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Quantitative Analysis of the Relation Between Gravity Headposition and Ocular Torsion with Regard to the Otolith Function

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The question whether the otolith organ is stimulated by the iraction, the pressure or the shearing force exerted by the otoliths nas led to considerable controversy. As the normal stimulus, gravity, is a vectorial quantity, adequate experiments ask for the use of a centrifuge to enable us to vary both the direction and the magnitude of the stimulus. From 3,600 measurements of the ocular torsion made on the human centrifuge of the Dutch National Aeromedical Centre, the influence of the otolith system could be calculated. This influence appeared to be exactly proportional to the laterally directed component of the shearing force of the otoliths along the utricular maculae. It also appeared that the subjective plumb-line which was measured simultaneously depends largely on a different mechanism, "perceptive compensation", which is independent from I he ocular torsion and only partly dependent on the otolith system.

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