On measurements as a diagnostic means for distinguishing the human races : a systematic plan established and investigated by the undersigned, for the purpose of taking measurements on individuals of different races during the voyage of H.I.R.M.'s frigate 'Novara' round the world.

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ON MEASUREMENTS

AS A

DIAGNOSTIC MEANS FOR DISTINGUISHING THE HUMAN RACES.

A SYSTEMATIC PLAN ESTABLISHED AND INVESTIGATED BY THE UNDERSIGNED, FOR THE PURPOSE OF TAKING MEASUREMENTS ON INDIVIDUALS OF DIFFERENT RACES DURING THE VOYAGE OF H. I. R. M.'S FRIGATE "NOVARA" ROUND THE WORLD.

THE vague and unsatisfactory classification of man into four, five, seven and even eleven races, totally different from each other with respect to their form and structure, appears to be the best proof of the deficiency of our present knowledge of the deviating particularities of mankind. Thus Leibnitz and Lacépède divide the human race into Europeans, Laplanders, Mongols, and Negroes; Linnæus into white, red, yellow, and black; Kant into white, copper-coloured, black and olive-coloured races; Blumenbach into Caucasians, Æthiopians, Mongols, Americans, and Malays; Buffon into Northern (viz. Laplanders), Tartarian, South Asiatic, Black, European, and American races; Hunter into black, blackish, red, copper-coloured, black-brown, brown, and white races; Prichard into Iranians (also Indo-atlantics or Caucasians); Turanians (Mongolians), Americans, Hottentots and Bushmen, Negroes, Papuas, (or wool-haired tribes of Polynesia) and Alfourous (or Australians); Pickering into Whites, Mongolians, Malays, Indians, Negroes, Æthiopians, Abyssinians, Papuas, Negritos, Australians and Hottentots.* Together with the acknowledgment of this deficiency there must rise in the mind of every scientific investigator the anxious desire to agree with regard to

* This classification, according to external, and for the most part unessential marks of distinction, as colour of the skin, colour and form of the hair, or with reference to their probable primitive geographical position, as for instance: Iranians (of Iran, a country situated to the south and south-east of the Caspian Sea, which Dr. Prichard considers to be the original seat of that race), or Turanians (of Turan, the name of a country bordering on Iran in the north and north-east, which already in the remotest times was inhabited by a part of that race), is extremely indefinite and uncertain, because a negro, even if we should change artificially the colour of his skin and his woolly hair, will not become an European, an Indian, or a Malay; and because a child of European parents begot and born on one of the isles of the Malayan Archipelago or in Æthiopia, will not be a Malay or an Æthiopian, but an European *by race*, although the colour of its skin may possibly approach, by climatical or local influences to that of the indigenous race.—(*Compare also Humboldt's Cosmos, vol I., p.* 361—363; *translated by E. C. Otté.*)

anthropological researches and to find out a rule by which the critical examination of man, as the representative of his race, may no longer be left to individual opinion, or be shaded and influenced by sectarian or other prejudices, but founded upon a more solid basis.

Anatomists, Anthropologists, and travelling Naturalists have come to the conclusion, to consider *measurements* of the different dimensions of the human body as a principal means* of comparing the *Normal* Caucasian with the *Normal* Malay, Mongol, Papuan, New Zealander, Indian, &c. But just as the claims of merit of the scientific papers on that subject may be considered, for having given the impulse to further investigations, yet the measurements recommended by them were neither sufficiently extended over every part of the human body, nor, in fact, taken on individuals of various races, so that they may be considered as only incomplete, and therefore allow and even make it desirable to improve upon them.

The Expedition of the Imperial Austrian Frigate "Novara," to which we have the honor to belong, appeared to us an excellent opportunity of carrying into practice such measurements, after a certain system and on a larger scale, than has ever been done before. We traced and arranged a plan, so that, in the course of our voyage at all places, where we made a sufficiently long stay, measurements should be taken on as many individuals of both sexes of an average constitution and age as possible, in order to gain less deceptive marks than the existing ones, for the distinctive characters of the different types of mankind.

The warm interest which the mere communication of our intention to take such measurements met in scientific circles, the encouragement which we enjoyed by the most acknowledged and established authorities in our own country as well as in England and France, induced us still more to carry into execution our designs, and thus we achieved, after numerous alterations and additions, a system, the exposition of which, together with the justification of measurements, *as a means for the diagnosis of the human races in general,* is the object of the following pages.

Positive science as well as speculation in general has marked the limit between man and animal; they have made many a valuable discovery in favour of the differential diagnosis of races, and have drawn many an important deduction from them. But do

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* Though not in direct relation to the human body, yet with respect to measurements of objects of natural history in general, the greatest naturalist of our times says:—"In all that is subject to motion and change in space, the ultimate aim, the very expression of physical laws depend upon *mean numerical values;* which show us the constant amid change, and the stable amid apparent fluctuations of phenomena. Thus the progress of modern physical science is especially characterised by the attainment and rectification of the mean values of certain quantities by means of the processes of *weighing and measuring*. And it may be said, that the only remaining and widely diffused hieroglyphic characters still in our writing-numbers appear to us again as powers of the Cosmos, although in a wider sense than that applied to them by the Italian school."—(*Humboldt's Kosmos, vol. I., p. 64; translated by E. C. Otté.*)

not all these results rather do honour to the human mind and its indefatigable striving for knowledge, than furnish to the common observer more exact and definite marks of distinction for his investigation ?—

There exists for instance no doubt, that, as the position of the great occipital foramen is a condition of the coincidence of the centre of gravity of the head with the axis of the body and its supporting plane, aided by the muscles of the neck, any deviation from this position must be met by other arrangements, if the head is not to recede from its balance. While the first event never happens, comparative anatomy has on the other hand stated, that in descending from the higher to the lower organized vertebrata, the great occipital foramen (which occupies in the so-called Caucasian race nearly the centre of the basis of the head) proceeds backwards, and that the equilibrium thus deranged, is re-established by the more powerful muscles of the neck.* After this experience the conclusion appears justified, that nations with prevailing muscles of the neck which are not in harmony with the rest of the muscular system, have the foramen in a more backward position, and by this circumstance show an analogy with the above mentioned observation. Nevertheless, we would not venture to advance this single distinguishing mark as a safe diagnostic for the varieties of races.

But there is another point of view, which directs the attention of the scientific investigator to the muscular system.

No animal, not even the largest one, possesses comparatively such powerful gluteal muscles as man, because they are intended to balance his trunk upon the extremities, and to enable him to carry himself in an erect position ; a well known, popular characteristic which our valued teacher and friend, Professor Hyrtl, deduces in so ingenious a manner from the arrangement of the muscular system, and which is one of the numerous spirited remarks of his instructive and delightful lectures.

Comparative anatomy has succeeded in distinguishing on the skeleton, as well as from internal organs, characteristics for the different races ; it has further ascertained, that the predominant development of the masticatory organs, the proportion of the face to the head, the prominency of the jaw-bones, the degree of the tension of the zygomatic arch, &c., may be considered as so many leading signs of the nearer or more distant physical relations between man and animal. We find internal organs serve to the anatomist to fix the limit between families, genera, and even between groups and varieties of animals, which by *external* marks, as general form, colour of the skin and its appendicular organs, are placed one next to the other, and even identified, notwithstanding that they are totally separated by their manner of living and their destination, and on this account have been provided by the wise arrangement of nature with other more suitable organs or organic alterations.

* A consequence of this circumstance is, that such men (nearly always gifted with prevailing masticating organs), always carry their head thrown backwards, and thus transposing a part of its weight behind the axis of the body, raise their face in such a way that the inferior margin of the body of the lower jaw is in a horizontal direction.

In the same manner a closer examination has led to the result, that the frontal position of the eyes in the plane of the face, their distance from each other, their receding on both sides, their form when open, the height of the back of the nose, the length of the extremities, the numerical increase of the muscles, &c., &c., must be likewise acknowledged as important *external anthropognostical signs*. However, so highly appreciable as these and other contributions may be, which embrace nearly every region of the human body, and which comparative anatomy has recently furnished, yet, there exists still, as we have already observed, *an absolute want of less deceptive and more distinct characteristics for recognizing the different races of mankind.*

Wherever we come into contact with but one race or variety, man appears to us, with respect to his corporeal condition, the most common object of observation, and without ever having reflected upon one or the other distinctive characters, we acknowledge in man, as it were instinctively, our equal. This seems also to be the reason, why, to this very moment, investigation has omitted, or rather neglected to search after and to establish absolute scientific forms for an object, so instinctively familiar to him, as the diagnosis of man. The travelling inquirer feels much more this want, as he comes frequently in contact with creatures, whose appearance renders it difficult to distinguish, after general popular ideas, what he is viewing.

But even if we suppose the above mentioned diagnostics daily increasing in number and evidence, and we should wish only to establish the different varieties between man and man, such an attempt would soon prove still more difficult, and find but little support by the progress of the differential diagnostics. It would be quite erroneous to believe, that by the examination of but a small number of individuals, for instance, ten, twenty, or thirty men, a decisive point can be gained. But too often the inquirer will not be able to ascertain by the mere sight alone, whether, and in what respect an individual distinguishes itself from that, which he has chosen as the basis of his comparison, viz., his *normal* type. Without mentioning, that even in Europe it would not be difficult to find some persons out of the great bulk of population, who resemble exactly one or the other individual, or even a number of persons of non-european races, we see the scientific traveller meet sometimes with whole tribes, who recal to his memory a well known individual impression, if he abstracts from unessential signs, as colour of the skin,* form of hair, &c. The Shingalese, the Indian Peons, the Sepoys,† look exactly

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* This character, which is used with former observers to serve as a basis for their classification of the human race, must be considered as unessential, because its alteration cannot induce even a passing error; (a white-painted negro and a blackened European will never be confounded with each other.) Moreover, the observer very seldom sees the natural colour of the skin of savage and half-savage tribes, on account of their continual oiling, painting, colouring, tattooing;—nobody would admit a turmeric-coloured or a blue and black tattooed race.

† We mention particularly these two classes of Indian population, because they belong to its most indigenous part, and are likewise generally fine, well-made, typical individuals.

like most of the Wallachians, and notwithstanding the difference of the dress, their physical resemblance to each other strikes the observer.*

In the Dutch colonies, at Java, we have had many opportunities of seeing and measuring among others some fine robust Bugis, Makasars, Amboinese, Sundanese and the inhabitants of Sumatra, whom, had we met them in the Austrian soldier's coat on the parade ground of Vienna, instead of in Dutch regimentals at Batavia, we should have taken, without hesitation, for Croatians or border-soldiers; just as many a Chinese, with his fine delicate features and his melancholy expression of face, might easily pass in the saloons of our capitals for an European fashionable.†

When at the prison in Hong-Kong, examining its Chinese inmates deprived of their tail, especially those of the Hakka tribe, with their stout and vigorous constitution, their fine well-shaped aquiline, or long and straight nose, and the form of the eyes not at all specific Chinese, we could not help affirming that the Hakkas resemble in such a degree certain plebeian figures of our lower classes, that, dressed in European fashion, they might have the most extensive intercourse without being ever recognized as Chinese, even if the observer should have before his eyes the typical image of a Chinese with tail, opium-pipe, palm fan, tea-box and pagoda, as impressed upon our mind since our early days by the above-mentioned stereotype representations of that class.

But still more we feel the error of most of the external characteristics at the sight of the Protestant and Catholic missionaries at Hong-Kong and Shanghai, who, as in the far West, are living here among the people as the able, devoted bearers and diffusers of christian civilization and science, influencing most beneficially the natives by word, action, and example. Knowing how much the human mind dwells upon external objects, these venerable men have condescended, for the more sure attainment of their pious purpose, to adopt certain customs and habits of the Chinese people, especially to wear their hair after the Chinese fashion. The consequence of these concessions in dress is such a complete illusion, that it not only commands totally the imagination of the Chinese, but produces a like effect upon the eye of the European. At the Jesuit

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* Peculiar dresses, ornaments, arms, &c., which certain representations of races in ethnographical works bring repeatedly and in such a stereotype manner before our eyes, have accustomed us to assign to an individual immediately its place as the type of a race, as soon as it appears in a certain dress, or with certain ornaments, arms, musical instruments, and other distinctions; as for instance, the Esquimaux in a seal-skin dress, with a fish in his hand; the Indian Prince riding an elephant; the Arab leading a camel; the inhabitants of the tropics with the cocoa-nut, or other palms in the landscape; the Malay with a kris and betel-box; or the native of Nukahiwa with an immense club and a turtle in his hand, &c. But should we see on the contrary, for instance a Chinese without tail, opium pipe, palm fan, varnished parasol, or a pagoda in the background; we should find as great a difficulty in the classification of the represented type as if we should meet the individual under similar circumstances in life. No doubt, men of science possess other means of recognising and distinguishing the different types of man; but these are neither sufficient for all cases, nor universally known.

†This deception is still more striking among the by far finer formed Tartars. Unfortunately we have not had an opportunity to see a sufficient number of them to enable us to enter into more particulars on this subject. However, on having an opportunity of seeing five or six Tartars of both sexes, it was but with reluctance that we took them to be of Mongolian rather than of European descent.

College at Sikkawei, near Shanghai, we found ourselves among a number of Catholic missionaries in Chinese dress, and might have imagined ourselves in a circle of learned natives of the Chinese Empire.

The distinguished English Missionary, Dr. Medhurst, sen., travelled once unrecognized in the interior of China in the dress of the natives for many months, at a time when the detection of his real nationality would have exposed him to the greatest dangers. Mr. Gützlaff, some years before Mr. Medhurst, went in the disguise of a native in a boat up the Yang-tse-Kiang river, and returned to Canton undetected, in spite of the cunning of the Chinese race.

There is still more difficulty in separating sub-races, although there must exist likewise for them certain distinctive characters. An anthropologist who inhabits the island of Java, the centre of the Sunda Archipelago, will, for instance, at the first view be able to classify most of the Malayan tribes inhabiting the larger and smaller islands of the Eastern Archipelago, even without certain external marks, such as dress, head-gear, war-implements, &c. But should it happen that we ask him *by what method* he distinguishes a Javanese from a native of Celebes, Amboina, &c., we must generally content ourselves with the reply, that although he is able to distinguish without ever mistaking, yet he cannot give an account of the *proper marks* which *direct* his judgment. We ourselves have personally and frequently experienced, that even men of high standing and renown in the scientific world were obliged to answer our question by a similar reply.

But should only the highest organised being of this creation, man, have originated without plan or system, he, who has ascertained the laws, by which the stars are moving and the globe is following its orbit; who has tried to explain even the most minute proceedings in Nature's Works, and moreover, has dared to trace the plan upon which this glorious creation is based? Is it to be supposed, that only for man there should not exist a fixed rule according to which the different varieties of his race should be distinguished, while his restless inquiring spirit has succeeded in dividing the vegetable kingdom according to a certain system, into hundreds of families, thousands of genera, and hundreds of thousands of species, and to assign to each single plant its fixed place in it; while he has likewise been enabled to submit to the same law the almost numberless species of the animal creation (as the head of which he places himself, as it were *hors de classe*), from the giraffe of nearly eighteen feet high, down to the most minute microscopical infusoria; which enables the student to classify from millions of creatures of the animal world, each individual according to certain distinctions!

The scientific eye of the botanist gives him the power to arrange, without difficulty, after certain systematical characteristics, the smallest, most insignificant little plant, which he has never seen before, next to that plant in which it stands nearest by its morphological relation, to assign it the proper place to which it belongs in the great

system, and give it the exact name, as if it had been present when the system was first founded, and had at that time already claimed both these prerogatives!

And, again we ask, why man alone should make an exception to those inevitable and unchangeable laws of nature, why for him alone there should not be found to exist a law by which his different types are formed and distinguished?—

Although everybody must be *a priori* convinced of the existence of such a plan, yet, even should there still remain any doubt on the subject, it seems under all circumstances to be a most worthy task, that man should dedicate the same amount of study and inquiry to the systematic arrangement of his own species, as he has applied long before to thousands of species of the vegetable and animal kingdom!

And if we see, moreover, what warm sympathies are felt towards similar scientific investigations, as for instance, microscopical examinations of the smallest organism of the animal or vegetable creation, whether marine or terrestrial, we also hope that the like kind disposition of the naturalist as well as of the friend of science, will be accorded to our not less important undertaking, which, in endeavouring to increase and promote the knowledge of the human race, permits us likewise to arrive in its final results at such important deductions!

As the principal object of our study and examinations is the diagnosis of races, sub-races and varieties, while for the present we do not enter into the enumeration of generic characters, we have chosen to follow for our purpose a more detailed mode of investigation. However, we have not neglected to introduce into our new plan, in one way or another, most of those characters which have provided former inquirers with the principal material for the description of man.

Our more minute way of examination with respect to the diagnosis of varieties led us to adopt a method already much pursued in other branches of natural history, viz., *the method of measurements*. What admirable results have, for instance, accompanied the few measurements of the length of the body, the expansion of the wings, the size of the head, the breadth of the breast, as well as other striking peculiarities in the dimensions of animal organs and remarkable individual formations in ornithology, where measurement and weight of a full-grown bird, in many cases, are considered as the decisive diagnosis for the determination of the species. In a similar manner measurement and weight are consulted for the diagnosis of other individuals of the animal creation.

We have already mentioned the deviating points in our system, and its more extensive character. The principal reason why some of our measurements differ from former similar theories, may be found in the fact, that points united by lines are much easier to mark with numbers and to control, than certain regions and planes chosen by former investigators, which, as for instance, Sole of the foot, Gluteal Region, Cheek,

Abdomen, &c., not only appear as indications of too vague a kind, but, moreover, formed by soft parts, are more subject to alterations with respect to momentary position. Experience has taught us only recently, that even habits and customs are able to produce, against the plan of nature, peculiar alterations not only on soft parts, as for instance, ear-lobes, mammæ, genitalia, &c., but also on *solid* parts of the body.

In this respect, inquirers who adopt for instance, and quite correctly, the range of the teeth and their position in the jaw as a differential diagnostic, would not be able to use this distinctive character among the natives of the Nicobar Islands, as this tribe produces (by its continual chewing of corroding and hard substances) such a pathological alteration, and consequently such an unnatural position of their teeth, that the upper and lower range, when closed, are acting one upon another in an acute angle.

In determining the points of measurements, we paid that attention to the system of bones and its practical importance which, to use the words of Professor Hyrtl, it deserves "on account of its comparative relations to the softer parts." Most of the terminating points of our measurements are likewise natural protuberances of portions of the skeleton which are not covered by soft parts.

Some of our points of measurements have already been duly appreciated by other inquirers in this branch of science, so as to give rise to several valuable monographs,* yet the existing number of measurements seemed not comprehensive enough† for our anthropological purposes, and we have therefore founded our measurements upon a more extensive system, and divided the intended investigations into four different parts viz. :—

1. General observations.
2. Measurements of the profile and the full face.
3. Measurements of the trunk.
4. Measurements of the upper and lower extremities.

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* A. Quetelet, *Sur l'homme et le developpement de ses facultés, ou Essai de Physique Sociale.* Paris, 1835. 2 vols. *Geologische Bilder, zur Geschichte der Erde und ihrer Bewohner, von Dr. H. Burmeister. Leipzig,* 1835. *Der schwarze Mensch, Pag.* 95. The most extensive work on measurements, although in another point of view, has been furnished by Dr. Zeising, in his *Proportionslehre des menschlichen Körpers. Leipzig,* 1854.

† We cite as an example of the way in which measurements were previously taken, some tables of measurements from the latest and most celebrated voyages :—"Narrative of the U. S. Exploring Expedition during the years 1838-42, vol. v., p. 539. Appendix.—Table of the measurements of the natives of several groups of Polynesia :—1. Height; 2. Facial angle; 3. Front line; 4. Upper line; 5. Lower line; 6. Length of arm; 7. Length of collar bone; 8. Number of teeth; 9. Length of hand; 10. Length of foot; 11. Circumference of head; 12. Number of beats of pulse in a minute."

"Narrative of the surveying voyages of H. M. S. 'Adventure' and 'Beagle,' between the years 1826-36. Appendix to vol. ii., p. 142. Remarks by Mr. Wilson, Surgeon, on the Structure of the Fuegians. Measurements :—1. Thorax; 2. Abdomen; 3. Pelvis; 4. Thigh; 5. Calf of the leg; 6. Arm; 7. Fore arm; 8. Length of the head, from the chin upwards; 9. Length of the body from the symphysis pubis to the top of the sternum; 10. Length of the thigh; 11. Length of the leg; 12. Length of arm; 13. Length of fore-arm and hand; 14. Length from spine to sternum, externally; 15. Same, internally; 16. Breadth of the thorax; 17. Breadth of hypochondriac regions; 18. Breadth of pelvis between superior and spinous processes."

From the 78 different measurements taken on each single individual by means of the measuring tape, the callipers, and several other instruments of a most simple construction, which are systematically described at the end of this memoir, 30 relate to the head, 19 to the trunk, 21 to the upper and lower extremities, and 8 to general observations. Some of these measurements have less value for the anatomist and physiologist than for the artist, as it appeared to us an additional advantage of our system to make use of it likewise for the graphical representation of the skull, the head, and in fact of the whole human body.

I. GENERAL OBSERVATIONS.

All the observations contained in this part relate, besides the name, sex, native place, occupation, character and thickness of the beard and hair of the measured individual, to the following eight divisions:

1. Age.
2. Colour of the hair.
3. Colour of the eyes.
4. Number of pulsations in a minute.
5. Weight.
6. Manual strength (*force manuelle*), measured by means of Régnier's Dynamometer.
7. Muscular strength in the loins (force rénale).
8. Complete height.

The importance of most of these general observations appears so obvious, as not to require any more minute explanation. But with regard to the application of the balance and the Dynamometer of Regnier (intended to ascertain the muscular powers of an individual) we propose to add a few remarks. The ascertaining of the weight is not only important for the system of the bones and the muscles as a whole, in so far as a knowledge of it furnishes the approximating numbers for these systems and for other organs, but because the knowledge of the weight and height of an individual permits us likewise—according to Mr. Quetelet—to determine its own age as well as the average age of an entire population. This fact enables us to arrive at the age (put down merely by estimation) of those tribes which in their primitive condition either have not yet any correct idea of time, or are making in consequence of their want of a chronological record the most absurd and preposterous statements.

With regard to the application of the dynamometer, we wish only to allude to the important aid which the knowledge of the muscular strength* of the individual supplies for the exact appreciation of the producing force of whole nations.

The dynamometer as an apparatus for measuring the muscular power seems however, with regard to primitive tribes, more as a measure of a negative result, namely, of *that* which at a given muscular power remains *below* a certain *normal rate*, on account of a want of exercise and development (both the results of civilization), perhaps also of a want of irritability of the nerves and the influence of the will. And if we further take into consideration those measurements which permit the theoretical determination† of the power of those muscles, which are active during the application of the dynamometer,— should we not, by comparing them with the practical result *gained*, find in the *Plus* a measure for those mysterious motors of the muscular power: *the nervous* ‡ *influence and the will?*

After these general observations, we now proceed to the measurements themselves.

II. HEAD.

a) in Profile.

The head is, physically and ideally considered, the noblest part of the human body, as being the exclusive seat of intellectual power, and hence we were desirous of taking from it as many measurements as possible, (those of an acknowledged importance as well as those of an interesting character,) and to unite the separate measurements into one complete net-work of lines extending over the whole surface of the head.

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* We cannot agree with Dr. Prichard, when he remarks (a Manual of Scientific Enquiry; edited by Sir John F. W. Herschel, Bart., section xiii, Ethnology, p. 443,) that, in case the dynamometer should not be at hand, the same purpose may be answered by experiments, showing what weights a given number of men can raise by their individual efforts. We might certainly get a just estimate of the lifting power of an individual, if he would raise to a certain height at once the heaviest weight corresponding with his muscular strength. But although an intelligent person is able to estimate, after some experience, the amount of weight he can lift just as he estimates the distance he may spring or run; yet one single misapplication of his power to too small or too large a weight, is sufficient to yield an erroneous and unsatisfactory result. By means of the dynamometer the first trial must succeed, supposing that the experimenting person understands how to manage the instrument. But if we try to determine by weights the lifting power of uncivilized tribes where it is very difficult to know whether they are willing or able to exercise their power to *the full extent*, it would require several experiments to find out for every single individual the correct weight adapted to his force; we shall perhaps find his real muscular power already diminished by former experiments, *before* we have succeeded in finding out the weight corresponding to his *real* strength.

† Compare the admirable experiments of Weber, Dubois-Raymond, Ludwig and others, on the lifting power of vivified muscles of measured volume.

‡ Experience teaches us that amongst wild tribes the best result with the dynamometer is gained at once, as soon as we have shown them its manipulation, and encouraged to do their utmost during its application.

A great importance is attached to the exact position of the profile, in order to be able to represent, by the acquired numbers, a true figure, and for that purpose we thought the following four points, and their position in the line of profile, worthy of a particular consideration:

1. The beginning of the growth of the hair on the forehead.
2. The root of the nose.
3. The basis of the nose.
4. The point of the chin.*

These four points were gained by measuring previously the absolute lengths † from the beginning of the growth of the hair at the forehead to the root of the nose, from the beginning of the growth of the hair at the forehead to the basis of the nose, from the beginning of the growth of the hair at the forehead to the point of the chin, and by bringing into contact afterwards any one or two points of the profile (tip of the nose, prominent upper and lower lip, or both together ‡) with a perpendicular line established by the plummet. This being completed, we measured the horizontal distance of the above-mentioned four points of profile by the plummet. By this method of proceeding these points are perfectly well determined and can be represented in the following way:

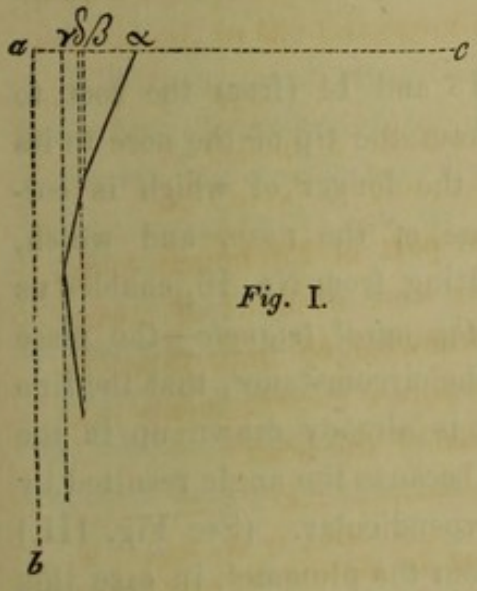

Fig. I.

From the point *a* of the horizontal line *a c* (see Fig. I.), draw the perpendicular *a b* and mark from the point *a* upon the horizontal line, the distances found by measurement No. 9 (distance of the commencing line of the growth of the hair from the plummet) and the measurement No. 10 (distance of the root of the nose from theplummet ||), respectively a_α and a_β. After this, draw through the point β a parallel to the line *ab*, and mark upon this parallel, from the point a in the horizontal line, the distance *ax* found by the measurement No. 15 (beginning of the growth of the hair to the root of the nose). By such a proceeding the situation of the root of the nose in the profile-line is determined.

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* The detailing of these four points is to be found in Nos. 15, 16 and 17 of the joint systematical schedule. It seems quite obvious that all these measurements have to be taken in the middle-line of the face.

† By this proceeding every distance *between* those points can be ascertained, as for instance, basis of the nose to the root of the nose.

‡ It is, however, not at all necessary to bring any point into contact with the perpendicular line, but the usefulness of such a proceeding shows itself to the draughtsman. The selected points must be especially put down in the notes.

|| See Systematical Schedule at the end of the paper.

The situation of the root of the nose is gained by tracing its distance from the perpendicular in the horizontal line (γ), and by marking again from a upon the perpendicular line established through the point γ, the distance ay found by the measurement No. 16 (the commencement of the growth of the hair to the basis of the nose).

Exactly in the same way we succeed in getting the situation z for the point of the chin in the profile-line.

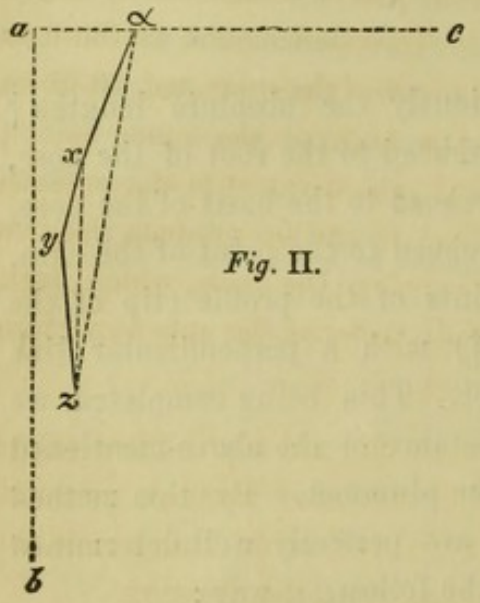

Fig. II.

These four points put down, two angles may be constructed by joining a, x and y with z (see Fig. II.), which we propose to call *profile-angles* (viz., xzy the anterior, and azx the posterior).

We will not at present enter into more particulars respecting these two angles, because we consider our collected facts upon this subject not yet sufficient, to enable us to draw any correct conclusion from them, and intend to postpone this important task for a future investigation.

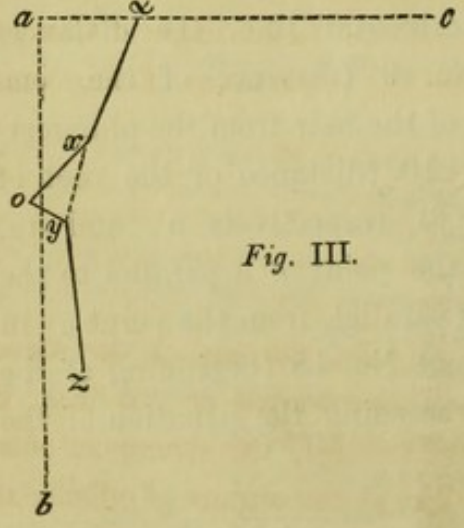

Fig. III.

The measurements 13 and 14 (from the root to the tip of the nose;—from the tip of the nose to its basis), yield two lines, the longer of which is corresponding to the bridge of the nose, and which, together with that resulting from No. 16, enables us to construct a triangle—*the nasal triangle*—the place of which is prefixed by the circumstance, that the line nasal root to nasal basis is already drawn up in the curve of the profile, and because the angle resulted by 13 and 14 joins the perpendicular. (See Fig. III.) This angle (o) projects from the plummet, in case this was, as by us, applied to the tip of the nose. The artist finds by this method a direction for figuring the nose-tip in order to construct the profile of the whole head. We selected for the basis that line which connects the root of the nose with the point of the chin, (called by us the *facial line*) and laid down upon it a number of triangles, all the angles of which are situated in the peripherical line of the head, and consequently offer to us so many leading points for it.

By the measurements from the point of the chin to the vertex,—from the nasal root to the vertex,—from the point of the chin to the occipital protuberance,—

from the nasal root to the occipital protuberance, &c., &c., (see No. 18—21), being measurements issuing from the terminal points of the facial line to a third point, we have acquired three lines for the construction of triangles, which will augment the accuracy of the representation of the profile of the head in proportion to their number. (See Fig. IV.)

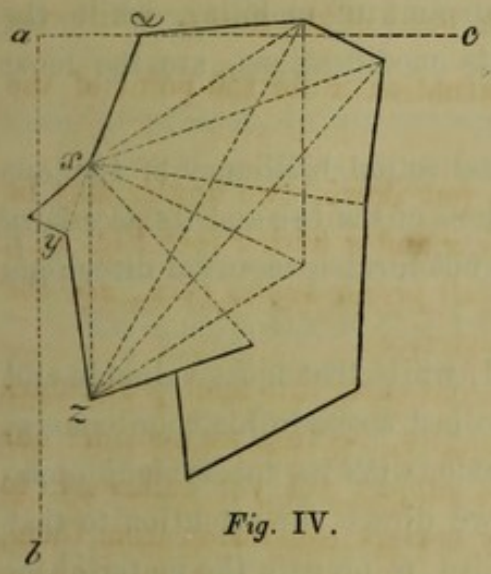

Fig. IV.

The figure of the head will be completed by drawing the measurement 18 (commencement of the hair growth to the semi-lunar notch of the sternum), 40 (from the seventh vertebra of the neck to the same point), and 56 (from the occipital protuberance to the seventh vertebra of the neck.) Nos. 18 and 56 produce the two lines, representing the column of the neck, which itself is closed by the straight diameter of the upper aperture of the thorax (40).

Without mentioning that many of our measured distances are already acknowledged important diameters of the head, their delineation in the indicated manner, permits, moreover, the connection of two points to a new line not measured, or on living men not even a measureable line, the value of which is to be calculated from the drawing.

Thus, for instance, we have the line from the root of the nose to its basis gained by measurement, and a second line from the basis of the nose to the external meatus auditorius gained by the drawing, as it were a modification of the facial angle of Camper, the adoption of which might be acceptable, considering that the importance of this angle consists only in comparison.

b) in Front.

The greater part of the head in front comprises the face, the seat of the senses, rising above and protected by the forehead, which in man is the symbol of intellect, the bulwark from which *the dangers perceived by his senses* are avoided, the strongest power granted to him by nature. In animals the front is the seat of the organs of offence and defence.

If the senses were but indifferent mediators of received impressions and of the emotions arising from them, if they remained unaffected by the reflections of the mind, their seat together with the organs surrounding them, *the countenance*, would be only capable of animal development, and therefore show only the capabilities which are required by animal actions; the human countenance would then exhibit a certain stability,

and thus permit us to gain fixed points. But this is not the case.* We see, on the contrary, how the most perfect sense of man, that organ which imparts intellect and expression to the face, the *eye*, possesses the greatest amount of mobility, while the means which mark its expression, that is light and its modifications, are the most difficult to measure and to determine.

However expressive and significant a vivid and intellectual brilliancy of the eye may be for the individual, and however truly certain positions of the eye and its accessory organs may reflect the affections of the mind, yet it does not furnish essential directions for more general characteristic purposes.

It is a remarkable fact, well worth mentioning, that, while that most valuable and almost pschychical organ of man, the eye, claims the smallest space in his countenance, the highest sense of the animal organism, the sense of taste, with its subservient apparatus, occupies the most extensive part of it. And if we direct our attention to that portion of this wonderfully constructed apparatus intended to prepare the material for further functions, *to the mouth*, which offers a most distinctive character of man from the animal,† by its small form as well as by the large number of organs of motion, following involuntary certain affections of the mind, while others are reflected voluntarily, we observe how this organ governs the predominant expression of the face to such a degree, that the ancients have sometimes figuratively made use of the word "*mouth*" instead of face. Nevertheless, we have accepted the mouth as a distinguishing mark, just like those fixed points of other senses and their accessory organs, which, together with the front, unite in completing the head *en face*.

III. & IV. TRUNK AND EXTREMITIES.

From the measurements of the head we passed over to those of the trunk, and here we measured first the line of circumference of the neck in the height of the *Adam's apple*.‡ Then we proceeded to take on the thorax those measurements which give an idea of its dimensions, and combined with them different measurements on the abdomen

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* The more frequent and various such impressions and excitements are, the more the mobility of the countenance is increasing; just as the face remains on the contrary, quiet, in proportion to the uniformity and monotony of the former. From this reason we observe so great a tranquillity in the face of savage tribes, who have less wants and affections than civilized nations, who are continualy struggling with social obstacles.

† Width of the mouth, width of the nose, and the distance of the inner corners of the eye, should theoretically give the same number.

‡ May it be permitted to us to remark, that the neck of the *East Indian* women (at Ceylon, in Madras, Singapore, at Java, Manila, Hongkong, and Shanghai), is extremely delicate and thin; a fact, the more striking, as they do not at all oppose to the well-known favouring causes of the intumescence of the neck at the approaching age of puberty; but on the contrary, in most instances, these causes have occurred previous to that period. Or is it perhaps exactly this last-mentioned circumstance which becomes an impediment to the development of the neck? We could not observe this in other organs labouring under the same influences.

and the pelvis, some of which have been made both with the measuring tape and the callipers. We acquire by such a proceeding an arch, and thus are able to calculate prominences and convexities.

On the extremities we measured circumference and dimensions of length; they have, at present, in an antropological point of view, no other purpose but to exhibit striking differences, and to invite more minute investigations on such parts, (similar to Dr. Burmeister's interesting examinations of the negro-foot); but they will, nevertheless, in other respects satisfy the scientific inquirer.

We must postpone to a later period the separate investigation of every single point of measurement, and we consider, therefore, with this sketch the exposition of our system of measurements on the human body at present terminated, the systematic plan of which we give in the following pages.

SYSTEMATIC TABLE OF MEASUREMENTS.

I. GENERAL OBSERVATIONS.

1. Age of the measured individual.
2. Colour of the hair.
3. Colour of the eyes.
4. Number of pulsations in the minute.
5. Weight.
6. Pressing power (Force manuelle), measured with the dynamometer of Régnier.
7. Lifting power (Force rénale), ditto ditto.
8. Complete height.

II. HEAD.

a) in Profile.

9. Distance of the commencement of the growth of the hair from the perpendicular line.*
10. Distance of the root of the nose from the perpendicular line.
11. Distance of the basis of the nasal septum from the perpendicular line. †
12. Distance of the basis of the chin from the perpendicular line.
13. Distance from the root of the nose to its tip.

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* The measurements Nos. 9, 10, 11, 12, are to be executed with the plummet and the mêtre-scales; Nos. 13 and 14, by the application of the mêtre scales alone.

† Viz., that point, where the integument covering the free margin of the cartilaginous septem of the nose is forming an angle with the upper lip; corresponding nearly with the spina nasalis anterior.

14. Distance from the tip of the nose to the basis of its septum.
15. Distance from the commencement of the growth of the hair to the root of the nose.
16. Distance from the commencement of the growth of the hair to the basis of the nasal septum.
17. Distance from the commencement of the growth of the hair to the point of the chin.
18. Distance from the commencement of the growth of the hair to the semi-lunar notch of the sternum.*
19. Distance from the point of the chin to the vertex of the head.†
20. Distance from the nasal root to the vertex of the head.
21. Distance from the point of the chin to the crown of the head.‡
22. Distance from the nasal root to the crown of the head.
23. Distance from the point of the chin to the occipital protuberance.
24. Distance from the nasal root to the occipital protuberance.
25. Distance from the point of the chin to the meatus auditorius externus.
26. Distance from the nasal root to the meatus auditorius externus.
27. Distance from the point of the chin to the angle of the lower jaw.
28. Distance from the nasal root to the angle of the lower jaw.

b) en face §

29. Circumference of the head.
30. Distance from one meatus auditorius externus to the other.
31. Distance of the uppermost points of fixation of the external ear (ear-shell) about the level of the eye-brows.
32. Precise distance of the malar or cheek bones, or the arches between the cheek and the temple.‖
33. Distance between the external corners of the eyes.
34. Distance between the inner corners of the eyes.
35. Distance of the fixed points of the lobes of the ear.
36. Breadth of the nose.
37. Breadth of the mouth.
38. Distance of the angles of the lower jaw-bone.
39. Circumference of the neck.

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* That is, the lowest point of the notch in the middle line; at the measurement No. 56, (distance of the occipital protuberance to the seventh vertebra of the neck) the head ought to remain fixed in the same position as at No. 18. It is therefore recommendable to execute these two measurements the one immediately after the other.

† In about the perpendicular direction of the meatus auditorius ext.

‡ About *that* point, where the posterior upper-angles of the parietal bones are meeting the occipital squama bones.

§ To this section belong also actually the measurements of Nos. 15, 16, and 17, which have already been taken at the head en profile.

‖ This depends upon the more or less prominency of either of these points. It is necessary to state in the column of remarks of the plan the point from which this measurement was taken.

III. TRUNK.

40. Distance from the seventh vertebra of the neck to the semi-lunar notch of the sternum.
41. Distance from the protuberosity of one humerus in a horizontal line across the chest to the other.
42. Distance from one middle line of the axilla, above the mamma, to the other.
43. Cross diameter from the same point (see practical plan).
44. Distance from the sternum to the vertebral column in the same line (straight diameter.)
45. Circumference of the thorax at the same place.
46. Distance from one mamma to the other.
47. Circumference of the waist.
48. Distance from one anterior superior spine of the ileum to the other (taken with the measuring tape).
49. Distance from one anterior superior spine of the ileum to the other (taken with the callipers).
50. Distance from one trochanter major to the other.
51. Distance from the most prominent part of the sterno clavicular articulation to the anterior superior spine of the ileum.
52. Distance from the same point to to the umbilicus.
53. Distance from the umbilicus to the upper ridge of the symphysis pubis in the middle line.
54. Distance from the fifth lumbar vertebra along the crest of the ileum, the inguinal fossa to the symphysis pubis.
55. Distance from one acromion across the back to the other.
56. Distance from the external occipital protuberance to the seventh vertebra.
57. Distance from the seventh vertebra to the terminating point of the os coccygis.

IV. EXTREMITIES.

58. Distance from the acromion to the external condyle of the humerus.
59. Distance from the external condyle of the humerus to the styloid process of the radius.
60. Distance from the styloid process of the radius across the back of the hand to the metacarpal articulation of the middle finger.
61. Distance from the same articulation to the top of the middle finger.
62. Breadth of the hand.
63. Greatest circumference of the humerus (round the biceps.)
64. Greatest circumference of the fore arm.

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* The measuring tape is applied round the metacarpal articulations of the little finger and the aducted thumb.

65. Smallest circumference of the same.
66. From the trochanter major to the anterior superior spine of the ileum.
67. Distance from the trochanter major to the external condyle of the femur.
68. Distance from the external condyle of the femur to the external malleolus.
69. Distance from the lower ridge of the symphysis pubis to the internal condyle of the femur.
70. From the internal condyle of the femur to the internal malleolus.
71. Greatest circumference of the thigh.
72. Smallest circumference of the thigh.
73. Circumference of the knee-joint.
74. Greatest circumference of the calf.
75. Smallest circumference of the lower part of the thigh, above the malleoli.
76. Length of the foot.*
77. Circumference of the foot round the instep.
78. Circumference of the metatarsal articulation.

In the preceding pages we hope to have satisfactorily explained, that in a similar manner as the anatomist ascertains by essential distinctions of internal organs the necessity of a classification of the human races, so the anthropologist is able to find by some external parts of the human body, which are acessible to measurements and description, distinguishing marks, which on a more intimate examination allow him to recognize a certain normal type, peculiar to a great number of individuals of the same race.

Convinced of the importance of this subject, we endeavoured to attain by our measurements the following results :—

1st. A classification of the different groups of the human race, based upon figures and proportions, without venturing to determine beforehand the number of races, or to arrange already the existing ones, but with the object to fix the likeness of the present types of mankind, (probably already considerably changed from the primitive form) and thus acquire, by comparison, a natural system of the humam race.

Was this at any time necessary, it is more so at present, when, by imposing means of communication of every kind, the so-called white race is spreading every day more over all parts of our globe. Settling amongst different tribes, and retaining its own habits and customs, it exercises by the power of its intellectual faculties upon those surrounding it that imposing influence, which seems to be the inseparable companion of the prevalence of mental power. That this influence becomes great,

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* From the middle of the heel, along the inside of the foot to the top of the great toe.

we may see among animals, which, by mere domestication, undergo considerable changes, and from which moreover we are able to produce varieties, differing widely from the original type. With man mental influence will, of itself, occasion certain alterations; but what immense changes occur from the fact, that, after communication with any other race, the prevalence of the white, compared with that of almost all other races, leaves its impression upon the whole of the next generation. If we do not succeed at once in fixing the likeness of the present races, and should they be subjected to the above mentioned changes, then, even the few characteristics, which might give some hints to discover the relations that exist between the different human types, *those original characters of nature*, will become obliterated and defaced, and utterly incapable of being distinguished. That will then happen to mankind in the whole world which has already happened to single tribes in Europe, which, whilst related by language and customs, (but not by organic formation) to some remote people, seem, on the other hand to be connected by consanguinity with a *third* tribe, whose historical sources leave barren the field of investigation of their original connection.

2nd. To furnish to comparative anatomy a richer material for its important and valuable examinations, bringing all the different races under its investigation.

3rd. To offer to the artist such numbers and measurements, as will enable him to represent graphically the *ideal* figure of every single type. It is quite erroneous to suppose that natural pictures, especially *portraits*, always give *a true* idea of the race they represent. Individuals, whose exterior is like *that* impression, which is forming itself in our imagination of a whole tribe, after a long intercourse with it and which, without reminding us of the sign of a single individual, comes near to the whole of the race, are extremely rare in reality, and still more rarely found out and represented by the artist as typical figures. Exactly in the same manner as the meteorologist endeavours to get the mean of the different temperatures of the day, the month and the year, in order to find out that temperature, which agrees with the greatest part of the year, we must attempt to take the average of the *different* impressions of *single* parts, together with total impressions of many individuals, in order to arrive at the desired result. Thus, for instance, we believe that the average of measurements taken from about one hundred individuals, will give a figure much more adapted to most of them, than if we should represent one *single* individual with the utmost minuteness. We acquire in this way, an *ideal*, which, perhaps will not find one equal to it in reality, but which, with slight alterations, will come near to most of them.

4th. We intended likewise to procure for the political economist such data on the muscular strength of different races, as may enable him to form a conjectural opinion on their productive power.

As far as circumstances permitted, we have also tried to make notes on the history, the habits, customs, social and sexual conditions of the different tribes we met with during our voyage; to compile vocabularies of the languages spoken by them, and to gather the most important nutritious plants, medicinal, chewing and dyeing substances. We did also not neglect to make a collection of the hair of the measured individuals, and attempted likewise to acquire as many skulls as possible for our anthropological purposes, and by the flattering reception which we enjoyed from men of science in the different countries we visited, we are happy to find our craniological collection already enriched by more than one hundred human skulls, belonging to the different races *

In concluding, we beg leave to say a few words more on an objection, which we heard sometimes raised against the *practical* importance and utility of our system of measurements, and which especially dwelt upon the supposition, that a comparatively small number of measured individuals of each single race will not enable us to obtain a fair average. We submit, that at present, at the commencement of our proceeding, this inconvenience exists, but in proportion as our system gains interest and extensive use, it will decrease, and at length totally disappear. We find ourselves in this respect in a somewhat similar position as Lieut. Maury, at the time when he planned his great wind and current charts; for in this instance, a joint concurrence alone would remedy the want of sufficient material and facts for comparisons, as in his undertaking certain deficiencies can only be filled up after years of indefatigable diligence and collecting of facts.

We have, however, not omitted to meet this inconvenience. The numerous valuable relations into which we have had the pleasure to enter with men of science in almost every part, visited during our circumnavigation, offer us for this purpose the best and amplest means. In all the places where we took measurements, we tried to interest physicians, naturalists, and friends of science for our system, and to induce them to take in future, at their different residences, according to our plan, measurements on as many aborigines of both sexes as possible, and to communicate to us, from time to time, the results. Convinced, as it seems to us, of the scientific importance and the disinterestedness of an undertaking, deficient even of that degree of egotism, which incites scientific labours, whether intended for the examination of certain useful or noxious plants and animals, or those which are caused by anomalies in the human organism, almost all of our newly gained acquaintances and friends have given us in that respect the most assuring and satisfactory promises of assistance. And thus we dare express the hope, that already at this time when, not unconscious of its defects, we give publicity to this memoir, numerous savants in the most distant and remote parts of the world, in Brazil,

* We need not observe that a craniologist will make other more appropriate measurements on the skull than we did on the head of the living individuals, for which our system is alone intended. (*Compare Morton's inestimable Crania Americana.*)

at the Cape of Good Hope, at Ceylon, at Madras, at Java, at the Philippines, in China, in the Spanish-American Republics, in the United States of America, in the East Indies, are active in enriching our modest material with new and valuable contributions.

Such powerful assistance will furnish, no doubt, the best and safest means to encounter the inconvenience in question, and at the same time contribute most satisfactorily to promote a scientific undertaking, which, whatever may be its final result, we beg to consider as the issue of the sincerest and most anxious desire to contribute likewise in respect of anthropology to the achievement of those noble purposes which the first Austrian Expedition of Circumnavigation, undertaken under the auspices of an illustrious and enlightened prince, is just now striving to accomplish.

On board H. I. R. M.'s Frigate "Novara,"
Port Jackson, November, 1858.

Karl Scherzer. Ph. D.
Eduard Schwarz. M.D.

APPENDIX.

PRACTICAL TABLE FOR MEASUREMENTS ON THE HUMAN BODY.

The following table originated in the experience which we have made in the prosecution of the mechanical labour of measuring, and differs only so far from the systematical table that the various heads do not follow according to the usual order of the parts of the body, but for greater convenience and saving of time have been thus arranged, that all measurements taken with one and the same instrument may be performed at once, and that only after having finished with one instrument we pass over to another.

All measurements are made in the erect position of the individual; all single but symmetrical organs ought to be measured accurately in the median line; and between other points the measuring tape must always be lightly drawn, in order to get straight lines of distance and not curves.

The unit of our measurements is the French mêtre, being now most generally in use for scientific labours.

The unit of weight is the kilogramme.

The instruments required are the following :—

1. A balance for weighing.
2. Régnier's Dynamometer.
3. A measuring staff for taking the height of the individual.
4. A plummet with a silk lace and a small mêtre-scale, for measuring the distances from the perpendicular and the nasal lines.
5. Callipers.
6. Measuring tape.

Striking or extraordinary dimensions, also, if they do not occur in the following plan, ought to be measured and noted down under "remarks."

In order to change the succession of heads of the *practical* plan into that of the *systematical* one, it is only necessary to make use of the numbers noted in the right column of the following table.

TABLE OF MEASUREMENTS.

(*a*) GENERAL OBSERVATIONS.

(NAME, SEX, NATIVE COUNTRY, OCCUPATION, SHAPE AND GROWTH OF THE BEARD, ETC.)

NUMBER OF THE *practical* TABLE.		NUMBER OF THE *systematical* TABLE.
1.	Age of the measured individual	1
2.	Colour of the hair	2
3.	Colour of the eyes	3
4.	Number of beats of the pulse in the minute	4
5.	Weight	5
6.	Pressing power (Force manuelle), measured with the dynamometer of Régnier	6
7.	Lifting power (Force rénale), ditto ditto ...	7
8.	Complete height	8

(*b*) MEASUREMENTS WITH THE PLUMMET AND THE METRE-SCALE.

NUMBER OF THE PRACTICAL TABLE.		NUMBER OF THE SYSTEMATICAL TABLE.
9.	Distance of the beginning of the growth of the hair from the perpendicular	9
10.	Distance of the root of the nose from the perpendicular	10
11.	Distance of the basis of the nasal septum from the perpendicular ...	11
12.	Distance of the point of the chin from the perpendicular...	12
13.	Distance from the root of the nose to its tip	13
14.	Distance from the tip of the nose to the basis of its septum	14

(*c*) MEASUREMENTS WITH THE CALLIPERS.

15.	Distance from the point of the chin to the commencement of the growth of the hair	17
16.	Distance from the point of the chin to the nasal root	15
17.	Distance from the point of the chin to the basis of the septum*	16
18.	Distance from the point of the chin to the vertex...	19
19.	Distance from the point of the chin to the crown of the head	21
20.	Distance from the point of the chin to the external occipital protuberance	23
21.	Distance from the point of the chin to the meatus auditorius externus ...	25
22.	Distance from the point of the chin to the angle of the lower jaw ...	27
23.	Distance from the root of the nose to the vertex	20
24.	Distance from the nasal root to the crown of the head	22
25.	Distance from the root of the nose to the external occipital protuberance	24
26.	Distance from the nasal root to the meatus auditorius externus	26
27.	Distance from the nasal root to the angle of the lower jaw	28
28.	Distance from the growth of the hair to the semi-lunar notch of the sternum	18
29.	Distance from the external occipital protuberance to the seventh vertebra of the neck*	56
30.	Distance from one meatus auditorius externus to the other	30
31.	Distance of the uppermost points of fixation of the ear about the level of the eye-brows	31
32.	Greatest distance of the cheek bones or the arches between the cheek and the temple	32
33.	Distance between the external corners of the eyes	33
34.	Distance between the inner corners of the eyes	34
35.	Distance of the fixed points of the lobes of the ear	35

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* The distances 16 and 17 may be easily changed by substitution into those required in Nos. 15 and 16 of the systematical plan.

* The measurements Nos. 28 and 29 have to be executed in the natural and the very same position of the head.

NUMBER OF THE PRACTICAL TABLE		NUMBER OF THE SYSTEMATICAL TABLE.
36.	Breadth of the nose...	36
37.	Breadth of the mouth	37
38.	Distance of the angles of the lower jaw-bone	38
39.	Distance from the seventh vertebra of the neck to the semi-lunar notch of the sternum	40
40.	Cross-diameter from one middle line of the axilla above the mamma to the other	43
41.	Distance from the sternum to the vertebral column in the same horizon (straight diameter)	44
42.	Distance from one anterior superior spine of the ileum to the other ...	49
43.	Distance from one trochanter major to the other	50

(*d*) MEASUREMENTS WITH THE MEASURING TAPE.

44.	Circumference of the head*...	29
45.	Circumference of the neck	39
46.	Distance from the great tubercle of one humerus in a horizontal line across the chest to the other	41
47.	Distance from one middle line of the axilla above the mamma to the other	42
48.	Circumference of the throax at the same place	45
49.	Distance from one nipple to the other...	46
50.	Circumference of the waist	47
51.	Distance from one anterior superior spine of the ileum to the other ...	48
52.	Distance from the trochanter major to the anterior superior spine of the ileum (at the same side)	66
53.	Distance from the most prominent point of the sternal articulation of the clavicle to the anterior superior spine of the ileum	51
54.	Distance from the most prominent point of the same articulation to the umbilicus	52
55.	Distance from the umbilicus to the upper ridge of the symphysis pubis ...	53
56.	Distance from the fifth lumbar vertebra along the crest of the ileum, and the inguinal fossæ till to the symphysis pubis	54
57.	Distance from the seventh vertebra to the terminating point of the os coccygis	57
58.	Distance from one acromion across the back to the other	55
59.	Distance from the acromion to the external condyle of the humerus ...	58

* The measuring tape is laid round the external occipital protuberance and over the *arcus superciliares*.

NUMBER OF THE PRACTICAL TABLE.		NUMBER OF THE SYSTEMATICAL TABLE.
60.	Distance from the external condyle of the humerus to the styloid process of the radius across the extending side	59
61.	Distance from the styloid process of the radius across the back of the hand to the articulation of the metacarpal bone of the middle-finger ...	60
62.	Distance from the same articulation to the top of the middle-finger ...	61
63.	Breadth of the hand *	62
64.	Greatest circumference of the upper arm (round the biceps)	63
65.	Greatest circumference of the fore-arm	64
66.	Smallest circumference of the same	65
67.	Distance from the trochanter major to the external condyle of the femur	67
68.	Distance from the external condyle of the femur to the external malleolus	68
69.	Distance from the lower ridge of the symphysis pubis to the internal condyle of the femur	69
70.	Distance from the internal condyle of the femur to the internal malleolus	70
71.	Greatest circumference of the thigh	71
72.	Smallest circumference of the thigh	72
73.	Circumference of the knee-joint	73
74.	Greatest circumference of the calf	74
75.	Smallest circumference of the lower part of the thigh above the malleoli	75
76.	Length of the foot †	76
77.	Circumference of the foot round the instep	77
78.	Circumference of the metatarsal joints	78

* The measuring tape is applied round the metacarpal articulation of the little finger and the adducted thumb.

† From the middle of the heel along the inside of the foot to the top of the great toe.

SCHEDULE

OF THE

JOURNAL TO NOTE DOWN THE DIFFERENT MEASUREMENTS.

NO.	NAME OF THE INDIVIDUAL.	NUMBERS OF HEADS OF MEASUREMENTS OF THE *practical* PLAN.															REMARKS. (NAME, SEX, NATIVE COUNTRY, OCCUPATION, PECULIARITY AND GROWTH OF THE BEARD, ETC., ETC.
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 &c., till 78	
1	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	
2																	
3																	
4																	
5																	
6																	
&c.																	

In order to change the succession of heads of the *practical* plan into that of the *systematical* one, it is only necessary to make use of the numbers noted in the right column of the preceding table.

W. Hanson, Government Printer, Sydney, New South Wales.—1858.