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QUARTERLY PROGRESS REPORT NO. 10

HINGE POINTS OF THE HUMAN BODY

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As in several of the previous Quarterly Reports, this report outlines the principal month-by-month effort of the past quarter. In addition, certain annotations will give supplementary information on the status of the work.

REPORT ON WORK DURING APRIL

During April, activity on the project was continued primarily by the principal investigator and by his professional colleague. Some 230 hours of typist and illustrator time were involved. The chief activities of the month were as follows:

1. Two research papers based on project work were presented to the Galveston, Texas, meeting of the American Association of Anatomists, April 7-8-9. These papers were: "Instantaneous Centers of Rotation in Major Extremity Joints", by W. T. Dempster, and "An Analysis of Sagittal Plane Forces for the Seated Subject", by G. R. L. Gaughran.

2. The major effort of the month was the preparation of data on joint range, including reviews of literature, plotting, planning of illustrations, and writing.

3. Information on bone length relative to stature was assembled and plotted from raw data obtained through the courtesy of investigators at Western Reserve University, Cleveland (Prof. C. W. Dupertuis) and Washington University, St. Louis (Prof. Mildred Trotter).

4. Data on sagittal-plane push and pull forces were further analyzed, and illustrations and rough drafts of data were begun.

Work planned for the coming month: further writing and illustration, assembling of data on manikin design, and completion of data-gathering on force vectors associated with pull forces.

REPORT ON WORK DURING MAY

Project work during May amounted to an expenditure of some 320 hours of time by assistants in addition to that of the principal investigator. The activities of the month were as follows:

1. Data-gathering was completed on the pilot study involving work on hand-grip orientation and force vectors associated with hand pulls in various regions of space. This activity brings to a close the formal data-gathering involved in this project, although the analysis of this and other phases of the work will continue.

2. Data were analyzed and illustrated on the range of movement of the major limb joints.

3. Measurements on limb bones, including radius of curvature of the articular surfaces, were made to determine ratios between standard limb-bone lengths and link lengths.

4. In response to a request of the Wright Field Anthropometric Unit, several days were spent in assessing the amount of completed work in our files in relation to that which can be written up by July 1. It is clear at this writing that it is mechanically impossible to organize and write up more than a portion of the work, including contract items, by an arbitrary July 1 deadline.

5. Much of the effort of the principal investigator was directed to writing up information.

REPORT ON WORK DURING JUNE

Work during June involved some 620 hours of assistance in addition to time by the principal investigator. Work during the month centered on:

1. Assembly of information on body dimensions and joint range, the construction of illustrations, and the development of plans pertaining to a scale manikin.

2. Analysis of force-vector data and grip angles used in hand pulls for various regions of the work space.

3. The preparation of material for the final report, emphasizing joint functioning, body links, and the manikin.

ANNOTATIONS

It was implied in the monthly reports above that all data-gathering has now ceased, except for occasional checks required as material is written up. The files contain a considerable mass of material; some of the work is in such a state that it can be written up directly; other parts, although organized to some extent, require further consolidation. In general, illustrations have kept pace with the writing.

The survey of the status of work made in mid-May shows that only the first phase of the report could possibly be organized by July 1. Data pertaining to this phase required considerable working over before a manuscript could be completed. Aspects of this phase of the work were studied rather late in the project, and considerable data-processing was necessary. Likewise, additional figures were required. Work during June concentrated on this activity.

Since the job of transforming data from the files to manuscript copy channels through the principal investigator, the rate of preparation is critically dependent upon the number of hours of work that can be devoted to writing. Two technical assistants, who have been processing data, an illustrator, and a secretarial assistant require certain supervision. There is still much to be done. A time extension, as requested through standard channels, will be the only way of assuring that the final report will cover the whole scope of this investigation, including contract items. The continuing activity from now to the completion of the Final Report will concentrate entirely on problems of data presentation, illustration, and writing.