mous dual personality in fiction, Stevenson's Dr. Jekyll and Mr. Hyde, and say "cane." The benevolent Dr. Jekyll might respond, "take a walk," while the murderous Mr. Hyde would exclaim, "beat him up!"

This is the kind of reaction Mr. Carington got from his mediums. In their normal state, they gave one set of reactions to test words. In their trance, their "controls" gave the opposite set of reactions. This led Mr. Carington to suspect that a medium's "control" is no messenger from the spirit world, but simply an ordinarily suppressed "other self" who gets leave to speak up during the trance condition.

Science News Letter, September 14, 1935

PSYCHOLOGY

Scientists Do Best Work During Early Maturity

GREATEST achievements in science and literature are most commonly the work of men in their early youth, psychologists at the meeting of the American Psychological Association learned from a report by Dr. Harvey C. Lehman of Ohio University.

A sort of scientific or literary "batting average" was computed by Dr. Lehman for outstanding achievements in chemistry, physics, short story writing, and other fields of creative work. Each year of the scientist's life would count as "one time at bat" in this computation. Each important contribution would count as a "hit."

Chemists reached their highest batting average between the ages of 27 to 39. When only the 100 most important chemical discoveries or achievements were considered, Dr. Lehman found that they were made most frequently by persons who were about 30 years old at the time of their invaluable contributions.

This does not mean that if an individual has failed to make an important contribution to chemical science by the time he is 35 or 40 that he will never do so, Dr. Lehman pointed out. Among the scientists who were responsible for noteworthy contributions to this science, there were 100 who were credited with just one major contribution each. Of these, 34 per cent. were over 40 at the time of their single contribution, 19 per cent. were past 50; 5 per cent. were over 55; and one individual was 69 years old.

At the other end of the age range was William Perkin, who at 18 discovered the first coal-tar dye and gave the initial impetus to the present great dye industry.

For physicists, the age of highest "batting average" is attained between 30 to 34. For mathematicians it occurs between 28 and 38.

For inventors, from 30 to 34 are the most productive years. Thomas A. Edison, whose long productive period lasted for more than 60 years, had his most creative year when he was 35. Between the time he was 33 to the time he was 36, Edison took out a total of 312 patents, more than a fourth of all those he received during his lifetime.

The writers of short stories attaining the distinction of listing among the "best short stories" are likewise young when they make their contributions.

Their highest "batting average" comes between 30 and 34 years. The writers of great poems are mostly persons between 22 and 35.

The single exception, among the fields studied by Dr. Lehman, seems to be astronomy. Astronomers reach their most productive years between 40 and 44.

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BIOPHYSICS

Four Types of Brain Wave Formed During Sleep

WHEN you sleep, your brain's activity shows either "saw-tooth," "random," "spindles" or "trains" types of brain waves, studies at the Loomis Laboratory, Tuxedo Park, N. Y., by Alfred L. Loomis, Prof. E. Newton Harvery of Princeton University and Garret Hobart have revealed (*Science,* Aug. 30). The four terms denote the appearance of the wavy records harmlessly obtained with special electrical brain wave apparatus.

Whether your brain waves show saw-tooth, random or other patterns in the records is apparently connected with the different levels of consciousness or brain activity going on while sleeping. The saw-tooth type of brain wave appears only in children just after they have fallen asleep.

In the comparable stage of sleeping in adults the brain waves appear as trains. Gradually, as sleep becomes more profound, the trains become less numerous and finally change to the random type of wave pattern.

A sudden change from the random to trains type of wave can be obtained by talking to the sleeping person. The random type of wave, it is found, predominates in the brain wave patterns of children and young people in deep sleep.

Science News Letter, September 14, 1935

PSYCHOLOGY

Confusion of Causes Hampers Treatment of Mental Ills

PROGRESS toward the cure of the mentally sick is often hampered because the attending specialist is himself mentally muddled, and does not distinguish between the real causes of the conditions he is treating, and the mere symptoms that appear on the surface.

This challenge to psychologists and psychiatrists was laid before the meeting of the American Psychological Association by Prof. Knight Dunlap of the Johns Hopkins University.

One of the fruitful sources of this confusion about the true causes of mental afflictions has been the proneness of scientists and medical men who deal with abnormal psychology to swallow whole the plausible theories of certain fashionable schools of psychiatric thought, and then make their facts fit the theories. It is high time, he declared, to dig out the facts, and let theories be developed that will bring such facts into useful relationships.

Examining the causes of neuroses, Prof. Dunlap divides them into two main categories, primary causes and accessory causes. Primary causes are not necessarily displayed in symptoms at all; they are often physical rather than mental, and may be hidden from both patient and physician. They may include such things as malnutrition or physical illness during childhood. A tragically large number of cases, Prof. Dunlap believes, are traceable to the operation of circumcision, performed on boy babies as a well-inten-