

the other, in pedaling the tricycle is of a higher order than that required for skill in the other sports.

If you have ever noticed a young child with a new tricycle, you may have observed that he is inclined to use the new vehicle as a kiddie car and propel it by "walking" it with feet on the ground. Not until the child reaches a certain stage in mental development will he be capable of pedaling.

This discovery was more interesting to the psychologist than the more striking discovery that Johnny could make such unexpected progress in other ways. For it points to a fact of great interest to educators. Apparently, each kind of motor skill may have a corresponding mental age, or stage of mental development, at which it can be learned. Until that age is reached teaching is useless and only serves to waste the time of pupil and teacher and provide annoyance for both.

Perhaps, there may be another age beyond which learning becomes less easy. Perhaps there is one best age at which to learn tennis. Another when baseball should be taken up. Another when writing should be studied. Another for knitting, or billiards, or marbles, or typewriting, and so on.

The present research on Johnny and Jimmy cannot provide the answers to these questions. It does point the way to further study.

#### Personalities Different

But another result has developed from Dr. McGraw's experiment which she considers more important than the amazing differences in the motor achievements of the twin babies. That is the difference in personality which has been developed by training.

Jimmy obviously has adequate motor and mental equipment for doing many of the performances of which Johnny is capable. What he lacks is the confidence that comes from meeting obstacles and mastering them.

Jimmy looks at the steep slant of the slide, hesitates, and turns away.

Johnny walks right up.

"He has such confidence in himself and the world that after a few trials he will attempt anything he is directed to do," Dr. McGraw said. What a valuable attitude to have in these days of depressions and discouragements!

The most important result of the training of infants is the development of correct attitudes toward life and its difficulties, Dr. McGraw concludes.

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#### MEDICINE

# Sleeping Sickness Seen As Influenza of Brain and Nerves

## New Theory Holds That Filterable Virus Attacks Brain And Nervous System Instead of Nose, Throat and Lungs

**E**NCEPHALITIS, sometimes known as "sleeping sickness" and recently epidemic in St. Louis, may actually be virus influenza of the brain and nervous system.

This new theory of the baffling disease is suggested by Drs. Earl B. McKinley and Elizabeth Verder of George Washington University School of Medicine, in a report to the Society for Experimental Biology and Medicine.

The suggestion that encephalitis is brain "flu" of virus origin is purely theoretical, Dr. McKinley emphasized. So far, there is no proof for it, although there seems to be considerable circumstantial evidence. The theory developed as the result of ten years' investigation and study of the disease.

The name encephalitis simply means inflammation of the brain, Dr. McKinley pointed out. So far, no one has discovered what causes the inflammation. His own research has shown definitely that it is not caused by bacteria or disease "germs." Both Dr. McKinley and other scientists believe that it is caused by a filterable virus, such as causes smallpox and measles. A filterable virus has recently been found to be the causative agent of colds and influenza.

Dr. McKinley suggests that the same virus is the cause of both "flu" and encephalitis. The difference in the diseases is due to the fact that the virus attacks different parts of the body. In virus influenza, the nose, throat and lungs are attacked. A variety of influenza, known as gastrointestinal "flu," has been observed recently, in which the virus apparently attacks the stomach and other digestive organs, causing stomach and digestive upset with or without the other symptoms of influenza. When this same virus attacks the brain and nervous system, encephalitis or brain "flu" results, in Dr. McKinley's opinion.

Encephalitis first appeared after the influenza outbreak during the World War. It frequently follows an attack of influenza. In the St. Louis epidemic the patients suffered digestive upsets at the beginning of the encephalitis attack.

These facts all support the new theory.

Doctors have long suspected a relation between influenza and encephalitis, but it was impossible to explain this relation so long as a bacillus instead of a virus was considered the cause of "flu." Now that both diseases are known to be caused by a virus, a relation between them may again be considered.

Viruses are very susceptible to change in their passage through an individual's body, Dr. McKinley pointed out.

You know how, when you "catch a cold" from a neighbor or relative, you may have an entirely different sort of cold from his. This is because the virus changed in passing through his body and was different when it reached yours.

Just as there are different kinds of colds, there are different kinds of encephalitis attacks. The disease in St. Louis was quite different in some respects from what it had been in previous epidemics in this country. This probably was because the virus had changed somewhat. A more radical change may account for its attacking different parts of the body and causing, as a result, either influenza of lungs and other respiratory organs, digestive upsets known as gastrointestinal "flu," or brain and nervous disturbances, known as encephalitis, according to the new theory.

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#### ASTROPHYSICS

## Star Temperatures Now Found From Spectra Photos

**T**HE PHOTOGRAPHS that are made of the stars when a spectroscope is used in conjunction with a telescope show gradations in character as well as in brightness. These gradations have long been known to indicate the temperatures of the star's surface. Only recently, however, has it been learned how to read the actual temperature from these so-called star spectra. The method has been worked out by Prof. H. N. Russell of Princeton University in con-

junction with the Carnegie Institution's Mt. Wilson Observatory.

We must be satisfied with surface temperatures, Prof. Russell explains, because we can look into a star only through a small mass of its atmosphere. If our atmosphere were as opaque as the hot atmosphere of a star we could see only a few feet in it. The opacity is due largely to the abundance of free electrons and ions which are partly separated from each other on account of the high temperatures. The extent of this so-called ionization can be calculated according to the law of mass action which has proved so powerful in studying chemical reactions.

The extent of the ionization also determines the character of the spectrum. Prof. Russell described how certain lines in the spectrum at first became stronger as the temperature increased and then became weaker again. By studying the relative strength of many lines he tells how hot a star is. By this method he expresses in degrees the temperatures of many stars which have previously been classified only as to color.

Using this information, Prof. Russell is able to determine the relative abundance of different elements in the stars. It turns out that hydrogen, for example, is usually a thousand times more abundant than all the metals put together.

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#### METEOROLOGY

### Trees Protected By Lightning Rods

**P**ROTECTION against lightning has been given to a number of fine trees in Maryland, some of them of historic interest, by equipping them with lightning rods. Success with this method over a period of seventeen years is described by Dean J. B. Whitehead of the Johns Hopkins University engineering faculty, in *Science*.

The equipment is quite simple. Seven-strand copper cable is led to the top of the tree, its end unbraided to give a number of free discharge points, and the lower end soldered to the top of an iron pipe driven eleven feet into the ground. Some trees have been given several such rods. Several of the trees thus equipped had been struck by lightning one or more times before the installation of the rods, but since then no protected tree has been struck, though in some cases other trees near by have suffered.

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#### CHEMISTRY

### Blush of Green Solution Betrays Poisonous Lead

**L**EAD, a poison against which our food, drugs and cosmetics have to be guarded with ever-increasing vigilance, is now made to betray its presence by the red blush it causes in a greenish solution of one of the aniline dyes, diphenyl-thio-carbazone, called "dithizone" for convenience by the chemists. The new test, which has the double advantage of being both delicate and quick, was described before the meeting of the Association of Agricultural Chemists by H. J. Wichmann, of the Food and Drug Administration, U. S. Department of Agriculture.

Food and drug analysts often have to determine whether or not a shipment of

fruit is carrying more than the tolerated minimum of lead-spray residue. They cannot take more than a few hours for this. Yet hitherto the quickest accurate lead-determining technique demanded several days. To deliver themselves from this dilemma they made their search for a new and quicker method.

The dye "dithizone" has been known for a long time; it was first described in Germany by the famous chemist Emil Fischer. Fischer even noted the red precipitate caused by the addition of lead. But so far as is now known, nobody had previously discovered the beautifully delicate gradations of color, from the solution's original green through blue and purple to cherry red, that occur when a lead solution treated with ammoniated cyanide is added to a solution of the dye containing chloroform. By matching hues with other

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