becomes human with all the great distinctions of that term.

ANTHROPOMETRICAL TESTS.

SINCE Mr. Francis Galton conducted his anthropometrical measurements at the International health exhibition, increased attention has been given to the measurement of physical characteristics and of the senses. Mr. Galton has received letters from Tokio, from Rome, from Paris, and elsewhere, asking for the necessary apparatus for establishing a laboratory where the important measurements of the body and testing of the senses can be made.

The importance of such observations is well understood. It will enable us to determine accurately racial characteristics, to mark the stages of individual growth, to detect abnormalities of development in time to check them, to lay the foundation for a rational education of the senses and the muscles.

Mr. Galton has been devoting much time to the preparation of instruments for measuring the head and the delicacy of the senses; and Mr. Horace Darwin, of the Cambridge scientific instrument co., has aided him in the work. The last Journal of the Anthropological institute of Great Britain contains a preliminary account of some of their devices.

As regards the size of the head, it is well known that the caps of university students are larger than those of the uneducated population. With a convenient method of determining the size of the head in various directions, one could find at what age generally and individually the growth of the brain comes to a standstill. The method of taking the measurements is still a matter of controversy. The maximum breadth can be gotten by a pair of calipers, with rough teeth, like those of a comb, to penetrate the hair. The maximum length from the glabella (the central point between the eyebrows) is also easy to measure. The great difficulty is in getting the height of the head. Mr. Darwin's instrument for this purpose is inserted into the two ear-holes, and a slight projection is caught by the inner edges of the orbits: this determines the horizontal plane, and measurements are taken to either side from it. He will improve the instrument by having a band attached, to be inserted under the chin, and thus press the frame close against the orbit.

For the color of the eyes and hair, Mr. Galton suggests, instead of printed shades, which are apt to fade, small disks of colored glass for the eyes, and spun threads of this glass for matching the hair.

The usual form of dynamometer for measuring the force of one's grip is objectionable, because the maximum clutch depends on the width and convenience of the instrument at its widest point. Mr. Darwin is making an instrument to avoid this defect.

With regard to sight, Mr. Galton admitted that there was no good recognized way of measuring the acuteness of vision, but thought the simple method of getting the distance at which one can tell in what corner of a white card a black dot is to be found, as good as any. Mr. Brudenell Carter, who has published some interesting views on the relation of eyesight to civilization, objected to this method, and preferred the test of distinguishing two closely adjoining dots. There are many good methods of testing the color-sense; and Dr. Cattell's experiments at Leipzig, on the time it takes to perceive the various colors, are of interest here. He found that it requires 8 ten-thousandths of a second to see orange, 10 to see yellow, 12 to see blue, 13 to see red, 14 to see green, 23 to see violet. The exposure was made by an arrangement similar to the instantaneous shutter of a camera. Great individual differences in the perception of various colors appeared, and a simple form of his apparatus might be useful for testing the color-sense.

With regard to sounds, we have almost no exact methods of measuring. The susceptibility to pitch can be readily measured.

Mr. Darwin also exhibited before the Anthropological society an ingenious contrivance for measuring one's reaction time, which works on the principle of snapping a rod, and arresting it in its fall as soon as possible after the sound is heard.

The subject is really one of the highest practical importance, and physiological as well as mechanical problems are involved. A physiologist with a mechanical bent would certainly find here a fruitful field.

THE STUDY OF THE SENSES.

THE great name of Helmholtz stands for the union of the physical and biological sciences. The late Professor Clifford speaks of him as "the physiologist who learned physics for the sake of his physiology, and mathematics for the sake of his physics, and is now in the first rank of all three." In his 'Physiological optics' and his analysis of the 'Sensations of tone,' he gave to the world two classical works, as invaluable to the physicist as to the psychologist and physiologist. The real greatness of these studies, the new engine that he employed, consisted in recognizing the dual nature