

ABSTRACT OF SUMMARY REPORT ON THE DEVELOPMENT OF A READING MACHINE FOR THE BLIND^a

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This report describes the progress from July 1, 1969, through June 30, 1970, on the development of personal-type reading machines for the blind sponsored by the Prosthetic and Sensory Aids Service of the Veterans Administration.

The most advanced personal-type reading machine being developed by Mauch Laboratories (the Cognodictor) provides the blind user with the "spelled speech" equivalent for each upper- and lower-case letter or ligature scanned by a hand-held optical probe. The "multiple snapshot" character recognition technique recognizes most popular type fonts with moderate accuracy (90-95 percent) and speed (80-90 words per minute) by using a special arrangement of CdSe photoconductors to sense letter features. The development of the hand-held probe for this machine also resulted in a family of direct translation reading aids which are pocket-sized and battery-operated and may be used independently for low speed reading. These are the Visotactor A and Digitactor (which may be used for recognition also) and the Visotactor B which are "tactile optophones" with one or more columns of photocells and associated stimulators, and the Visotoner which is a nine-tone self-contained optophone. (See BPR 10-12 Fall 1969, pp. 243-271.)

During this report period, the first three Cognodictors and associated Visotactor A's were assembled and placed in operation. At the end of June 1970 one was being used by Mrs. Deal in Dayton, Ohio, and another was being used by Mr. Lauer and his associates at Hines VA Hospital in Chicago, Illinois. The third Cognodictor remained at Mauch Laboratories so that a number of possible improvements could be tested.

^a Based on work performed under VA Contract V1005M-1943.

After using the Cognodictor and Visotactor for about 2 months, Mr. Lauer reported that he could read at about 40 words per minute. However, he felt that if he had a *Visotoner* which was equipped to operate with the Cognodictor he could read faster. It was decided to modify Visotoner #031 for Mr. Lauer's experiments. This modification should be complete at the end of July 1970.

Several improvements in the Colineator and Visotactor/Visotoner designs were made. An improved battery plug was found which should eliminate failures due to loose spring contacts. A wire spring covered with vinyl tubing which applies friction to prevent too easy (or too hard) rotation or up-down movement of the optical barrel was designed and added to a number of Visotactors/Visotoners. The Colineator cross slide bumper caps were redesigned to provide a better bumper action and a stronger limit stop to prevent bearing and axle damage. Seven additional Visotactor B's and Colineators were assembled from previously purchased parts. Twenty-three power supplies were built and 17 were distributed to Visotactor/Visotoner users.

Miss Jameson in London and other participants in St. Dunstan's research program began using Visotoners, and Mrs. Deal in Dayton started teaching two Visotactor B students. Mrs. Deal and her students indicated a preference for sharper tactile stimulator points and several Visotactors were so equipped.

Several Digitactor designs which were considered are described. The Digitactor is a multicolumn, direct translation, tactile reading aid which fits and stimulates the underside of the index finger of either hand, the same hand which scans the page. This one-handed operation makes it relatively easy to search rapidly and to read otherwise difficult-to-handle material. In addition the Digitactor will produce electrical signals suitable for being fed into either a personally owned recognition machine with a "spelled-speech" output or a central library computer with a machine speech output.

Complete Visotactor B-Visotoner manufacturing specifications were prepared, and eight copies were made and distributed. The specifications contain over 250 engineering drawings and 188 typewritten pages which cover assembly operations, operating instructions, parts lists, and indexes.