

The NYU Field Studies—A Postscript

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Well, one of the two (who will soon be here)—
But *which* of the two it is not quite clear—
Is the Royal Prince you married!
Search in and out and round about
And you'll discover never
A tale so free from every doubt—
All probable, possible shadow of doubt—
All possible doubt whatever!

—W. S. Gilbert, 1889

J.N PREPARING a report on extensive research, a modern investigator faces the same problems as the Grand Inquisitor. He may be able to furnish explicit answers to all the minor questions and to delimit the possible solutions of major problems. Only in fortunate circumstances can he provide final answers to all the questions originally posed.

This, the second of two issues of ARTIFICIAL LIMBS to be devoted to the NYU Field Studies of 1953-55 (see issue for Spring 1958), offers a wealth of censuslike information on fascinating problems revealed in the course of studying extraordinarily large samples of upper-extremity amputees and their prostheses. It answers with overwhelming affirmation a critical and highly pertinent question; *Do* modern concepts of upper-extremity prosthetics truly represent substantial improvement over previous practices? But this favorable broad conclusion demands by virtue of its own importance respect for certain essential qualifications more or less obvious from the circumstances of study if not from the nature of the study itself.

Largely because the samples in the NYU Field Studies included such high percentages of veterans of World War II and Korea, many of the amputees treated had already received organized care and training in military amputation centers. Moreover, many had already reaped some early benefits of the Artificial Limb Program. New and supposedly improved devices and techniques had already been developed and applied progressively over a period of half a dozen years, and the U. S. Veterans Administration was already operating Orthopedic and Prosthetic Appliance Clinic Teams in some 30 key cities. Though at the time members of these clinic teams were concerned largely

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with the suction-socket program and with lower-extremity problems generally, they were so stimulated by the special courses at UCLA, and so encouraged by the monthly visits of NYU field representatives, as to tackle problems in upper-extremity prosthetics and to expand their perspective from simple application of mechanical gadgets to genuine concern for all aspects of the resulting man-machine system. And consequently the results here given are clearly weighted by disproportionate inclusion of the comparatively young and otherwise healthy adult male with special advantages not ordinarily then to be had by the amputee population at large.

The nature of the subject matter is something else again. In any investigation so intimately associated with the individual proclivities of human beings, and particularly one of the magnitude indicated, the variables to be controlled are many and diverse, and the data to be had are especially voluminous. Although census counts may provide clues to major influences, and although modern electronic computers may furnish effective correlations and satisfying proof of statistical significance, prosthetics problems in clinical practice are not apt thus to be fully solved because, as in polio, cancer, and numerous other kinds of human disorder, there is generally no single "necessary and sufficient condition" but instead a rather large number of interrelated factors which, added or subtracted in proportions variously weighted, may easily tip the balance for or against clinical usefulness and research success. Thus effective application of the present findings calls for the exercise of keen discrimination over and above that required by the limitations of the sample studied.

Despite the existing correlations, therefore, the NYU Field Studies leave unsolved, or at best still subject to serious debate, some disquieting major questions. Why, for example, did a few amputees prefer their old arms over the newer ones? How well did the new prostheses pass the comfort aspects of the checkout tests required? Are the checkout standards adequate? Were complaints about terminal devices heavily correlated with mechanical failure? Of many such puzzlers, some might be resolved by further analysis and correlation of the mountainous data now embalmed in the form of 29 punched cards for each of several hundred amputees. Others indicate the need for further research in the social sciences, while still others constitute a continuing challenge for designers of devices, developers of techniques, and sponsors of research.

Perhaps even more fascinating than the yet unsolved questions of physical and mechanical significance are the hints at the nature of amputee psychology. Still needed are thoughtful studies of the problems of realistic acceptance of amputation losses, of objective appraisal of the possibilities for rehabilitation, of the influence of amputee expectations on success in restoration, and of the potentialities for improvement through counseling and guidance both for the patient and for the public as regards attitudes toward what is still called

"handicap." Serious consideration of some of the points raised in the present volume may be expected to temper success with humility and hence possibly to afford a degree of wisdom not otherwise to be had. Here, then, is a by-product perhaps more valuable in the long view than are the actual conclusions it is now possible to formulate.

In these investigations, NYU faced and overcame in the conduct of its own studies many practical difficulties in addition to the complex problems inherent in investigations in limb prosthetics. It recruited from a highly restricted labor force a field staff of persons able to observe and assess clinical procedures effectively and willing to travel two weeks in every four during a period of uncertain tenure. It thereby quickly established relationships with VA facilities throughout the country and, even more important, with the numerous private clinic teams that NYU helped to foster, and it maintained checkout standards despite differences in interpretation from one clinic to another. The correlations and insights here presented have all come from the very persons who helped to collect the data, and the summaries have all been prepared with the help of former field men who have since transferred to other NYU projects or who have now left the NYU facilities entirely.

Recognizing residual deficiencies, facing unresolved problems, and yet expressing gratitude for the substantial achievements described in NYU's unprecedented two-number contribution to ARTIFICIAL LIMBS, we may now, in the acknowledged infancy of the art and science of limb prosthetics, justifiably substitute "books" for "babes" in the familiar characterization by the Grand Inquisitor:

Both of the babes were strong and stout,
And, considering all things, clever,
Of *that* there is no manner of doubt—
No probable, possible shadow of doubt—
No possible doubt whatever.