## 20 THE MEASUREMENT OF INTELLIGENCE

powers. We may thus learn which of the measurements are the most instructive."<sup>2</sup>

Galton gathered much of his data by rather crude methods, such as mere casual observation. In some cases, however, he followed quasi-scientific procedures. He studied differences in mental imagery by elaborate questionnaires; the ability to make discriminations in weight, he tested by careful experiment; and for determining sensitivity to high pitches, and the limit at which pitches become too high to be audible, he devised a kind of whistle. One of these, he tells us, he had set into the end of his walking-stick, with a bit of rubber tubing concealed under the handle. A sudden squeeze of the tubing forced a little air into the whistle and caused it to sound. On his walks through zoological gardens, he amused himself by sounding this apparatus as near to the ears of the animals, as he safely could. If the animals pricked up their ears, he concluded that they had heard the whistle; if they did not, that the tone was inaudible.

Galton was followed by a large number of investigators, who, while perfecting the precision of mental tests and increasing their number, made observations regarding their applicability to various practical problems. In Germany, Kraepelin inaugurated studies of the differences between the mentally normal and the insane. In America, Cattell devised a set of tests which for a number of years were given to freshmen entering Columbia University. These tests were designed to measure such capacities as the following: Strength of grip, or the greatest possible squeeze of the hand; sensory discrimination by the skin, indicated by the distance that must separate two

<sup>a</sup> Remarks, following an article by Cattell, on "Mental Tests and Measurements," in *Mind*, vol. xv, 1890, p. 380.

compass the sense on the ba sation; th least diffe before a ment mai perception line: time an interva memory, be repeat As m negative directed I what mor by a num children ( increase in of his test. as estimat tion time the brighte These ten peared pos be readily The we

> \* "Ment: \* See W Psychologica \* "Resea Schoot Child vol. ii, 1894, \* See Ke Children."