

LIVING WITHOUT A BALANCING MECHANISM*

BY

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ONE morning, now about 4 years ago, I arranged toothpaste, toothbrush, razor, and shaving soap in my pyjama pocket, mounted my crutches and, with towel and washcloth hung over my shoulder, made my way across the hospital ward to the lavatory. In preparation for shaving, I wrung out the washcloth in steaming hot water, spread it over my hands, and then held it to my face. Thus blindfolded, I suddenly lost my balance and fell sprawling on the floor. Unhurt but surprised, I picked myself up and looked around to see if someone had jostled me. There was no one in the room. In an effort to recreate this unexpected accident, I braced myself with both hands on the edge of the sink and tried closing my eyes. Instantly there was a feeling of dizziness and nausea. After that there was no further question in my mind as to the diagnosis—vestibular nerve damage.

Streptomycin treatment had been started nearly 2½ months earlier because it was thought that the acute arthritis in my right knee might be tuberculous. At that time relatively little information about the indications for, and dosage and toxicity of, this new drug had reached the medical officers in the European army of occupation. Few of us had had any opportunity to use it. The reports we were receiving, however, suggested that streptomycin was as dramatically effective in tuberculosis as penicillin in pneumococcal pneumonia.

When I became ill, penicillin was tried but proved ineffective. It was then decided to use streptomycin. The initial dose prescribed was 6 g. daily intramuscularly with 250 mg. locally into the knee joint. Improvement seemed to follow, and in a week or two the dose was reduced to 4 g. daily and the painful instillations into the joint discontinued. Just before my return to the United States, 6 weeks after becoming ill, the dose was reduced to 3 g. a day. It was on the 76th day of continuous streptomycin treatment that the first symptoms of eighth nerve involvement became evident.

I returned to my bed discouraged and frightened. At ward rounds I reported the episode in the lavatory to the medical officer in charge. He was non-committal as always.

Through that first day symptoms increased rapidly. Every movement in bed gave rise to vertigo and nausea, even when I kept my eyes open. If I shut my eyes, the symptoms were intensified. At first I found that by lying on my back and steadying myself by gripping the bars at the head of the bed, I could be reasonably comfortable. Later, even in this position the pulse beat in my head became a noticeable motion disturbing my equilibrium.

Most of us have experimented with motion pictures at home. This experience can be used to illustrate the sensations of the patient with damage to the vestibular apparatus. Imagine the results of a sequence taken by pointing the camera straight

* From *When Doctors are Patients*, edited by M. Pinner and B. J. Miller. 1952. Norton, New York.

ahead, holding it against the chest and walking at a normal pace down a city street. When a sequence thus taken is viewed on the screen, the street seems to careen crazily in all directions, faces of approaching persons become blurred and unrecognizable, and the viewer may even experience a feeling of dizziness or nausea as he watches. Our vestibular apparatus normally acts like the tripod and smoothly moving carriage on which the camera of the professional motion-picture taker is mounted. Without these steadying influences, the moving picture is joggled and blurred. Similarly, when the vestibular influence is removed from the biological cinematograph system, the projection on the visual cortex becomes unsteady.

From the beginning of my illness, I had resolved to try to be a patient and not the combination doctor-and-patient hybrid which often makes the care of one physician by another so difficult. Hence, at rounds that morning, I had reported only my symptoms to the ward medical officer and restrained myself from asking him to discontinue streptomycin. As I lay in bed the rest of that day, I tried to rationalize the continuing, regular visits by the nurse armed with syringe and needle. Perhaps by now cultures of the joint fluid *had* grown out tubercle bacilli. Perhaps loss of vestibular function *was* to be preferred to the consequences of tuberculous arthritis. From time to time I put my wrist watch to my ear, to see if I could still hear its ticking and assure myself that cochlear function was still intact.

Streptomycin injections were finally discontinued 2 long days later. At that point my courage started to return, and there began the slow process of learning to live with a handicap. The subsequent period was one of consuming interest to me. In it I saw demonstrated how effectively the loss of one of the sensory systems of the body can be compensated for by other systems. My first efforts were turned to overcoming the difficulty I had during reading. By bracing my head between two of the metal bars at the head of the bed I found I could minimize the effect of the pulse beat that made the letters on the page jump and blur. By using a finger or pencil on the page I gradually learned to keep my place.

Once I was able to read again, time began to pass more and more quickly. I soon persuaded myself, nevertheless, that I must try to walk. Already I had discovered as I lay in bed that turning my head from side to side while looking forward, produced the sensation that the room was turning around me, rather than that I was turning around in the room. This proved to be less disturbing, however, if I looked at a distant object rather than on one but a few feet from my eyes. I had also learned that there was less vertigo associated with moving about or turning over in bed if I kept my eyes closed. This manoeuvre had its drawback, however, in that with my eyes closed I had the giddy feeling that the bed was no longer horizontal but had been tipped up on end or on its side.

When I first attempted to walk, I found it helped to close my eyes and steady myself with both hands on the bed. Thus oriented by tactile sense, I groped my way around the bed telling myself, despite sensations to the contrary, that both the floor and the surface of the bed were stationary and on a horizontal plane. Later I learned to open my eyes, fix on a distant object to add visual to tactile orientation, and move around the bed.

My progress was greatly accelerated when, at last, I was permitted to dispense with the cumbersome plaster shell that had immobilized my right leg from sole to hip.

Ten days of physiotherapy restored the strength in the limb so that it no longer collapsed under me when I put my weight on it. I began to take excursions around the ward and later along the endless corridors that connected the various divisions of the military hospital. In these corridors I had the peculiar sensation that I was inside a flexible tube, fixed at the end nearest me but swaying free at the far end. In various places the corridors led up or down gentle inclines. On these ramps I had to learn to appreciate that I was going downhill by the sensation of strain on the extensors of my legs; or that I was climbing a grade by the strain on the flexor muscles. Of course, if there was a window nearby, I could corroborate the proprioceptor signals by comparison of the plane of the floor with that of the horizon outside.

There were certain things I learned not to do. One of these was not to try to look at a newspaper or letter in my hand while walking. In those early days my proprioceptive orientation was insufficiently well developed to permit even momentary withdrawal of visual orientation. When I was allowed to go outside, I quickly found that it was imperative to restrain the impulse to look up when an aeroplane passed overhead until I could reach a railing or tree against which to brace myself. I discovered, when I began to walk in open places without a nearby wall quickly available for support, that it was a mistake to slow down or stop. It was as if I were riding a bicycle—the faster I walked the more easily I could keep a stable upright position. Indeed, I soon noticed that unconsciously I had begun to walk the same type of course as that steered by a ship's gyroscopic compass, veering first slightly to the left, then overcompensating and veering equally to the right.

During walking, there was too much motion in my visual picture of the surroundings to permit recognition of fine detail. I learned that I must stop and stand still in order to read the lettering on a sign. These early excursions taught me a habit foreign to my New England background—that of greeting anybody who happened to pass. Being unable to distinguish the familiar from the unfamiliar faces when walking, the obvious solution was to pretend to recognize everybody.

Learning to get about at night or in the darkness has been the most difficult part of convalescence. Even after considerable practice in walking in daylight, I still find myself almost helpless in the darkness; so helpless, in fact, that sometimes at night I have had to resort to arriving at my destination on hands and knees. It is the rare occasion, however, when we find ourselves totally without light. Hence, for example, when I leave a friend's house in the evening, a short pause just outside the door usually permits accommodation so that I can see sufficiently well to maintain orientation from doorstep to automobile. My difficulties in navigation under such circumstances continue to be noticeable even now; but they can ordinarily be passed off as the result of an extra highball to top off a convivial evening!

The life I lead at present is little, if at all, affected by my disability. I am almost wholly engaged in research medicine and teaching; hence, if my gait is wobbly in the evening, I am not subject to the criticism that might be aroused were I a practitioner making house calls. With a little extra caution, I can successfully transfer a tray of glassware from one bench to another in the laboratory. Once I was told that I'd have to forget some of the activities in which I used to indulge on week-ends and vacations. Nevertheless, I now enjoy tennis doubles as much as I once enjoyed a fast running game of singles. On the water I am spared the sensation of seasickness

and hence make a useful hand in the hot galley when the seas are choppy. For a time I was intimidated about swimming by a prominent neurologist, who told me that many patients with nervous-system syphilis and central vestibular dysfunction had drowned because they lost their orientation in the water, and swam down when they thought they were coming up for air. Temptation has been too great, however. Some cautious experiments have reassured me that I can find the surface if I keep calm. So far I haven't been foolish enough to try swimming at night.

When I recall how completely disabled I was by the initial impact of loss of vestibular function, I am amazed that I am so little troubled at present, even though tests show no sign of recovery of that particular sensory system. Is there any man-made machine designed like the human apparatus, with so many alternative systems to accomplish its end?