

PHYSIOLOGY—PSYCHOLOGY

Loss of Memory, Attention, Found in Deep-Sea Divers

High Pressure May Cause Difficulty in Making Quick Decisions; Unstable Persons Most Affected

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THE AVIATOR and the deep-sea diver present an interesting contrast in their environment of activity. The former enters ever decreasing levels of atmospheric pressure as he ascends. The latter enters the opposite condition as he descends into the sea, for the reason that air must be pumped into his diving suit at increasing pressure to offset that of the surrounding sea water.

It is a familiar fact that the aviator as he reaches the higher altitudes is subject to certain psychological effects, the real cause of which is a shortage of oxygen in the air, or, as it is called, anoxemia. When it develops gradually, the subject first has a feeling of alertness, stimulation and well-being, although his judgment may be impaired despite a sense of great confidence. As the condition progresses the powers of attention, memory, hearing, vision, and the finer muscular movements deteriorate but the person may not be aware of the situation.

Recent research has revealed that the deep-sea diver may also develop psychological disturbances as a result of exposure to high air pressure, but this must be due to an entirely different cause. The flier suffers from the effect of low oxygen on the brain but the diver is always breathing higher oxygen than at sea level; in fact a concentration ten times greater at a depth of 300 feet.

It has long been known to diving supervisors that it requires a greater effort to concentrate while under pressure and loss of memory is common, especially in depths exceeding 200 feet, the greater depths therefore retarding the efficiency of the diver.

Definite additions to our knowledge of the psychology of diving have recently been reported from the Second British Admiralty Committee on Deep Diving, the Harvard School of Public Health and the Experimental Diving Unit of the U. S. Navy.

The Admiralty Committee found that certain divers—not all—at 270 to 300

feet experienced what to them were new sensations, that is, difficulty in assimilating facts and in exercising that quick decision which is so essential in successful diving. Others reported that they had become unconscious on the bottom which was inconsistent with the fact that they had responded to telephone instruction which they were continually receiving. These men became so abnormal mentally or emotionally while under this high pressure that they could remember nothing that they had been doing on the bottom. Other men reported a detached feeling as if under an anaesthetic. This appeared to be an advanced stage of the mental changes which come over certain men at lesser depths. Men so affected were classed as psychologically unstable and a method of psychoanalysis was adopted for the selection of divers for work at great depths.

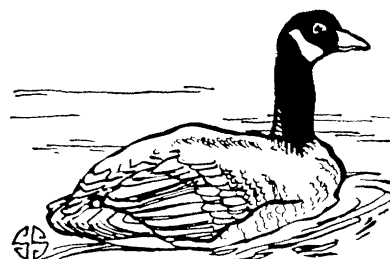
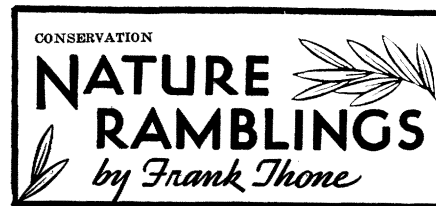
These symptoms resembled to a great extent the effect on the brain similar to that caused by too low an oxygen pressure. When the men were exposed to pure oxygen in a chamber at a pressure corresponding to 495 feet in depth no abnormal signs were observed; the effects therefore not being due to high oxygen in the air.

The Harvard group studied the influence of four atmospheres air pressure corresponding to a depth of only 100 feet. They observed a slowing up of mental activity even at this moderate depth.

Tests were carried out at the Experimental Diving Unit in a steel chamber at pressures corresponding to depths of 100 feet to 300 feet and compared with the results at normal pressure. Reaction time was tested by turning a light on and off at irregular intervals, the subject pressing a telegraph key in response to seeing the light. The reaction time was slowed and increasingly so with increased depth.

There are wide differences between individuals in the psychological effects of high air pressure.

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Ruinous "Improvements"

AMERICA is not the only land where ill-advised "improvements" to rivers have brought loss and trouble in their train. Some of the older countries made their mistakes earlier—and have had longer time to be sorry for them.

A clear-cut example is furnished by the wide floodplain lands of the lower Danube, on the estate of Count Traun, one of the great landholding nobles of Austria. Until the end of the eighteenth century the river floods were allowed their own way on the flatlands. They deposited fertile silt, which made for lush growth of vegetation and rich forests.

Then, early in the nineteenth century, the river was "improved." Its channel was straightened, and levees were built to keep its floods away from a large part of the former overflow lands.

Today the consequences are tragically evident. The protected lands back of the levees have been stripped of their forest cover, where they had it, and all of the land has been so intensively cultivated that the alluvial soil has been "mined" of its plant nutrient wealth. And of course, no new silt deposits can be brought by the river to renew it.

Between the levees the condition is even worse. The river, in its straightened, narrowed channel, rushes through rapidly. When high water occurs, it boils out onto the restricted flood plain that has been left to it. Long since, it carried off the rich surface soil it had once deposited. In its stead, the river now dumps gravel and coarse sand. The land that was once almost tropically luxuriant meadow and swamp-forest is now a tortured, sterile desert.

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