measured the amount of radiation received in calories per minute per square centimeter at right angles to the sun.

The average during this 15-year period, he found, was 1.9410 calories per square centimeter per minute.

Informed of the Harvard announcement regarding statistical studies of his observations on solar radiations, Dr. Abbot said:

"The weight of scientific opinion for many years has been opposed to the variability of the sun or its importance.

"I am convinced, on the contrary, that the variation in the sun is the main cause of weather on the earth and believe that the work of Dr. Sterne, made from a skeptical point of view, will have

