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Project MAC

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DESIGN OF THE HAND

by

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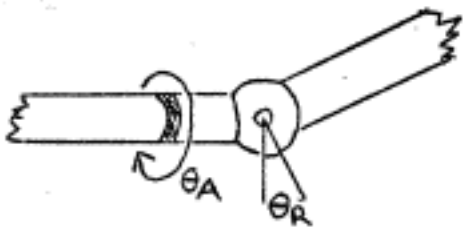
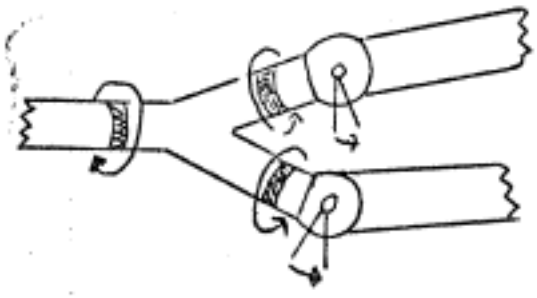
The following scheme for designing a general-purpose manipulator organ has many theoretical attractions. The basic idea is perhaps best conceived as a theoretical, or mathematical, idea. While it is unlikely that the actual system will be very much like it, it may have value as a sort of ideal against whose elegance we can match engineering and practical compromises.

The device is built up of rods, connected by two kinds of joints, L and Y. An L - joint is a sort of elbow, or L - bow:



with two degrees-of-freedom, one axial and one rotary.

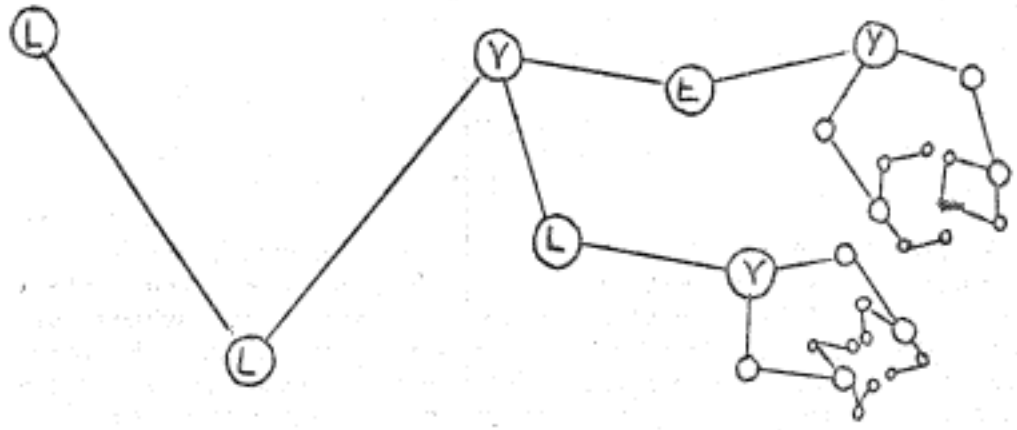
A Y - joint is a branch, or fork:



composed of two L - joints and a rotating Y - piece.

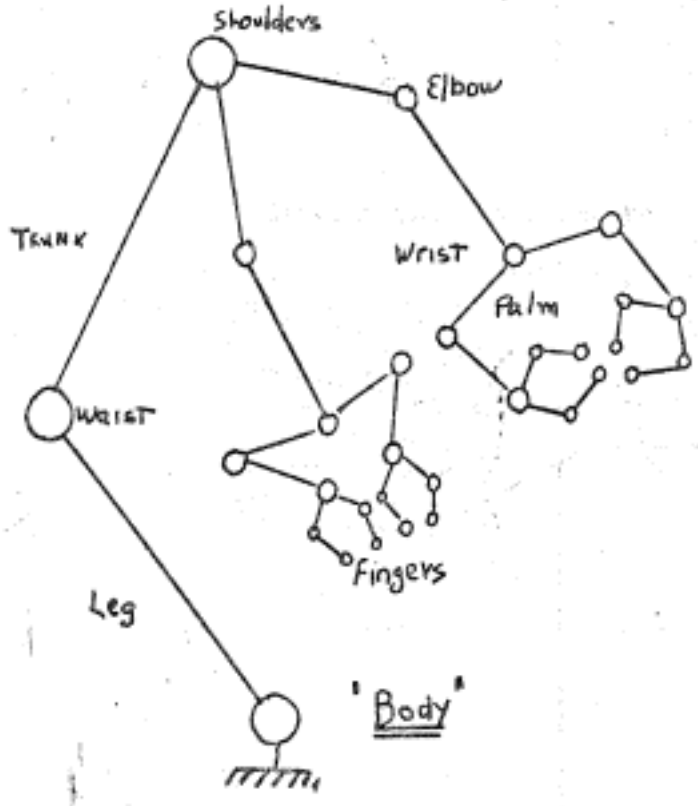
Engineering realism may dictate simplifying the Y - joint, as discussed below.

Our design for the system is based on a binary branching and dimension scheme, that forms a jointed tree as follows: let a be some unit of length:

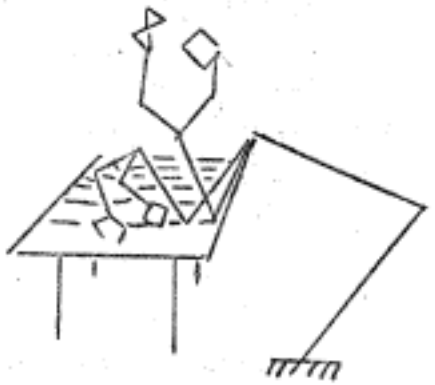


Thus, the scheme alternates L's and Y's; the dimension-scale is halved after each Y- joint.

Note how the system, magically, forms the essentials of the human body:



'Body'



'Leaning' for small, precise work

One gets a configuration for the hand that has, apparently, all the virtues of palm fingers, and thumb, but more versatility.

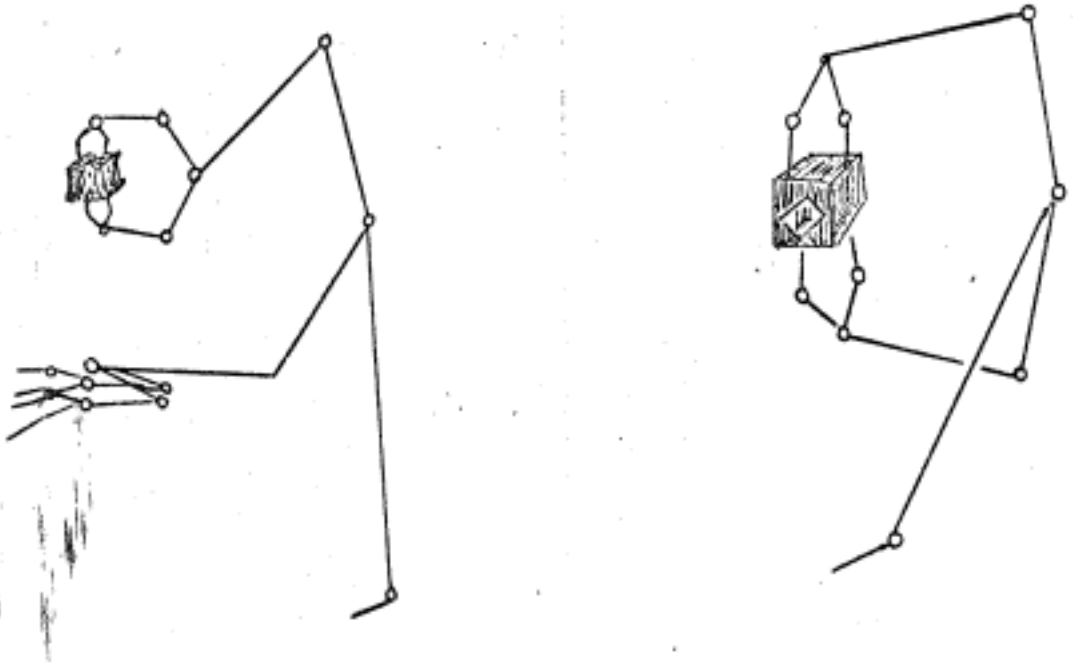
ADVANTAGES: Uniform design of joints - one technology,

Different sizes.

Uniformity of programming.

Modular system.

Note how the system can be used over a wide range of task sizes, by selecting the parts used in each application:



Thus the same programs and methods can be used at each size scale.