

STUDY OF PARALYSED LOWER LIMBS

Joan Bryan, a 21-year-old secretary at the National Research Council, is one of several volunteers in a gait-characteristics study being conducted by bioengineers Dr. Morris Milner and A.O. Quanbury. The study is part of a larger research project on the feasibility of restoring locomotion to persons with totally paralysed lower limbs through the application of programmed electrical stimuli directly to muscles or to the motor nerves of the afflicted limbs.

The two NRC bioengineers believe there is an important need for an instrument that will allow a clinician to observe readily and to record the actual joint trajectories from a walking patient. Such an instrument, they say, should be useful in determining gait abnormalities or gait changes in patients recovering from an affliction or in those fitted with prosthetic devices.

NATURE OF TESTS

Miss Bryan's task in the experiments is to try to walk under various conditions created by Dr. Milner and Mr. Quanbury in their efforts to develop a system

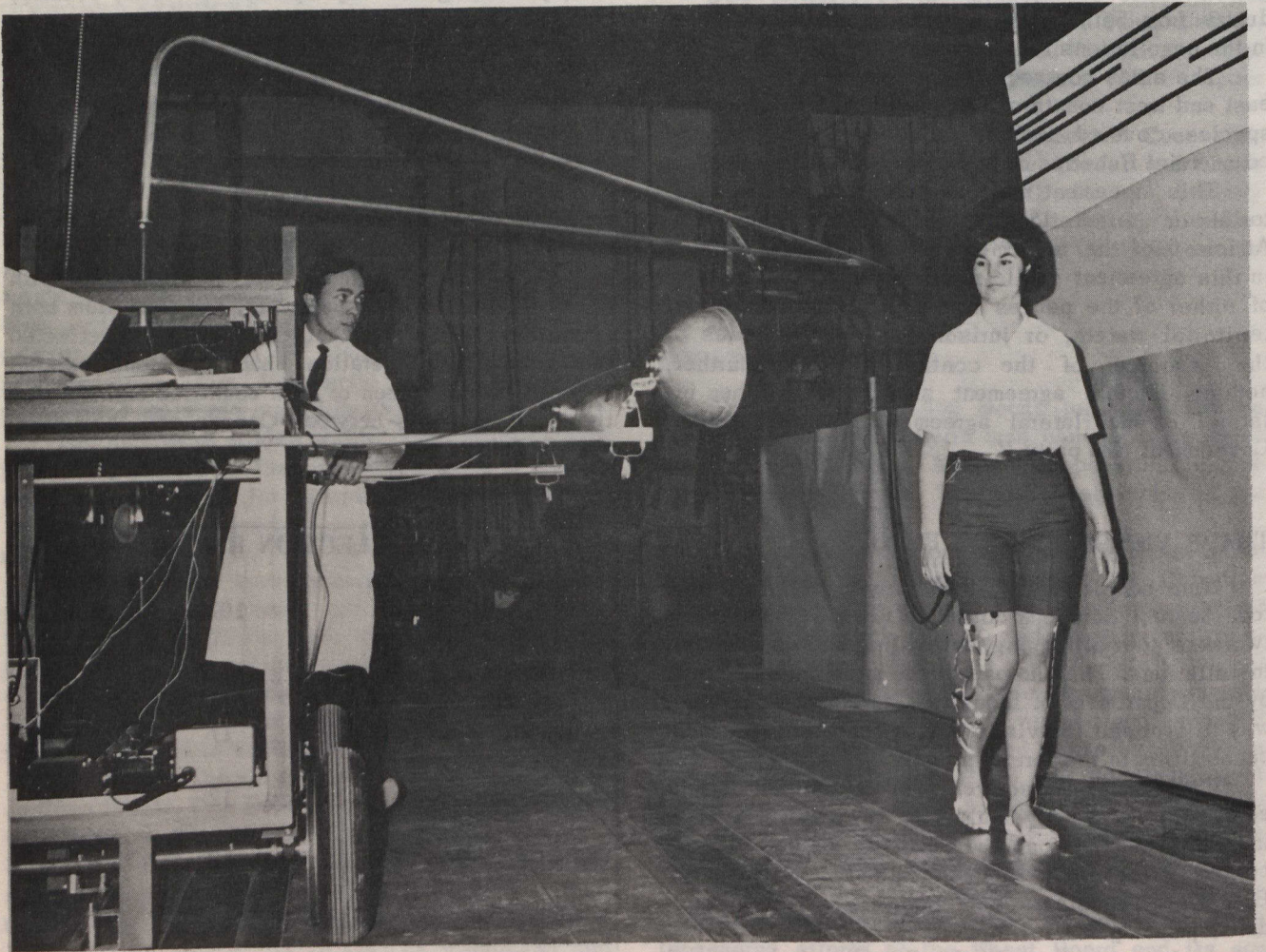
for the computerized analysis of human locomotion.

In bandaged bare feet, she marches back and forth atop a 20-foot metallic strip, which is a portion of a 60-foot walk-way, to the measured cadence of an electronic beep that, together with a moving cart with which she must keep abreast, sets her predetermined pace. Through metal pads attached to her heels and toes, signals are transmitted along wires on her legs and pass through a junction box carried at her waist. Electrical signals generated by selected muscles are picked up with special electrodes whose connectors also pass through the box. A digital computer will facilitate automation of the analysis of all these data. The box is linked to equipment on the cart running alongside the walk-way. From here, 16 millimeter film records her limb movements against a coded background.

Each frame of the photographed action will be analysed by a computer program.

RESULTS HOPED FOR

Extensions to this computer program are expected to produce the following information: planar position of



Joan Bryan walks metallic strip, while a camera on locomotion study cart records her movements against coded

background (extreme upper right). Linking cable transmits signals from electrodes on her legs to equipment on cart.