

Mild Nitrogen Narcosis ?

Breathing compressed air has not been found to affect mental efficiency until a pressure has been reached of about 4 atmospheres absolute, or is 45 pounds per square inch (p.s.i.) (3.16 kg./sq. cm.) gauge pressure, which occurs at a depth of about 100 ft. (30 m.) of water (Kiessling and Maag, 1962; Barnard *et al.*, 1962). At the invitation of the M.R.C. Decompression Sickness Panel we recently looked for measurable changes in mental efficiency at lower pressures. When we used a test which had been practised first at normal atmospheric pressure we failed to find any effect on mental efficiency at a pressure of $3\frac{1}{2}$ atmospheres absolute (38 p.s.i. (2.6 kg./sq. cm.) gauge pressure). But when the test was carried out first at pressure without any previous practice we found a statistically reliable change in performance at a pressure as low as 2 atmospheres absolute (16 p.s.i. (1.12 kg./sq. cm.) gauge pressure), as indicated in the Table.

Each man had to sort packs of cards for 10 minutes into boxes according to the suit. The time at which each card fell into a box was recorded automatically, and the occasional errors of classification were noted at the end of the

Effect of Compressed Air on Card Sorting

Absolute Pressure (Atmospheres)	No. of Men	Mean Age	Mean Percentage of Very Slow Responses*
$3\frac{1}{2}$	7	33	2.89
$2\frac{1}{2}$	10	27	3.15
2	10	29	2.74
1 (normal)	13	27	1.99

* 1 atmosphere reliably different from all higher pressures ($P < 0.05$).

test after the pressure had returned to normal. To be counted as very slow, the recorded time interval between a response and the previous response had to equal or exceed 2.5 seconds. A difference as large as that in the Table between the 2.74 mean percentage of very slow responses at 2 atmospheres absolute and the 1.99 mean percentage of very slow responses at normal atmospheric pressure would have occurred by chance less often than once in 20 experiments. This is conventionally taken as an acceptable criterion of statistical reliability in experiments of this nature.

Where there were only about 2% of very slow responses they were probably produced by having to pick up a new pack of cards. We believe that most of the remaining long delays were caused by transient lapses of attention which have been termed "internal blinks" (Broadbent, 1957), and that they indicate a reduced level of mental efficiency. The Table shows that the long delays became more frequent at the higher pressures. The very slow responses did not become more frequent at pressure when the task had been well practised at normal atmospheric pressure as the task did not then require such continuous attention.

A pressure of about 2 atmospheres absolute appears to be the lowest at which measurable changes in mental efficiency are likely to be found. It is also the lowest pressure at which type I "bends" are normally reported (Paton and Walder, 1954). A fuller account of this work is to be published.

E. C. POULTON, M.B., B.Chir.,
A. CARPENTER, M.B., B.Chir.,
Medical Research Council, Applied
Psychology Research Unit,
Cambridge.
M. J. CATTON, M.B., B.S., D.P.H.,
Appointed Factory Doctor, Tilbury,
Essex.

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