PSYCHOLOGY

Can Detect Dreams

➤ NOW SCIENTISTS have an objective method of telling just when a sleeping person is dreaming.

It is done by recording electrically the movements of the sleeper's eyes. The method is described in the *Journal of Experimental Psychology* (May) by Drs. William Dement and Nathaniel Kleitman. Their research was conducted at the department of physiology of the University of Chicago.

The pattern of the eye movements may also give a clue to the content of the dream.

Nine subjects took part in the experiment. In addition to records of the eye movements, the brain waves were recorded to indicate the depth of sleep.

At intervals all night, the sleeper was awakened by the ringing of a doorbell near his bed. He had been instructed in advance to speak into a recording device and tell first if he had been dreaming when awakened and then to relate the content of the dream. The experimenter was not in the room while the sleeper made this report. No one questioned him while the report was being made.

It then took the subject less than five minutes to get back to sleep when the report was completed.

When a subject was awakened during a period of rapid eye movements, he remembered having a dream in a large number of cases, but among those awakened during a period of no rapid eye movements the reports of dreams were very few.

The awakened sleeper's estimate of the amount of time his dream had taken corresponded with high accuracy to the length of the period of rapid eye movements before his awakening.

If the periods of rapid eye movement are assumed to indicate the sleeper is dreaming, and the experiment seems to indicate this is justified, some interesting facts about sleep and dreams are revealed.

Dreams occurred at regular intervals every night in every one of the nine subjects. The average frequency for the whole group was one dream every 92 minutes. But no dreams occurred during the initial onset of sleep.

Dreams are not instantaneous, as some people have supposed. Instead they seem to progress at about the same rate as a real experience of the same sort.

Eye movements in a vertical direction were found to be extremely rare. In each case the action in the dream was recalled as occurring in an up-and-down direction. One man dreamed he was climbing up a series of ladders and looking up and down as he climbed. Another dreamed he was throwing basketballs at a net and then looking down to pick up another ball.

Only one instance of pure horizontal movement was observed. That was when the dreamer was watching two people throwing tomatoes at each other.

In 21 cases where there were mixtures of eye movements, the dreamer was always looking at things close to him.

The findings of this experiment provide the scientist with an objective means of studying the effect on dreaming of drugs, psychological stress, and a variety of other factors, the scientists suggest.

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ACOUSTICS

Jet Noise Studied

➤ NOISE made by a rocket plane's engine is intense enough to damage the plane itself, loosen rivets, shatter panels and scramble "brains"—electronic "brains," that is. It is a great deal louder than that of a comparable size turbojet engine.

A study of the frequency of this noise was reported to the Acoustical Society of America meeting in New York by Dr. Harold R. Mull of the Lewis Flight Propulsion Laboratory of the National Advisory Committee for Aeronautics, Cleveland, Ohio. The damage done to the plane by its own noise depends, he said, upon the frequency as well as on the strength of the sound coming from the engine.

A small cold-air nozzle supplied with air at 450 pounds per square inch was used in the study. The air was forced out at a velocity of nearly three times the speed of sound. Then microphone measurements were made of the sound in the area surrounding the jet stream.

The study showed the noise begins at a point far downstream from the exit. The most intense noise centers about the end of the supersonic portion of the airstream. Downstream of this point, the noise field is similar to that from a subsonic jet.

It is now possible to partially reduce jet noise, Dr. Mull told the meeting.

"There seems to be good reason to hope," he said, "that jet airliners may be operated into present airports without causing any more disturbance than the present reciprocating engines."

One such method for reducing jet noise was reported to the meeting by Dr. Peter J. Westervelt of Brown University and Ira Dyer and Peter A. Franken of Bolt, Beranek and Newman, Cambridge, Mass.

A corrugated or vaned nozzle or ejector can be placed in the jet, they reported. This acts to mix the jet stream with the surrounding air and thus produce a new jet stream of larger area and lower velocity. This cuts down the noise.

There is an upper limit to the amount of noise a jet can produce, these scientists reassured the meeting.

A portion of the mechanical power in the jet stream is converted by the mixing process into turbulent power. In turn, a portion of the turbulent power is converted into sound power. Thus, the sound power is always less than or equal to the turbulent power.

The sound power of very powerful jets, including rockets, is therefore limited to about one percent of the mechanical power in the jet stream.

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