at which the difference between peak and trough of illumination is too small to be distinguished. This point will depend on the signal-to-noise ratio in the sense that when this is low the distinction between peak and trough will become blurred. Weale[2] has shown that some, perhaps most, of the fall of CFF during middle and old age can be attributed to alteration of light reaching the retina, that is, to lower signal strength, due to peripheral changes in the eye, but some seem clearly to be due to other causes and may reflect a fall of signal strength or a rise of noise-level in central mechanisms.

These EEG and CFF findings are also true of children who tend to show more fast EEG activity and lower CFF than young adults.

The reasons for decline of signal-to-noise ratio in older people are commonly assumed to be the loss of functional cells which occurs progressively throughout life. The loss would tend to lower signal strength while the lower number of brain cells would mean that there was less averaging of random activity and thus, in effect, a rise of noise-level. It has also been suggested that shortly before destruction nerve cells tend to show an increase of spontaneous activity, which would constitute a form of noise in the nervous system.

Clearly these explanations cannot apply to children. Any explanation of the similarity between older adults and children in this matter must be speculative, but a possible reason might be that, as suggested by Hebb, there is an increased patterning during childhood of the connexions between nerve cells, and that this patterning results in an effective increase in the number of discrete functional units.

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Falling Efficiency at Sorting Cards during Acclimatization at 19,000 ft.

During the course of the Himalayan Scientific and Mountaineering Expedition 1960–61 (ref. 1) the members sorted cards three times, a practice at a height not much above sea-level, and then two tests at 19,000 ft. Before the first test the average stay at 19,000 ft. had been 2 weeks, with an additional 6 weeks at 15,000 ft. Between the two tests an additional average of 9 weeks had been spent at 19,000 ft., plus 2 weeks at 15,000 ft. Adequate data were available for only three members of the expedition, whose ages ranged from 23 to 32 years. A comparable group of eleven research scientists from the Applied Psychology Research Unit was therefore collected, covering the same range of ages and academic experience. These men sorted cards with the same card-sorter three times in Cambridge, separated by the same average time-intervals. Table 1 shows that the number of delayed responses increased after acclimatization at 19,000 ft., whereas it fell slightly at about sea-level.

Table 1

Height above sea-level (ft.)		Age (years)	Mean percentage of delayed responses: Test 1	Test 2	Difference
19,000	J. B. W.	32	2·66	2·87	0·21
	J. S. M.	30	2·86	4·95	2·09
	M. B. G.	23	2·04	3·48	1·44
	Mean of 3 men	28	2·52	3·77	1·25*
< 50	Mean of 11 men	30	3·07	2·83	−0·24*

* Two groups reliably different ($P < 0·05$ on a two-tailed Mann–Whitney U test (ref. 3)).

Each man had to sort packs of cards continuously for 30 min into boxes according to suit. The time at which each card fell into a box was recorded automatically on magnetic tape. A fuller description of the apparatus is given in Poulton *et al.*[2]. The errors of classification, which averaged about 4 per test in the two tests both at 19,000 ft. and at about sea-level, were recorded by the experimenter. To be counted as delayed, the recorded time-interval between a response and the previous response had to exceed 2·0 sec. The increase in the percentage of delayed responses at 19,000 ft. was reliably greater than the change in the control group at sea-level; a difference in mean rank order as large as that between the two groups would have occurred by chance less often than once in 20 experiments[3].

So far as we know this is the first time that a statistically reliable change in performance has been reported in men during acclimatization at such heights. That the change was for the worse is compatible with the observation that "all members of the party lost weight at a rate of 1–3 lb. (0·45–1·36 kg) a week at 19,000 ft. (5,790 m)" (ref. 1). Previous work on acclimatization to height has simply compared the performance of men at different heights up to 17,500 ft. after they had become acclimatized to that height[4,5].

The tape-recordings from the experimental and control groups were made in different places at different times, and any discrepancies which could have been produced in this way inevitably confound the differences reported between the two groups. By comparing the differences for each individual between tests 1 and 2, this criticism has been taken care of as far as it is possible to do so, since any constant added to the results of both tests 1 and 2 will have been eliminated. But the effect of a constant multiplier, if present, has not been eliminated. The possibility of an artefact is difficult to rule out completely when comparing the course of acclimatization in a remote but natural environment with the effect of time alone on a control group.

A second task, number checking, showed no reliable change in performance over that of the control group until a height of 24,400 ft. was reached. This was presumably due to the insensitivity of the task[6], since reliable changes in performance on many tasks are recorded at heights above 10,000–15,000 ft.[7].

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