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VOL. VII.

FAU'S

ANATOMY

OF THE

EXTERNAL FORMS OF MAN.

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1849.

THE ANATOMY OF THE EXTERNAL FORMS OF MAN;

INTENDED FOR THE USE OF

ARTISTS,

PAINTERS AND SCULPTORS.

BY DOCTOR J. FAU.

EDITED WITH ADDITIONS

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With an Atlas of Twenty-eight Plates, Quarto.

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ENGLISH EDITOR'S PREFACE.

LONG prior to the appearance of M. Fau's work, I had collected materials for a Manual of Artistic Anatomy, being well aware that no work existed, calculated to be of the slightest use to Sculptors and Painters. No descriptive or iconographic work was in fact known to me, composed in a right spirit; none enabling the artist to comprehend the living anatomy, so as to transfer to the canvass, or to chisel on marble, a correct likeness of the human figure.

At the moment I contemplated the publication of such a Manual, the very excellent work, a translation of which, with an Appendix, is here offered to the public, appeared. Of the high merit of the iconographic part of M. Fau's work, there could not be the slightest doubt, and I quickly found by a perusal of the descriptive volume, that the author and myself, however much we might differ on some points, were completely as one upon all the great questions of Art; that our views, if not quite accordant, were similar; that we contemplated High Art from the same point of view; that the exterior forms of man had, in fact, been with both a favourite and engrossing study for many years. When, therefore, Mr. Baillière proposed that I should in the first instance translate M. Fau's work, which already contained all the anatomical details requisite for the Sculptor and the Painter, properly so called, adding to it in an Appendix or otherwise, as might in the course of the translation seem fit, the notes and observations I had collected for my own work on Art, I with pleasure acceded to his offer; assured that by doing so, we should best consult the interests of the student, and of all concerned. Thus was I spared the fatigue of re-describing structures which the numerous courses of anatomy I had delivered would have rendered a tedious task. Of my acquaintance with the external and internal forms of man, I need, I trust, say nothing here; the education of nearly five thousand surgeons and physicians, reckoning amongst them a great proportion of the leading men of the day, will, it is to be hoped, satisfy the public on this point, and be a further guarantee, if any were required, of the fidelity and truth of the descriptive and iconographical sections of this work.

It may be as well here to state the circumstances which led me to a deeper enquiry as to the real signification of external forms than is requisite for the surgeon or the physician, or even for the practical artist.

The longer I taught anatomy, the more I became convinced that the true signification of external forms was unknown to anatomists and physiologists; now in the discovery of this, is mysteriously wrapt up the whole theory of Art; the knowledge of the Perfect, the Beautiful. I was quite aware that no true theory of the beautiful had ever been submitted to mankind; and that as a consequence the discovery of "Nature in Art," as manifested to us in the antique marbles, was still to be made. This was in itself sufficient to lead me to a profound study of a mystery, seemingly connected with the very essence of truth in Art and of truth in Science; for the discovery of the Perfect, that is, the Beautiful, required also to be made, or at the least attempted, before a theory or hypothesis could be offered as to the nature of man; before any researches into the history of the origin of race, of the unity of organic structures, of diversity of form in time and in space, merited even a title to the term philosophic. Lastly, I knew that the exterior must ever, in some view or another, translate the interior. These were the circumstances which led me to consider the exterior with other views than as a mere anatomist, or perhaps I should rather say, as a surgeon or physician; it was, in fact, a preparatory study to my researches into the history of Race. Of the human figure, each takes a different view—the surgeon, the artist, the philosophic anatomist; one leads to a practical art, the art of surgery and of physic; another to the fine arts, noble and elevated, or practical and conventional, as the case may be; the last to philosophy, which must ever be transcendental and abstract; the eternal truth, the unchangeably true, when discovered, is included in this view.

A brief sketch of some of these enquiries I have added to M. Fau's work. Authorized by the spirited publisher to spare no expense in rendering the work as useful as possible to artists, I have caused to be added by a distinguished lithographist, four additional plates. These plates refer to the Townley Venus, now in the British Museum; to the Elgin marbles; to the busts of the young and the aged Hercules; to that of the young Memnon, the noblest remains of all the Coptic monuments I have yet seen. These latter are also in the galleries of the Museum; and to them have been added a profile of the Apollo Belvidere. The reasons for my selecting these figures, will be found at length in the Appendix; a single word only is requisite here in reference to their connexion with the original descriptive work.

The *type* sketched by M. Fau of the human form, has decidedly been taken from the antique statues, those admirable *chefs-d'œuvres* of the great masters; and this is true, whether the male or the female figure be considered. It may, in truth, be said, that had the author's whole mind not been filled with the recollection of these noble figures, derived from a deep study of their outlines, he never could have composed this work. But his lithographic figures, with the exception of the dissected Laocoon, give us only sketches of the living *model*, falling far short of his own description, and of the grand conceptions of the minds of those who have profitably studied the antique. This discrepancy between a large portion of the descriptive letter-press and the figures, I have endeavoured to compensate for by the additional engravings. In them the student will find the sublime and beautiful forms referred to in the descriptions of the original. They illustrate also M. Fau's chapter on Race, my analysis of the Beautiful, the true nature of the ancient and modern Athlete, appended by me to this English edition of the work; lastly, they serve to refute the pretended idealism of ancient Art; proving, moreover, that the surpassing grandeur of Greek Art, must ever endure, as being based, not in fiction, but in truth. A deep contemplation of many original marbles, and more especially of the Elgin, has led me to the adoption of these opinions; and, the field being entirely open, and all but unoccupied, to devise a theory in their support.

In the *ideal*, as it is called, of antiquity, I can only see the *real*. What pictorial anatomists and literary men have written on this point, crumble down under the slightest analysis. On this subject I know not M. Fau's opinions, as he has not clearly expressed them; my own have been long before the public.

In conclusion, should it be objected to the views contained in this work, that the general taste of the public seeks not for works of high art, of chaste design, of noble inspirations, my reply is, that this bad taste, for such no doubt it is, must arise from the imperfect education of the youthful mind; from the total neglect of the fine arts in this country by the schools, the universities, and the church. The mechanical tendencies of the Race prove obstacles also to the cultivation and encouragement of high art in Britain. I shall endeavour to show, in its proper place, how these may be overcome.

To put the artist in the right direction, is indeed the great aim of this work; but the public mind, as to art, must also be led in the same direction, else the artist labours in vain. This hint the English editor respectfully offers to the heads of educational institutions, to those who hold, as it were, in their hands the destinies of the future civilization of Britain, in as far, at least, as civilization, of which the fine arts form an essential part, can be regulated and advanced by human efforts.

LONDON,
SEPTEMBER, 1849.

AUTHOR'S PREFACE.

No one disputes at present the utility of a knowledge of Anatomy to the Artist. The enlightened man neglects no means of extending his knowledge; the skilful, the conscientious Artist, despises no education; gifted with a spirit of observation, he discerns at once what is likely to prove of benefit to him; the rest escapes his memory.

Artists have occasionally ridiculed Anatomy as an Art of no utility to them; a feeling which seems due to an exaggerated independence of spirit. How could such minds stoop to learn Anatomy, who despise the instruction, nay, the very influence of a Master, trusting wholly to their own imagination? Enlightened men, avoid such troublesome errors of an overheated imagination.

Artists may rest assured that Science never presumed to govern or regulate the Fine Arts; its efforts are confined to the offering them, in a friendly way, some knowledge likely to be useful to them,—some, of an incontestible utility. I do not hesitate affirming, that of all the studies to which Artists ought to devote their attention, the most important is the study of the External Forms of Man. In support of this assertion, I may cite that of great Artists (Painters :) who not only caused their students to attend anatomical lectures, but themselves wrote anatomical works, or drew anatomical plates. Albert Durer, Leonardo da Vinci, whose work was illustrated by Poussin ; Jean Cousin ; these unquestionably are no mean authorities.

There are two modes of studying Forms :—1st, the servile imitation of the model :—2nd, the anatomical study of the human body.

The first, entirely mechanical, leaves in the mind of the student feeble impressions only, quickly effaced or modified ; the second, based on observation and reasoning, produces a lasting impression, resisting the caprices of the imagination. It is not enough that an Artist is competent to copy exactly an academy figure ; this is merely a work of *manœuvre*, of handicraft ; he must ascend to causes, discover for himself the origin of the Forms he is called on to reproduce ; in a word, he must know how to decompose in order to recompose ; then only will he become competent to reproduce the work of Nature ; directed by genius and judgment, he will not overstep the limits of Truth.

Of the two methods just alluded to, the one produces Painters, the other Artists. I do not pretend to say that the study of Anatomy is sufficient to make an Artist ; I take it for granted that the student is irresistibly drawn towards this profession, to which we owe Michael Angelo, Raphael, Benvenuto-Cellini, &c. A person is not necessarily an Artist inasmuch as he cultivates the Fine Arts.

But it must be admitted, that if the Anatomy of Forms be not more generally attended to, the fault or omission rests not wholly with the student.

A Professor (Lecturer on Anatomy) imagines himself teaching Artistic Anatomy, when in truth he has merely been describing the bones and muscles to his audience, without ever directing their attention to the results of their arrangements; and when, at the end of the course, the student has copied one or two *écorchées* (dissected figures, bodies) he fancies that he thoroughly undertands the Anatomy of Forms, and that he has completed his anatomical studies! Fatal confidence, the sad results of which quickly show themselves in his works.

Should the Artist be desirous of studying that science profoundly, taught its utility even by its superficial study, and consequently alive to the insufficiency of the knowledge so acquired, what now does he find? Some collections of plates, almost always inexact, though decorated with the title of "the Anatomy of Artists;" a few fragments scattered through some laboured scientific works, overlaid by the weight of their envelope. To place in the hands of the student plates without a text, is to offer to the workman an instrument without the necessary instruction as to its use; and yet it were almost better to do so, than refer him to those lucubrations, extremely learned, no doubt, but of little utility to him, and always out of place in elementary works.

The works of Artistic Anatomy (Pictorial Anatomy) hitherto published, have in reality influenced the Fine Arts but little. At the very moment when the empire of Form was at its height, these works were rejected, a copying of the mere models being preferred by Artists, because, in such works, nothing was found but an inexact reproduction of the cadaveric dissections. The Gladiator, of Salvage, is conceived in a happier spirit; it is a more conscientious work; but unfortunately it is not a Treatise on Forms, being merely an application of this science to one of the finest works of antiquity. The two plates of Martinez ought also to be mentioned, not on account of their exactness, but with reference to the thought or conception which gave rise to them.

Although the great work of M. de Montabert be really a remarkable work, still the anatomical part appears to me unsatisfactory; useless details abound, whilst the more important points are treated of superficially. The plates are insufficient. But it is not my intention to criticize this great work, the price of which places it generally beyond the means of the Artist, so long as he stands in need of it; a number of other works, no longer thought of by Artists, I shall pass over in silence.

" The Anatomy of Forms," the work of M. Gerdy, merits all the attention of Artists; of an original and elevated character, as are all the labours of that celebrated *savant* A consideration of the high merits of

M. Gerdy's work made me long hesitate in attempting the publication of another Manual; it was risking a comparison too hazardous. These are the circumstances which overcame this natural hesitation:

After having for a long time taught Artistic Anatomy, M. Gerdy, at the solicitation of his students, undertook for their use a complete Treatise on Forms; but the tendency of M. Gerdy's mind being naturally towards his own Art, Surgery, this gave naturally a medical complexion to the work. It became then, in his hands, a work no longer addressed to Artists, but to Physicians and Surgeons: always original, and eminently so, it evidently was no longer a work exclusively addressed to the Artist. Moreover, the *first part* only has been published: the *Description of External Forms;* now this description is not sufficient. Profiting by the labours of M. Gerdy, I have thought of completing this description, following in a humbler sphere, and borrowing from Science merely what was requisite to explain the mechanism of *station* and of *locomotion*.

This is the plan I have adopted. The work is divided into two parts; the first comprises:—1. General Considerations on Man, and on the modifications he undergoes under the influence of Moral and Physical causes; the Characters of the different Temperaments, and of the Races of Men; 2nd. A brief sketch of the Human Organization; 3rd. The description of the Skeleton, considered in its different parts and as a whole; 4th. That of the Articulations or Joints, and the functions they perform; 5th. Animal Mechanics;

6th. The description of the Contours of the External Surface of the Integument; the indication of the principal causes of Forms; the mode of measuring all the parts of the Body, and of determining the Proportions.

I have reserved for the Second Part of the Work; 1st. Considerations on the Osseous Forms; 2nd. The description of the Forms, and of the changes caused in them by Muscular Movements, by Age, Sex, &c.; 3rd. In the concluding Chapter, some examples of the Anatomy of Forms, applied to the Study of the Antique Statues.

Such is the arrangement which has appeared to me the most suitable; a dry description of the human forms did not seem to me sufficient for the instruction of the Artist; the general considerations contained in the first part of this work seemed also necessary, as a preparatory step to his other studies, avoiding the fatiguing his attention and disgusting him by scientific details, of but little utility to him, and necessitating tedious explanations.

I have thus endeavoured to avoid the two extremes; scientific pretensions on the one hand, superficiality on the other. The work is addressed to Artists, and is intended for their use. The accompanying Plates have been drawn from Nature, and lithogrpahed by M. Leveillé; a skilful and conscientious artist, whose admirable talents are too well known to anatomists to require any commendation from me. I have esteemed myself fortunate in obtaining such a colleague inasmuch as that it was not a mere anatomical drawing which was required, but one in which the exactness of the Anatomist required to be combined with artistic elegance and truth.

When it is proposed to offer to the Artist a type, it unquestionably ought to be made as complete as possible; if the experienced eye of the Artist be not slow to discover, through all the seducing prestige of Art, imperfections, how is he to be forewarned against error when he has not acquired the penetrating glance, the sound and severe judgment, without which it is impossible correctly to estimate works of Art; it is for students that dissected models, (*écorchée*) anatomical works on form, &c., are prepared; it is for students who copy the false as readily as the true, and who, if misled, will be obligated ere long to engage in new studies, with a view to efface impressions which, unhappily, they will find to be but too often ineffaceable.

On Reflection, it has been thought unnecessary to add Engravings of Busts so well known as the Coptic Memnon and the Apollo Belvidere.

219, REGENT STREET.
SEPT. 15, 1849.

THE

ANATOMY

OF THE

EXTERNAL FORMS OF MAN.

CHAPTER I.

GENERAL CONSIDERATIONS ON MAN, AND ON THE MODIFICATIONS HE UNDERGOES THROUGH MORAL AND PHYSICAL INFLUENCES—TEMPERAMENTS, RACES.

THE gift of an intelligence superior to that of all other animals leaves man nothing to envy them on the score of structure. Hence, I do not sympathize with those misanthropic philosophers, who have drawn a parallel between man and other animals in favour of the latter. According to them, the finest gifts of nature have been denied to man. The undulating forms, the slender, yet agile limbs, at times robust and of matchless strength; the gorgeous display of colours with which nature has decorated the animal kingdom; these, she has denied to the human species. In lieu of such qualities, unbefitting his kind, she has bestowed on him a superior intelligence, by means of which he overcomes all other animals, thus carrying out the great destinies of his race.

The admirable harmony of the human forms, cannot, for an instant, be mistaken or overlooked; man's position on the soil, his walk, his gesture, the expression of his countenance, pourtraying his sensations, feelings and intellectual energy; all are in harmony with his physical organization. The reverie of those who imagined man to have exhibited a quadruped form at first, altered into the biped by civilization alone, cannot be admitted even as a theory; it is a dream at variance with all anatomy and physiology.

A hasty glance at man's whole structure proves this. The lower extremities form an ever varying base of sustentation equal to every change of position and emergency; at times extended and ample, at others narrow and confined; but always equal to the weight to be sustained. These limbs, elongated and articulated, moulded into broken or fixed levers, as the case requires, are perfectly fitted for rapid or slow progression. Gifted with strength and agility, they have been still further embellished by nature with forms remarkable for their purity; sweeping, flexuous, and fine lines form their margins. In man, the muscular developments, when strongly pronounced and visible, are indicative of his strength; grace and delicacy of contour, constitute, on the other hand, one of the ornaments of woman.

The torso, point of re-union of all the other parts, protecting envelop of the vital organs, required much care in its construction, in order to conceal the heaviness of its mass. In proportion as the model is large, so is the design pure, especially when examined behind. The movements of the torso exhibit the finest muscular developments; in man, the capacious chest, massive shoulders, braced up reins, indicate the rude labours in which he is forced to engage; whilst the undulating and smooth forms of the torso, in woman, exhibit an inexpressible grace and beauty, connected with her sex.

Even if we failed to admire, from a want of taste, the beauteous forms of the arms or upper limbs, their numerous and graceful movements, the superabundance of articulations in the hand of man, would alone merit all our admiration.

The head, as the culminating point, is not less wonderful; and if occasionally, irregular contours and forms less pure detract from the beauty of the face, it still remains, as the mirror of the soul, reflecting all its passions and sentiments.

In men living free and far removed from civilization, the human organization has a development in reference solely to the limited wants of his barbarous condition. The savage pursues and strikes the fleet antelope, contends with the jaguar, arrests with his arrow the bird in his rapid flight; the slightest noise, the scarcely perceptible footmark attracts his attention; and when, at last, he encounters his prey, then begins one of those struggles where force and skill display their utmost power.

In representing individuals so placed, the artist ought no doubt to have recourse to the descriptions of travellers; but already his imagination, guided by his judgment will have furnished him with the first materials of his labour. Look at this man, whose frame has been freely developed, untrammelled by civilization; look at his erect form, generally elevated, his large chest and slender limbs, robust without being heavy; tight shoes have not contracted nor deformed his feet; rarely surcharged with fat, he yet seldom shews that diseased meagreness, so common in the inhabitants of our cities; it is thus that the artist ought to represent man, who has not yet contracted our vices and our infirmities.

Let us transport ourselves now into the heart of our great cities, and observe the wide difference. The inhabitant of our large towns is generally meagre, his body is deformed by the tight clothing, in which fashion imprisons his frame; you must expect of him neither suppleness nor strength; this is not his affair; but it is in cities where we find those noble heads, wherein thought presides and dominates, crushing down the body as it were by their weight: those vast foreheads, those expressive eyes, in a word that physiognomy modified by the enobling labours of the intelligence, or by irresistible passions. In cities, the mind as it were overwhelms the body, finding not unfrequently in excesses, of all sorts, cruel auxiliaries. I pass over in silence those deformed beings, whose vast corpulence is but too often the sad result of gastronomic excess. In them the stomach reigns supreme; the corporeal mass overwhelms the mind.

A physiognomy without individuality, agreeable but effeminate, and of a pale sickly hue, looks arranged with an artistic care, attitudes soft and careless, a skin white and lustrous from the effects of cosmetics, fine and silky garments; such is the *ensemble* of a man favoured by fortune, genteel but without energy, a prey to the irresistible habits of luxury and sloth. The man, on the other hand, devoted wholly to intellectual labour, presents a totally different appearance. His constitution, originally perhaps robust, gives way before the contentious ardour of his mind, his prolonged studies, his neglect of diet or regimen. A self-neglect has evidently been pushed too far; still his eyes are full of thoughts, and when his look becomes animated, this man, despite his ungraceful and stooping body, becomes handsome, adorned with intellectual beauty.

Men, who devote themselves to laborious trades, have strong limbs and a robust torso, more especially when they avoid debilitating excesses. Their forms are heavy, indicative of *massive* force; their limbs are deficient in suppleness and agility. Nevertheless, it is proper to point out the differences which exist; in some the shoulders and arms have an excess of development over the lower extremities; in others it is the reverse. The smith, the porter, the sailor, present peculiarities in form connected with, and dependant on their calling; numerous privations, rapid atmospheric changes, and the fearful debauches the sailor commits when ashore, influence his form, and interfere with his full development.

The habitual and prolonged exercise of one or more parts of the body exerts an influence over the muscular development; this is shewn by the bowed limbs of horsemen, the large haunches of the sailor, the vigor of the calves of the legs in rope-dancers, combined with elasticity and rapidity of movement.

These hints, as to the influence of a civilized life over the human form, are intended merely to give the artist some idea of the course to follow in his own observations. He must attend to the exceptions which are numerous. The perfection of any work of art does not depend wholly on the harmony of its composition, on the purity of the forms, and the richness of the colouring; truth in respect of the persons represented, contributes powerfully towards its perfection; now this truth cannot be attained without an attentive study of man, and of the influences to which he is exposed.

Shut up in a humid dungeon into which a ray of light scarcely penetrates, a prey to physical suffering and moral torture, the prisoner, having in vain exhausted the most admirable combinations to recover his liberty, abandons himself to profound despair: his body impoverishes daily, and wastes away; profound furrows mark his face; the skin becomes discoloured and blanched; the eyes retire within their orbits; projecting cheek bones, hollow cheeks, disordered locks, at times whitened prematurely; dry withered hands—these are the frightful appearances marking despair.

On the other hand, this other captive, strong in his innocence, exalted by the glorious idea of martyrdom, resists with more energy; at times his resigned look reflects the calm of his soul; at other times, an ardent expression seems to foretel the expected fame.

A profound grief, the unextinguishable desire of vengeance, envy, terror, in a word, all human weaknesses re-act on the body, producing peculiar characters which ought to furnish to the observing artist, inexhaustible sources of study. To describe the effects of disease on the frame would require too many details; what the artist requires especially to know, is the principal modifications produced by the temperaments.

Peculiar faculties and dispositions of mind are connected with the predominance of certain portions of the organism over others. This predominance constitutes the temperament, which is sometimes well marked, that is simple, at other times complex; that is when simple temperaments counterbalance and unite in the same individual. When no one temperament prevails, the character is then indecisive.

The nature of these complex, or compound temperaments flows naturally from a study of the simple ones; we shall confine our remarks here, therefore, to the latter.

Authors have described five kinds of temperaments: the athletic, the sanguine, the lymphatic, the nervous, and the bilious.

I. OF THE ATHLETIC TEMPERAMENT.

Predominance of the muscular system, intellect feeble, sometimes scarcely existing. The skeleton, or osseous frame-work, solid; the joints voluminous. Specimens of this temperament are not rare; they are met with in the theatres and at fairs, exhibiting their strength. These Herculean forms have, generally, the head small; but the temporal and masseter muscles are large, indicating strong animal instincts. The face is large compared with the cranium; the features heavy and vulgar, forehead low; the hair implanted not far from the eyebrows; the eyes without expression, yet sometimes brilliant but ferocious; the locks and beard abundant. It is a common enough error to represent the Hercules with heavy, massive and overloaded forms. Strength does not arise solely from weight or bulk; quickness, rapidity, or address, are essential to great strength. Though Hercules has been represented by the ancients as assisting Atlas in sustaining the weight of the skies, they assigned, also, to his giant frame vast speed of foot and great activity. Further, a short and thick neck unites the head to a trunk characterized by shoulders and chest of vast proportions, well covered with enormously developed muscles. The athletic temperament then is characterized by the predominance of the muscular system, and by a defective intelligence almost wholly replaced by animal instincts. The temperament never occurs in woman, however strong they may occasionally be.

II. SANGUINE TEMPERAMENT.

In persons of this temperament, the form is rounded as in woman, and frequently too heavy. The skin is strongly coloured and rosy, especially on the face, which is rather round than oval. Fair or chestnut coloured locks overshadow a forehead more ample than in the Athlete. The eyes are blue or grey, prominent, rounded, and fully open; the too prominent cheeks occasionally seem to contract the orbits. The physiognomy partakes of the general character to which obesity is often added.

III. LYMPHATIC TEMPERAMENT.

Frequent enough in women. It has for its character a dull, or dead white skin, of a fine tissue and marked by a net work of blue veins. The contours are rounded, but the tissues are deficient in firmness; the person has a certain morbid air, at times not displeasing. The whole aspect has a doughy look, and recalls to the mind the appearance of a waxen figure. Persons of this temperament have generally the hair fair, the eyes blue; a rosy tint adds transparency to their colouring; the intellectual faculties present nothing peculiar.

IV. NERVOUS TEMPERAMENT.

The physiognomy is restless and mobile, the look pale and diseased, the eyes generally black and vivid, the hair brown or black, and the superficial veins prominent. The skin is transparent, and the muscular system not remarkable for strength. People commit a great mistake in calling an athlete, a nervous man. The nervous man has an exalted and quick imagination, is disposed to melancholy, and exhibits ardent passion.

V. BILIOUS TEMPERAMENT.

Men, called bilious, have a brownish colour, thin, elongated visage; eyes and hair brown, the superciliary ridges prominent; bushy eyebrows, the look penetrating; nose straight or aquiline; lips thin and pale; the body firm, and, as it were, dry; skin of a brownish tinge. To an intellect equalling the nervous temperament, the bilious adds great perseverance, overcoming obstacles by a most determined resistance; occasionally cruel, he is almost always a prey to an insatiable ambition.

The compound temperaments, composed of these simple ones, need not be dwelt on here; simple temperaments are the rarest. The study of the temperaments is of great importance to the artist.

It is only after much consideration and hesitation that I have made up my mind to say a few words on the races of men. I felt all the difficulties of entering on a subject still so obscure; of touching a question, the solution of which appeared to me actually impossible. Buffon recognized but a single species; Linné, proceeding from the same principle, divided this species into five varieties; Blumenbach, Prichard,* and Dumeril,

* The Natural History of Man; comprising Inquiries into the Modifying Influence of Physical and Moral Agencies on the different Tribes of the Human Family. By James Cowles Prichard, M.D. F.R.S. M.R.I.A. Corresponding Member of the National Institute, of the Royal Academy of Medicine, and of the Statistical Society of France; Member of the American Philosophical Society of France; Member of the American Philosophical Society, &c. &c. 3rd Edition, enlarged, with 50 coloured and 5 plain illustrations, engraved on steel, and 97 engravings on wood, royal 8vo. London, 1848.

adopt the same arrangement; Cuvier admitted the existence of three distinct races, adopting the facial angle of Camper; M. Virey distinguishes two principal species, which he subdivides into six races; Desmoulins viewed the races as eleven; Bory St. Vincent as fifteen; Maltebrun as sixteen, &c. I shall confine my remarks merely to the principal characters distinguishing mankind.

The simplest classification hitherto offered is, in my opinion, that of M. Gerdy.* Proceeding on the principle that primitive races no longer exist, but only varieties, more or less pure, M. Gerdy arrives at the conclusion, that the globe is covered with varieties, or secondary species merely, and that, in all probability, there is not one absolutely pure. He divides these mixed varieties into four sub-genera, under the names of white, yellow, black, and red varieties of mankind.

I. SUB-GENUS.—WHITE VARIETIES.

These occupy Europe, Asia, America, and the coasts of Africa, penetrating deeply towards the north, and as colonists, are spread over the isles of the Indian Ocean, and over many of those of Oceania, and on the shores of Australia. The height of the individuals composing this variety rises generally to more than five feet; their face is oval, elongated, with prominent features; the eyes widely open, and placed on a line nearly horizontal. These varieties have the hair of the head fair or blond,

* Physiologie Médicale, didactique et critique, vol. I. p. 284.

red, chestnut-coloured, or black. To this variety may also be referred the *white gigantic race*, or Patagonians.

II. SUB-GENUS.—YELLOW, OR OLIVE VARIETIES.

Found chiefly in Asia, and especially in Central Asia, and in the northern latitudes of the Old and New Worlds, in China, in the islands of the Indian Sea, more especially in those bordering on China. These men are about five feet high, the body generally robust, the hair of the head scarce and hard, the colour of the skin yellow, brown, or olive, face broad, flattened, broad over the cheek-bones, narrow towards the chin, eyes black, widely apart, eyelids oblique, opening of the eyelids linear, contracted, and as if bridled in by their tension, nostrils widely spread, nose flat, scarcely projecting from the face, and sometimes on a level with the cheeks; the ears large and very distinct, or set off from the head. The Lappes, a dwarf variety, belong to this sub-genus. It includes also a fair variety, and one with black hair, &c.

III. SUB-GENUS.—NEGRO VARIETIES.

Extending nearly over all Africa, on the shores and centrally, towards the inland sea lately discovered by Major Denham; these varieties are found also in the isles of the Asiatic Archipelago, of Polynesia, and Oceania, and on the coasts of Australia.

In this sub-genus, we distinguish:

1. *The African Negroes.* Their height usually from five feet to five feet five inches and a half; skin of

a fine black, hair of the head crisp or woolly; the facial angle about 65 degrees; lips large and projecting, chin receding, nose flattened, calf elevated, heel prominent. The mammæ of the married women, large and pendulous.

2. *The Mulattoes* are the product of an intermarriage between the white and black varieties. They differ from the negro only in being lighter-coloured.

3. *The Caffres.* In height about five feet five inches; colour yellow-brown; visage triangular; profile concave; the incisive teeth vertical; hair less woolly than the negro.

4. *The Hottentots* are generally about five feet in height, with a facial angle of seventy-five degrees; hair woolly, and implanted in a half-circle on the forehead. The Hottentot women are remarkable for the length of their breasts, the prolongation of the *smaller labia*, and the accumulation of fat on the hips.

5. *The Papous* have the skin black; the hair black, tufted and frizzled; nose wide and flattened; large cheek bones and lips.

6. *The Australasians.* The height of this race is below the medium standard, and the inferior extremities slender, *but this arises from misery, and is not natural to them.* They have the torso meagre, the head gross, the face large, the superciliary arches prominent, the nostrils flattened and wide, the skin black and reddish.

7. *The Negroes* of Oceania are black as Africans; their woolly, serrated locks are implanted on the forehead, following a line more precisely semi-circular;

their nostrils are excessively large and open, the superciliary ridges prominent, cheek-bones large and projecting, chin almost square, limbs slender in proportion to the trunk.

The Kourilans may also be mentioned here: they are distinguished by a deep brown tint, projecting eyebrows, a vertical nose, black and thick hair, and smooth velvet like skin.

IV. SUB-GENUS—RED VARIETY.

This variety includes the nations of the Gulf of Mexico, the eastern and western shores of central America, as far as the mouth of the river Amazon, with those of the eastern side of northern America, including Canada. It is asserted of this variety of men, that they have the skin of a red or copper colour under all climates; the beard is scanty, the head elongated, and the forehead depressed. The hair of the head is said to remain black, even in the most advanced age.

With a few supplementary remarks on the external characters of these races, I shall complete this chapter.

FIRST SUB-GENUS. PL. I. FIG 1, AND 1 *bis*.

In this race, the muscular system varies according to the temperament and the social condition; the forms are harmonious, height usually above five feet, coloration of the skin varying between a flat, or dead white, and a clear brown; face oval, nose elongated, prominent; hair long, soft, or flexible, of all colours, from blond, or white, to a perfect black; forehead large, eyebrows well arched; eyelids long and widely open; eyes placed on a nearly horizontal line; cheek-bones not very prominent; facial angle from 80^0 to 90^0.

SECOND SUB-GENUS. PL. I. FIG. 2, AND 2 *bis*.

Body robust, but often squat; forms less elegant and less harmonious than in the preceding races; stature short; skin of a yellowish brown colour or olive; beard and hair hard and scarce; face flattened; cheek-bones large; nose flat; eyes black, and widely apart; eyelids oblique, tied down at the outer angles, and with a linear opening; incisive teeth vertical; chin narrow; ears large, and well set off from the head; the head is rounded; facial angle from 70^0 to 80^0.

THIRD SUB-GENUS. PL. I. FIG. 3, AND 3 *bis*.

In this variety, the body is often robust, and the forms sufficiently elegant, but occasionally slender, and ill proportioned; height, varying from five feet to five feet five inches and a half; skin black or brown, varying in depth of colour; hair black, crisp, or woolly; temples flattened; nose flat, and widely spread, scarcely prominent on the face; cheek-bones projecting; eyes round, large, and prominent; lips thick; incisive teeth oblique; jaw-bones projecting; chin narrow; facial angle from 60^0 to 75^0.

FOURTH SUB-GENUS. PL. I. FIG. 4, AND 4 *bis*.

Forms regular; stature elevated; bodily strength considerable; skin of a copper colour, more or less deep; hair black, hard, flat, and glistening; beard scanty;

face oval; forehead strongly depressed; nose long, often aquiline; eyes large and black, deep sunk within the orbits, which are vast; incisive teeth almost vertical; cheek-bones elevated; lower part of the face prominent; the cranium, which is elongated and voluminous behind, is as much developed as in the other varieties, and in general the head is large; facial angle from 60^0 to 70^0.

The facial angle, so frequently mentioned above, was invented by Camper. It is formed by extending a straight line from the external opening of the ear to a point beyond the nasal spine, then intersecting this line by another descending from the more prominent part of the forehead towards the jaws. By means of the angle, formed by these intersecting lines, Camper showed the intellectual differences of races and individuals, extending his views even to the lower animals. Numerous observations proved to him that this angle varied from 70^0 to 100^0; but beyond this it degenerates into difformity. Descending below 60^0, the angle becomes smaller and smaller; thus he measured the profile of the ape, the dog, the snipe, &c.

By a study of the antique, Camper discovered that the Greek artists had adopted a maximum of 100^0. Some have thought a head so formed to be an ideal or conventional form; others view it as a reality existing at that time in nature, and perhaps not rare at the particular epoch. The Roman engravers, on the precious stones, seldom exceeded 95^0 in their delineations of the human face.

The facial angle of the infant at birth is 95°, according to Albert Durer; Quesnoy and I. de Wit make it 100°.

The relative proportions of the cranium and of the face merit the attention of the artist; the area, for example, of the European cranium being four times that of the face, whilst in the negro the area of the face has increased by a fifth. The cranium, therefore, and the face, in their relative proportions, show a sort of antagonism, the one being developed at the expense of the other.

CHAPTER II.

GENERAL IDEA OF THE ORGANIZATION.

A BRIEF sketch of the organization will be sufficient for the artist. The human body is composed of fluids and solids, the former averaging nearly nine tenths of the whole weight as has been proved by the experiments of Chaussier, and the observations of travellers respecting the bodies of men and animals who have perished on the parched sands of the desert. The loss of weight by disease also confirms these facts.

The skin is the first object of attention. It invests the whole exterior, reproducing the internal forms; but the presence of the cellular tissue, and the thickness of the skin itself, modifies these forms, and diminishing their asperities, bestow on them a peculiar grace. There is a wide difference between the *écorché*, and the body covered with the external integument.

Numerous furrows, folds, hairs, &c. take away from the integument its monotony, limiting certain regions and embellishing others. It is pierced also with openings, establishing communications by continuity with the mucous membranes, viewed by anatomists as an internal integument. This transition of the tissues may be seen at the eye-lids, ears, nostrils, mouth, anus and urethra; the outer integument becomes fine, changes colour and insensibly, as it were, changes into mucous membrane. The nails and the hairs are considered as appendages merely of the integuments.

Immediately below the skin is the cellular tissue, excepting in the neck and face, where peculiar muscles, called cutaneous, adhere to the external integument. The cellular tissue does not merely form a sub-cutaneous layer; it penetrates into all the interstices of the subjacent parts, unites them together, forms for them soft envelopes, facilitating their reciprocal actions, and protecting them from violent shocks. In this tissue, vessels and nervous filaments creep along.

Beneath the sub-cutaneous cellular tissue, we find the muscles arranged in successive layers. Many anatomists reckon them at four hundred; Chaussier viewed them as three hundred and sixty-eight. They are the active organs of locomotion; are of a red colour more or less deep, and vary extremely in size, shape, direction, &c. They are composed of fibrils; these united in bundles form fibres; these again, fasciculi united by cellular tissue, and provided with numerous blood vessels, and nerves. They are occasionally directly attached to the bones; sometimes, indirectly by means of tendons.

The muscles are enveloped on all sides by unyielding semi-transparent membranes called aponeuroses, whose arrangements have been minutely described by

M. Gerdy. These aponeuroses are first seen under the subcutaneous cellular membrane or tissue; they next form sheaths, exactly enclosing the muscles by sending down partitions between them. They proceed even to the bones themselves. Finally, in the centre of the muscular masses are placed the bones, serving as a support to them and offering them points of attachment. The bones themselves are connected to each other by ligaments, permitting sometimes extensive motion, sometimes none at all. Some bones are hollowed out by a medullary cavity; others are without this; the broad bones throughout the skeleton have no medullary cavities; on the other hand, they are found in the long bones of the extremities.

The great cavities of the body, that is, the head, the chest and abdomen are invested internally by diaphonous membranes, called *serous* ; these membranes are constantly bedewed with a peculiar fluid, the *serosity ;* by their peculiar arrangements, serous membranes facilitate the play of the organs and afford them the requisite support.

The cranium contains the brain and the little brain, or cerebellum ; the spinal marrow is lodged in the vertebral canal, extending nearly to the inferior margin of the second lumbar vertebra. The extremely delicate organization of these viscera renders their most careful protection essential to the well being of the animal. Hence the mechanism of their envelopes, at once membranous, and osseous. From, or to them, proceed numerous white cords, of a delicate tissue, analogous to the matter of the brain and spinal marrow. There are the nerves, the efficient instruments of sensation and motion, transmitting also the will. They are distributed in vast numbers throughout the body.

The lungs and heart are contained within the cavity of the chest: organs of respiration and prime agent of the circulation of the blood. Their position should be carefully studied by the artist.

The heart is situated behind the sternum, between the lungs, and in the middle of the chest. A fibro-serous sac or bag encloses it. Its form is that of an irregular cone, flattened from behind forwards; the base is backwards, upwards, and somewhat to the right; the summit or point, corresponds to the interval between the cartilages of the fifth and sixth ribs of the left side.

Laennec thought that the adult heart equalled as a rule, the size of the closed hand or fist of the individual. But this rule seems subject to many exceptions. The cavities of the heart are four in number, and the principal arterial and venous trunks spring from these cavities.

The thorax or chest is almost entirely filled by the two lungs, the organs of respiration. The summit of each lung corresponds to the first rib on either side; the base rests on the diaphragm, a powerful membranous and muscular section or partition, stretched between, and separating the cavity of the thorax from that of the abdomen. The attachments of this important muscle are forwards to the xiphoid appendix of the breast bone, behind to the transverse processes of the first lumbar vertebra, and to the fore part of the bodies and inter-vertebral cartilages of the second, third and fourth lumbar vertebræ; it is also attached to the bodies and cartilages of the six lowermost ribs. We return to the lungs.

These organs communicate with the exterior by means of two tubes, called bronchi, which uniting, form a single tube the trachea; this again is surmounted by the larynx, which opens into the pharynx, and this into the back part of the mouth. The upper opening of the larynx is protected by the epiglottis, a sort of valve by which the food and drink is prevented falling into the trachea or wind-pipe. The pleuræ are serous membranes partially enveloping the lungs and walls of the chest, to facilitate their reciprocal action. The gullet or œsophagus is the tube by which the food and drink pass into the stomach. Its upper opening is just behind the larynx. These brief notices may prevent the artist from falling into grievous anatomical errors.

In the abdominal cavity, over which is placed the great concave arch of the diaphragm, we find the stomach, placed transversely below the diaphragm; when full, it causes a prominent roundness below the xiphoid appendix in the hollow called, the pit of the stomach.

The intestinal tube is divided into two principal parts, the small and the large intestines. The intestine, whose length is six or seven times that of the body, forms circumvolutions or turns, so as to be lodged conveniently in a cavity, in which are placed many other organs; these convolutions are kept in their place by the peritoneum, a vast serous membrane, allowing of extensive motions of the intestine, and permitting the reciprocal play of the contained and containing parts of the abdominal cavity, as the pleuræ do in the chest. The intestine is terminated inferiorly by the anus, or lower opening of the digestive tube.

The liver is lodged on the right side, immediately beneath the diaphragm; it is a large gland, and the inferior edge of the organ may be felt just below the margins of the right false ribs. It is partially covered and supported by the peritoneum.

A very brief description will suffice for the remaining abdominal organs.

The spleen is situated in the left hypochondriac region, below the diaphragm. The kidnies, two in number, are placed in the lumbar region, on either side the vertebral column, on a level with the two last dorsal and first two lumbar vertebræ. Before the rectum, the terminating portion of the intestinal tube, is placed the bladder, communicating with the canal of the urethra, and with the kidnies, by two tubes called ureters. The urine secreted by the kidnies descends to the bladder, by which it is expelled through the urethra. In women, the womb separates the bladder from the rectum. In the midst of all these organs, and in the substance of their tissues, are placed the nerves and vessels on which their nourishment and functions depend.

The lower part of the abdominal cavity is in a great measure formed by the pelvis; above and below then, this cavity, the abdominal, is protected by osseous walls; that is, by the ribs above and by the coxal bones below; behind, the vertebral column protects it throughout the whole length of the cavity.

This brief description may, it is hoped, induce the artist to acquire of the structures described, a more complete knowledge.

CHAPTER III.

OF THE ENTIRE SKELETON, AND OF THE VARIOUS PARTS COMPOSING IT.

The human skeleton is formed of the re-union of all the bones of the human body: it determines the size, the leading forms and the attitude; in a word, it is the framework of the edifice.

The height of the skeleton cannot alter excepting under the influence of certain diseases affecting the osseous tissue.

The bones are the hardest part of the economy; every thing in their structure tends to give them solidity and mobility; they have been subdivided by anatomists into long, broad and short. The long bones prevail chiefly in the limbs, the broad bones protect the cavities, and the short bones prevail in the extremities properly so called. These arrangements have a reference to the uses of the different parts. In the mobility, and at the same time solidity of the feet and hands, we perceive the importance of, and necessity for the presence of short bones. The short and solid bones of the foot for example, united by strong ligaments and forming an elastic arch, resist falls on the lower extremities which are so frequent, yielding to the movements of progression and sustaining at the same the whole weight of the body. The structure of the hand by its strength and the number of its articulations, enables it to seize on heavy and voluminous bodies as well as to handle the most delicate.

The more important or vital organs, as the brain, are more or less protected by broad bones; the osseous cagework or thorax enclosing the heart and lungs serves the double purpose of protection and motion; mobility being essential to the play of the lungs.

A great part of the abdominal cavity and its contained organs is unprotected by any osseous walls; we leave to the physiologist the explanation of this.

The intimate structure of the bones is complex; they are united together, or rather meet each other by articular surfaces covered with cartilages; these cartilages are formed of a supple, elastic substance, smooth on the opposing surface, destined to facilitate the movements of the joints, to regulate the articular surfaces, &c. The bones themselves are kept in apposition at the joints by ligaments, composed of a white, compact, fibrous tissue, supple and of great solidity.

Of the bones themselves some are prismatic, triangular or cylindrical; others quadrilateral, &c.; some have the forms of wedges, cubes; they present on their surfaces furrows, grooves, fissures, &c. In them also may be observed cells, fossæ, sinuses, holes, impressions, crests, protuberances, tuberosities, &c. But I shall review the more important of these peculiarities when describing the skeleton.

The bones are two hundred in number, including the rotulæ or sesamoid bones, not usually reckoned with the bones of the skeleton; but as the greater number of these bones are in pairs, that is exist to the right and left, there remain but in fact one hundred and seventeen bones to be studied, of which thirty-four are single or fellowless bones, being placed in the middle plane of the body: such are the frontal, the sternum, the vertebræ, &c.; the bones in pairs are the parietal, the collar bones, the scapulæ, &c.

DESCRIPTION OF THE SKELETON.

The skeleton may be divided into the trunk and the extremities. The osseous trunk comprises the head, the vertebral column, the chest or thorax, formed by the ribs and breast bone, and the pelvis. The limbs are spoken of as the superior and inferior.

The head comprises the cranium and the face; the cranium much larger than the face is formed by the frontal bone in front, by the occipital behind, at the sides and above by the parietal, below and laterally by the temporal, below and in front by the ethmoid, and below and somewhat higher by the sphenoid. But these two bones, the sphenoid and ethmoid are concealed from view by the depth of their position, and do not concur in the production of the exterior forms.

The face comprises the bones of the nose, the superior maxillary or upper jaw bones, the malar or cheek bones, and the lower jaw or inferior maxillary bone. I may also merely mention the os unguis, the palate bones, the vomer and the lower turbinated bones, which contribute also in forming the skeleton of the face.

A separate description of each of these bones is quite unnecessary for the artist; what he requires to know is merely the *ensemble* of the forms.

The head has the form of an ovoid, more or less flattened on the sides. The summit is convex, smooth; here we find the sutures or articulations of the frontal and parietal bones. At the back part there is the articulation of the parietal and occipital, called the lambdoidal suture: the suture uniting the parietal bones is called the sagittal, Fig. 1. Pl. II. The convexities of the parietal bones are called the parietal protuberances.

In front the coronal or frontal, 1, Fig. 1., forms two convexities, sometimes but one; these are the frontal protuberances. The occipital, 2, Fig. 1. Pl. III., at first smooth and uniform, like the rest of the cranium, becomes all at once rugous, with a prominent eminence backwards, the occipital protuberance, from which proceed a middle vertical line and two curved lines on either side towards the mastoid process of the temporal bone, *c*, Fig. 1. Pl. VIII.

But these curved lines do not interest the artist, being entirely concealed by the soft parts.

On the sides of the cranium will be observed the curved temporal line, running from the external angular process of the frontal bone to the zygomatic process, which again is continuous with the malar bone, 4, Fig. 1. Pl. III. and 5, Fig. 1. Pl. IV. Below this curved line is the squamous suture, and still lower the zygomatic arch, 5, Fig. 1. Pl. IV. and *a*, Fig. 1. Pl. VIII. The cheek bone is united to the frontal by the orbitar process. The temporal fossa or cavity, filled with soft parts during life, is the cavity circumscribed by the curved line and processes just described.

The letter *g*, Fig. 1. Pl. VIII, marks the site of the auditory canal. In front of this canal is the articular surface called glenoid cavity in which plays the condyle of the lower jaw bone. The cavity is marked *b*, Fig. 1. Pl. VIII. The mastoid process is behind this, forming a prominent part of the cranium; the condyle of the lower jaw bone is marked *d*, Fig. 1. Pl. VIII. The branch or ramus of the lower jaw bone, *B*, Fig. 1. Pl. VIII. The coronoid process *C*, Fig. 1. Pl. VIII. The angle of the lower jaw bone *f*, Fig. 1. Pl. VIII. formed by the reunion of the body and ramus of the bone; and the body of the bone itself, 8, Fig. 1, Pl. IV.

A vertical line running down the centre of the frontal bone, between the frontal tuberosities, indicates the suture or union of the two portions of which the bone was originally formed. The nasal (superciliary) protuberances above the nose, acquire great size in certain persons and in old men. They form generally a kind of arch on either side the superciliary; and the arch or margin of the bone just below them, is the orbitar margin.

The nasal bones are easily recognized; together with the ascending branches of the upper maxillary bones and the cartilages, they determine the form of the nose. The orbitar openings are quadrilateral ; but this form is considerably modified by the soft parts.

The malar or cheek bones 5, Fig. 1. Pl. IV. form the prominences so remarkable in thin and aged persons. A hollow on the surface of the upper jaw bone is called the canine fossa. This bone contributes to form the anterior opening of the nostrils. A bony partition, the vomer divides the nostrils into two parts, generally unequal.

Lower down is the alveolar process and the teeth of the upper jaw. The arch so formed projects over that of the lower jaw, so that the upper teeth cover the lower when the jaws are closed. But the molar teeth placed further back, correspond precisely. The eminence of the chin is marked 8, Fig. 1. Pl. IV. In this description I have avoided speaking of the base of the cranium as not being essential to the artist.

The vertebral column, the ribs and sternum form the middle portion of the trunk. The vertebral column placed between the head and the pelvis, 6 to 9. Fig. 1, Pl. III. is composed of twenty-four vertebræ, seven cervical, twelve dorsal and five lumbar. By the reunion of these bones, a column is formed ; it measures generally from 2 feet 4 inches, to 2 feet 8 inches in length. Winslow viewed it, as composed of two pyramids whose summits meet at the fourth dorsal vertebra. To this flexible column we must add the sacrum, 10, Fig. 1. Pl. III. upon which it rests as on a basis, and the coccyx (11. *id.*) terminating the sacrum, and the vertebral column properly speaking. The column is curved; as seen from the sides the curves are four in number; as seen from the front or back there exists but one curve. In the neck, the column is concave, in the dorsal region convex, in the loins concave, and in the sacral and coxygeal regions convex, that is, when the column is viewed in profile. The lateral curvature or curve takes place on a level with the third, fourth and fifth dorsal vertebras; the concavity of this curve is turned towards the left side. We shall not here stop to discuss the various theories offered to explain the presence of this curvature in the column; some ascribing it to the contiguity of the arch of the aorta, others to the more frequent use of the right arm, others to the position of the fœtus in the womb. It is best seen when viewing the column from the front or back.

In all the vertebræ there is a body, processes, notches and a principal *foramen*, or hole. The body of the vertebra, *a.* Fig. 2, Pl. VII. nearly cylindrical, is convex in front, and flattened from above downwards; behind is the spinous process, *d.* Fig. 2, Pl. VII. having various directions in different vertebræ. The two plates of bone into which it divides at the base are called *laminæ.* They unite with the body of the vertebra, thus forming the great vertebral *foramen* or hole, which contains and transmits the spinal marrow. On each side the body are the transverse processes, *e*, Fig. 2. Pl. VII.; these articulate with the ribs. The other processes are called oblique or articular, as destined to articulate or firmly connect the vertebræ to each other; small smooth surfaces on the sides of the bodies of the vertebræ receive on them the heads of the ribs. The vertebræ have in different regions of the moveable part of the column, different shapes, which the artist will do well to observe. The characters just given apply to most of the vertebræ, but not to all; some are easily recognized by particular characters; in the neck or cervical region, the first, second, and seventh vertebræ have their peculiar characteristics; in the back, the first, tenth, eleventh and twelfth; of the lumbar vertebræ, the fifth is easiest distinguished: it is to the first and second, and seventh cervical that the artist should more especially attend; the seventh especially, which from its projecting spinous process, enables the student with more or less ease to determine the position of all the others. The rounded extremity of its projecting spinous process, raises the skin a little, and so points out the position of the vertebra.

The sacrum, 10, Fig. 1. Pl. III. terminates (*with the coccyx*), the vertebral column inferiorly, and connects it with the pelvis. By its broad base it is articulated with the last lumbar vertebra, and by its summit with the coccygeal bones, or coccyx, 11, Fig. 1. Pl. III. The sacrum is composed of five vertebræ, distinct from each other in young persons, but which unite together as age progresses. The adult sacrum thus forms but one bone; on this bone may readily be seen the rudiments of the processes found more perfect in the moveable vertebræ; the canal for the spinal marrow passes through it, but the medulla itself does not extend so low.

The bodies of the vertebræ are united to each other by substances called fibro-cartilages (discs) of great strength; these permit the column to move in nearly all directions with perfect safety to the spinal marrow and nerves; they are also extremely elastic, and to this is owing the elasticity of the vertebral column.

If the student examine attentively the entire vertebral column, which actually includes the sacrum, and the so called coccyx, he will observe the form and the direction of its curves; posteriorly, also he will remark the series of spinous processes following different directions, and on either side of these processes a deep groove, called *vertebral*, in which run the long fleshy masses or muscles of the back. These grooves are limited or rounded externally in the back by the angles of the ribs: the extremities of the transverse processes limit them in the cervical and lumbar regions; at the back of the sacral vertebræ they gradually disappear; they do not exist in the coccygeal region.

The thorax or chest is formed by the vertebral column behind; the sternum in front; and laterally by the ribs, twelve on each side.

The sternum, 12, Fig. 1. Pl. II. is a mesial bone or chain of bones, somewhat symmetrical, elongated, composed in the young person of a series of distinct bones, which grow together as age advances. It was compared by the ancients to a sword; modern philosophic anatomists view it as an anterior vertebral column. In length, it varies from 5 to 6 inches. This bone, or chain of bones, according as it is viewed, is situated in the anterior and middle part of the thorax; its upper extremity is broad and notched above, in the middle; at the sides of the bone there are facettes, or articular surfaces for articulation, with the collar bones and with the cartilages of seven ribs: at its lower end is the xiphoid appendage or cartilage, whose form and structure vary considerably. In the adult, the sternal chain of bones usually forms but one; not unfrequently, however, the upper portion remains distinct from the middle part or body; and their point of union may always be made out by an angle or elevation, more or less acute.

The sternum is directed obliquely from above downwards, and from behind forwards. According to M. Cruveilhier, it ought to form, in the well-formed man, an angle varying from 20^0 to 25^0 degrees, so that, were its upper extremity prolonged, it would intersect the third cervical vertebræ; but this direction is very variable. The ribs, twenty-four in number, are arches, partly bony, partly cartilaginous, whose dimensions vary according to the region they occupy. They are divided by anatomists into fourteen true, and ten false; the true are articulated directly to the sternum; the cartilaginous extremities of the others do not proceed so far: the last four are called floating ribs. The ribs and their cartilages form not only then the walls of the chest, but contribute extensively to the formation of the walls of the abdomen.

Whilst examining the ribs, the student's attention should be directed to their general form; also to the head of the rib, articulating generally between the bodies of the vertebræ; and to the tuberosity, *f*, Fig. 2. Pl. VII. resting on, and articulated with the transverse process of the vertebra. The anterior extremity of the rib is thin and terminates in a cartilage. The body of the bone is curved and twisted, and there are projections for muscular attachments.

In direction, the ribs incline from above downwards, and this angle increases from the first to the last. The thorax itself, thus formed, is of a conical shape, with the base downwards, and the summit above; a form entirely different from the living model, in whom, on the contrary, the chest is large in the line of the shoulders, and contracted at the lower part. For this reason, therefore, I shall describe the collar bones (claviculæ), and the shoulder blades (scapulæ), before attempting a full description of the whole of the thorax.

The collar bone, 10, Fig. 1. Pl. II. is situated between the sternum and the shoulder blade, with which it articulates by two articular surfaces, nearly horizontal, longer, thinner and less curved in woman; it presents a convexity and a concavity. The head of the collar bone rests on the sternum, and is fixed to it by ligaments; sometimes it articulates by its lower surface near the sternal end with the first rib; connected externally with the acromion process, by an articular surface and ligaments, it moreover has on its lower surface, near the acromial end, a tubercle giving attachment to the powerful ligaments connecting the bone to the coracoid process of the scapula. The collar bone plays an important part in the movements of the shoulder.

The scapula or shoulder blade, 16, Fig. 1. Pl. III. is a large, triangular, and rather thin bone, extremely moveable, and situated at the superior and lateral part of the back, by the sides of the vertebral column.

The anterior surface of the scapula, in which is lodged the subscapular muscle, is applied exactly to the posterior wall of the chest; its dorsal surface is divided into two unequal portions, by a very projecting osseous crest or ridge, called, *spine of the scapula*, *c*, Fig. 4. Pl. VII.; the lower portion below the spine is called the infra spinous fossa, lodging the infra spinatus muscle; the portion above the spine is the supra spinous fossa lodging the supra spinous muscle.

The spine of the scapula, a remarkable prominent portion of the bone, terminates in the acromion process, *a*, Fig. 4, Pl. VII. Over the crest, the integuments rest almost immediately on the bone. The scapula presents three margins, and three angles; on the external angle is placed the oval cavity called glenoid, *d*, Fig. 4. Pl. VII. against which rests the head of the humerus. The strong portion of the bone adjoining this cavity, is called the neck or cervix of the scapula; the *coracoid process* is marked, *e*, Fig. 3. Pl. VII.

We have seen that the thorax looked at by itself, presents a truncated cone with the apex upwards; as seen in the model, the chest seems broad above, this is owing to the presence of the shoulder bones and muscles. The thorax, like the sternum, follows an oblique direction from above downwards. The inter-costal spaces are wider above than below, and before, than behind. The thoracic cavity presents two openings or large apertures; a superior which is heart-shaped, and an inferior, which is much larger, and is, as it were, continuous with the abdominal cavity.

The bones of the shoulder (scapula and clavicle), form a kind of protecting circle around the upper part of the chest. Behind, the scapula descends usually as low as the eighth rib; and is more or less visible according to the condition of the person.

The pelvis is composed (in the adult) of four bones; the two ossa innominata or bones of the haunches; the sacrum and coccyx. The last have been described: let us now consider the ossa innominata or coxal bones, sometimes also called iliac, 20, Fig. 1. Pl. II.

These bones articulate strongly with the sacrum, and are extremely voluminous. They form, with the others, a basin, spread out above. Each coxal bone is considered by anatomists as composed of three portions, called iliac, ischiatic, and pubic.

In examining the coxal bones, the student ought to notice especially the *external iliac fossa*, and the curved lines, connected with it: the *iliac crest*, *d*, Fig. 3. Pl. VIII. the posterior iliac spines terminating the crest backwards, separated from each other by a notch; and anteriorly the anterior iliac spines, *d*, *e*, Fig. 3. Pl. VIII. separated also by a notch. There is a large and deep notch at the back of the bone, divided by an eminence called the *spine* of the *ischion*, *b*, Fig. 4. Pl. VIII. The sciatic tuberosity, *c*, Fig. 4. Pl. VIII. terminates this notch below; to this several muscles are attached, and in sitting, it receives the whole weight of the body.

The cotyloid cavity, *g*, Fig. 3. Pl. VIII. for receiving the head of the femur, is on the outer and somewhat anterior aspect of the bone; anteriorly is the oval foramen or obturator hole, *b*, Fig. 4. Pl. VIII. nearly oval in man, but smaller and triangular in woman. The angle of the pubis, *c*, Fig. 3. Pl. VIII. unites by an articulation with that of the other side, and forms the symphysis of the pubis.

There is formed, by the re-union of the bones just enumerated, a vast cavity with solid walls more or less deep, occupying nearly the middle of the body. This osseous cavity is notched behind where rests the vertebral column properly so called; still more deeply notched in front over the pubic portion of the pelvis. Beneath the symphysis of the pubis is the *pubic arch*, wider in woman than in man. The oblique position of the pelvis, with respect to the vertebral column must be carefully noted. In woman, the pelvis is much broader transversely, and also from behind forwards than in man; the upper margin less curved, the cotyloid cavities situated more apart, &c.; in a word, the proportions are larger, by reason of the part the pelvis has to perform in her, during gestation, and at the moment of labour.

The stature of the individual has little influence over the dimensions of the pelvis.

The arms, usually called by anatomists, the superior or thoracic extremities, have for their skeleton or osseous frame work, the humerus, the radius, and ulna, the bones of the carpus, the metacarpus, and of the fingers.

The humerus, 21, Fig. 1. Pl. II. placed between the shoulder and the fore-arm, is a long single bone divided into three portions, a body and two extremities.

The body is the middle portion or shaft, rounded above, prismatic below, ridges and impressions mark the attachments of muscles, and like all long bones, it is twisted on its axis. The upper extremity of the bone is formed by the head, and by the larger and smaller tuberosities. The head of the humerus, *g*, Fig. 3. Pl. VII. nearly hemispherical, is supported by the neck of the bone. The convexity of the head is encrusted with cartilage; here it rests on the opposing cartilaginous surface of the glenoid cavity; this portion of the spherical head forms, with the axis of the body, an obtuse angle. To the two tuberosities are attached powerful muscles; by its lower extremity the humerus articulates with the radius and ulna. It is flattened and enlarged transversely to meet this articulation. Externally there is the external tuberosity or condyle; *c*, Fig. 5. Pl. 7. to which are attached all the posterior muscles of the fore-arm; internally there is the inner condyle; *b*, *idem*, more prominent than the outer, placed on a higher level than the outer, and giving attachment to most of the anterior muscles of the fore-arm. Between the two condyles is the trochlea or pully, *d*, *idem*, and more externally the *smaller head* of the *humerus*. Above the trochlea of the humerus are two cavities, an anterior and a posterior; the upper part of the coronoid process of the ulna rests during flexion in the anterior cavity which is marked, *a* Fig. 3. Pl. VII. and the olecranon process in the posterior cavity, marked, *a*, Fig. 6. idem.

The two bones of the fore-arm have a very peculiar arrangement, to which I shall afterwards call the attention of the reader; at present I shall merely give their outline.

The radius and ulna articulate above with the humerus, below with the carpus. The ulna is the largest above, and the radius below: the ulna is the longest, and forms with the humerus, the more important part of the elbow joint, on the contrary, the radius plays the leading part in the wrist joint, the ulna being here of secondary importance.

The bodies of these bones twisted on themselves; they are articulated with each other above and below; an inter-osseous interval separates them at other points.

The humeral extremity of the ulna is large and hook-shaped, forming the olecranon process, *e*, Fig. 6. Pl. VII. posteriorly; also the coronoid process, *h*, Fig. 5. *idem*, anteriorly; together, these processes contribute to form the great sigmoid cavity, *g*, Fig. 5. *idem*, which cavity receives the pully of the humerus. Externally there is here a smaller cavity for receiving the head of the radius; it is the smaller sigmoid cavity, *i*, Fig. 5. Pl. VII. also *m*, *idem*. The head of the radius presents a cup-shaped cavity above, which receives upon it the smaller head of the humerus; a contracted neck supports the head of the radius, and beneath it is the bicipital tuberosity, *n*, Fig. 5. Pl. VII.

Inferiorly, the cubit becomes slender, forming the *head of the cubit*, *k*, idem, and the styloid process, *l*, idem. The head articulates *indirectly* with the carpus. The lower end of the radius is much larger; it articulates directly with two bones of the carpus. Externally it has also a styloid process, *p*, idem. There is a small hollow facette, *o*, idem, to receive the head of the ulna.

A minute study of all the bones of the hand would be tedious to the artist; but he ought to be well acquainted with their general form when united. The form of the human hand merits the deepest attention.

The hand is formed by the carpus, metacarpus, and phalanges. The carpus, 24, Fig. 1. Pl. II. comprises eight small bones articulated with each other It is concave on the palmar side, and convex on the back or dorsum. Inferiorly, it articulates with the five metacarpal bones, 25, Fig. 1. Pl. II. These bones are of unequal length, and are spread out something in the manner of a fan. The shortest is the first, or that supporting the thumb; its distal extremity corresponds to the middle portion of the second bone of the metacarpus. This part of the hand is concave anteriorly or on the palmar aspect and convex posteriorly like the carpus; and moreover it is slightly concave from above downwards.

The hand is terminated by the phalanges, 25, Fig. 1. Pl. II.; these bones are shorter than the metacarpal bones, and diminish progressively as they proceed from the metacarpus. They are distinguished into first, second and third, or proximal, middle and distal, or nail bones; the thumb has only two, the proximal and the distal. The nail bones are peculiar in shape; the others have heads or condyles at the distal end, and hollow facettes at the other.

The skeleton then of the superior extremity is composed of: 1. The shoulder, formed of the scapula and collar bones. 2. The humerus. 3. The bones of the fore-arm, forming with the humerus a somewhat obtuse angle, the form of the olecranon process being opposed to the complete extension of the limb.

The arm and fore-arm are inclined on each other, from above downwards, and from within outwards, so that the lower extremity of the fore-arm is more distant from the axis of the body than the upper part of the arm. The two bones of the fore-arm give to this segment its flattened form, even when covered with soft parts.

The femur, the fibula, the tibia, and the rotula, form with the bones of the foot, the skeleton of the lower extremity.

The femur, 27, Fig. 1. Pl. II. is the longest and largest of all the bones; as is usual with all the long bones, it is twisted on itself, and otherwise curved remarkably; the *linea aspera* running along the shaft or body, gives attachments to muscles.

The upper part of the femur comprises the head, the neck, and the two trochanters. This portion forms, with the body of the bone, an angle more or less obtuse. The head, *b*, Fig. 3. Pl. VIII. is received into the cotyloid cavity of the coxal bone, with which it forms the hip joint. It represents a portion of a sphere, is encrusted with cartilage, and is supported by the neck, *g*, Fig. 4. Pl. VIII. The *great trochanter*, *h*, *idem*, is a little lower than the head of the bone; it gives attachment to numerous muscles. The smaller trochanter, *i*, Fig. 4. Pl. VIII. having similar uses as the larger, is placed lower down and towards the inner side. To comprehend the relative position of all these parts, it will be sufficient to study them carefully on the structures, and on the figures.

At the lower end of the femur, there are the internal condyle, *c*, Fig. 6, Pl. VIII. descending lower than the external, *d*, idem; anteriorly, the condyles are separated by a depression (pully); in which is lodged a portion of the rotula. A deep notch separates the two condyles. On these condyles may be observed two *tuberosities*, the external, *b*, Fig. 5. Pl. VIII. the internal, *d*, idem.

The tibia, 29, Fig. 1. Pl. II. and the fibula 30, *idem*, differ greatly in size. The tibia is enlarged superiorly, diminishes inferiorly, twisted on itself, prismatic. The fibula or perone is as long as the tibia, but slender, and it also is much twisted on itself. Anteriorly the tibia shews an evident crest; the malleoles internus is marked *a*, Fig. 7. Pl. VIII. The form of the shaft of the tibia, and more especially of the inner and anterior surface cannot be too carefully studied by the artist. It is to a great extent subcutaneous.

Superiorly as regards the tibia there are the two *articular facettes*, *f*, *f*, Fig. 6. Pl. VIII. separated by a double eminence, and on which rest and slide the condyles of the femur. These facettes are frequently but improperly called condyles of the tibia; the superior eminence, is the spine of the tibia, *e*, Fig. 6. Pl. VIII. Two tuberosities support the facettes; the external *g*, Fig. 5. idem, less than the other, articulates with the fibula, *g*, Fig. 6. Pl. VIII. the *internal*, *f*, Fig. 5. idem, is larger than the external. The anterior tuberosity of the tibia is marked *h*, Fig. 5. Pl. VIII.

The upper end of the fibula is terminated by a styloid process; anteriorly there is a facette, *i*, Fig. 5. idem, by which it is articulated with the tibia.

Inferiorly, these two bones of the leg unite by articulation, and form together a cavity in which is received the body of the astragalus, *c*, Fig. 7. Pl. VIII. The *malleolus internus*, enclosing the cavity internally, *a*, Fig. 7. Pl. VIII. is a portion of the tibia; the external malleolus, *a*, Fig. 7. Pl. VIII. is larger and descends lower than the internal: it is formed by the lower end of the fibula. Thus of the two bones, the tibia ascends highest, and the fibula descends lowest.

The *rotula*, *d*, Fig. 5. Pl. VIII. situated before the knee joint is nearly triangular; to its base are attached the extensor muscles of the leg; to the summit or apex is attached the ligament of the patella. It is so formed as to fit the trochlea of the femur, on which it plays during the flexion and extension of the leg on the thigh.

The foot forms a right angle with the leg; it is composed of the tarsus, metatarsus and toes, making twenty-six bones in all.

Of the seven bones of the tarsus, 29, Fig. 1. Pl. IV. there are only two placed nearly on the same plane; these are the *calcaneum*, *D*, Fig. 5. Pl. VIII. and the *cuboid*, *F.* idem, the others are removed from the surface of the soil. The tarsus viewed in profile resembles a pyramid; the astragalus alone of all the bones of the foot, contributes to form the ankle joint.

The posterior half of the calcaneum, *D*, Fig. 7. Pl. VIII. projects backwards, constituting the heel. It articulates with the astragalus and with the cuboid.

The anterior bones of the tarsus, five in number *E*, *F*, *G*, *H*, *I*, Fig. 7. Pl. VIII. form a sort of wedge, whose superior surface is convex transversely.

Five long prismatic bones, *J*, Fig. 7. Pl. VIII. compose the metatarsus; by their base they articulate with the bones of the *tarsus*, leaving intervals between each other; anteriorly, they form condyles, which articulate with the phalanges.

The largest and shortest of the metatarsal bones is the first; the second is the longest; the fifth, remarkable for a prominence at the proximate or tarsal end of the bone; this process extends beyond the line of the tarsal bones. The metatarsus viewed as a whole is concave inferiorly; its upper surface is convex from within outwards.

The phalanges, 31, Fig. 1. Pl. IV. three in number for each toe, excepting for the first, which has but two, are disposed as in the hand; the shortness, however, of the last two phalanges of each of the smaller toes, and the size and fan-like shape of the last, or nail bone of the great toe, merits notice. The phalanges diminish in length from the first toe to the fifth, the extremity of which corresponds pretty nearly to the articulation of the two phalanges of the great toe.

The lower extremity represents an osseous column; the upper portion of the column, the thigh bone, has the axis directed obliquely from above downwards, and from without inwards; the inferior part (or leg bones), is vertical, and is placed on the posterior fourth of a base elongated from behind forwards, whose general disposition is that of an arch with antero-posterior, and lateral curves; the base (skeleton of the foot) is contracted posteriorly, widening progressively towards the toes.

An attentive examination of the skeleton shows that strong analogies exist between different parts, and especially between the upper and lower extremities. On this point, the artist may consult the dissertation of

Falgnerolles,* a Memoir by Vieg. d'Azyr,† and the Treatise on Anatomy of M. Cruveilhier.‡

The relative direction of the bones must be carefully studied; it determines those of the limbs. To ascertain the true direction of the different parts composing the skeleton, and especially that of the limbs, let fall a perpendicular line from the vertex or summit of the cranium, passing through the anterior portion of the occipital foramen, and terminating between the feet.

The skeleton of the child differs widely from that of the adult, hence arise differences in the external forms. The bones of the infant are at first of merely a mucous, or cellular consistence; after a time they become cartilaginous, and lastly ossify; at first in parts only, afterwards completely.

At birth, the bodies of the long bones, and a portion of the broad bones are already ossified; but the extremities of these first bones, with the exception of the inferior extremity of the femur are still at birth cartilaginous; at twenty-five or twenty-six years, the ossification of the skeleton is complete.

During the progressive development of the human body, the proportions of the bones alter like those of other parts. After the full development of the skeleton, the length of the different parts does not alter; in a word man then ceases to grow.

* Dissertatio de extrem. Analog. 1785.

† Œuvres de V. d'Azyr, t. 4. ‡ Tome 1.

An inspection of the infant skeleton, Fig. 3. Pl. v. will show the disproportion of the extremities to the bodies of the bones, the rounded forms, the absence of, or the rudimentary state of the various crests, tuberosities, &c. add to these the abundance of the cellular tissue, and you will readily comprehend the rounded, and dumpy forms of young children.

CHAPTER IV.

OF THE PRINCIPAL ARTICULATIONS.

ARTHROLOGY, or the science of the articulations, is of the highest importance to the artist; but how shall we place before him a branch of knowledge so little attractive? How engage him in a study so full of arid details? How induce him to trace, minutely, ligaments so numerous, as to put to a severe trial, the patience even of the anatomist? And yet without a correct knowledge of these cords, so skilfully connecting the bones together, at times in a way admitting of no motion; at other times, and in other parts, admitting of motions, more or less extensive, but in fixed directions, how were it possible for the artist to comprehend the mechanism of the movements of the frame? To determine their direction and their limits? To avoid all mention of arthrology in a work of this kind were impossible; to give its complete history equally so; I have adopted therefore the following course.

In Plates VII. and VIII. I have caused to be represented the principal articulations of the body with all their ligaments, placing opposite to them an explanatory text; in this place, I shall confine myself to a description of the *ensemble* of the articulations, indicating their mechanism, and their principal means of union.

The bones comprising the skeleton are united, either by their margins, or by their extremities, and held in contact by peculiar cords, so disposed as to render some joints nearly or wholly immoveable; whilst to others they allow movements more or less extensive, or regulate their action, by confining the motion within fixed directions. Hence it is that the articulations or joints have been subdivided by anatomists into the moveable and the immoveable.

All the moveable articulations which are also called *diarthrodial*, are formed by osseous surfaces encrusted with cartilages, and held in their place by ligaments, whilst many immoveable articulations, or *synarthrodial* have neither ligaments nor cartilages.

The enlargement of the extremities of the long bones themselves facilitate and strengthen the joints. The cartilages encrusting the osseous articular surfaces are supple, elastic, solid and perfectly smooth; an excessively delicate membrane invests their surfaces, secreting a viscous fluid, like albumen or white of egg: this fluid is called synovia (joint-oil).

The ligaments maintaining the bones in their place are exceedingly strong white cords, inelastic and inextensile, flexible, yet unyielding. Their fibres have the lustre of mother-of-pearl, and they differ from cartilage and from fibro-cartilages, a still stronger structure which nature sometimes employs as ligaments. Tendons, muscles and aponeuroses contribute still further to strengthen certain joints. By all the means just mentioned, the mobility and solidity of the joints are admirably secured.

Several classifications of the articulations have been proposed; it will suffice here to distinguish them into diarthrodial, or joints having contiguous surfaces; synarthrodial, or joints having continuous surfaces and symphyses, which are partly contiguous, partly continuous.*

Of the numerous articulations of the head, one only merits the attention of the artist, the temporo-maxillary articulation; the articulation of the lower jaw with the temporal bone.

The osseous surfaces composing this joint are the condyles of the lower jaw, *d*, Fig. 1. Pl. VIII. covered with cartilages of incrustation, and the glenoid cavity of the temporal bone also encrusted with cartilage, and invested by a synovial membrane, *b*, Fig. 1. In addition to these cartilages and membrane, there exists in this joint an inter-articular fibro-cartilage, destined probably to preserve the articulation from the effects of violent shocks. The external lateral ligament, 1, Fig. 1. *bis.* secures the neck of the condyle to the base of the zygomatic process. The stylo-maxillary ligament, although not rigorously belonging to the joint, is represented at 2, Fig. 1. *bis.*

* Cruveilhier, Anat. vol. 1.

The movements of the lower jaw, thus regulated by ligaments and muscles are downwards and upwards, or from side to side; that is, vertically and laterally. The jaw also can be made to slide forwards and backwards. The strength of the articulation depends mainly on its muscles, and their tendinous attachments.

ARTICULATION OF THE HEAD WITH THE FIRST VERTEBRA (ART. OCCIPITO-ATLOIDIEN).

The head articulates with the atlas, the first cervical vertebra.

At the sides of the great occipital foramen, are two condyles, *a*, Fig. 1. Pl. VII. ovoid and convex. These condyles are received into corresponding concave facettes on the upper surface of the atlas, *b*, Fig. 1. Short and powerful ligaments, Fig. 1. *bis.* connect the vertebra firmly to the cranium, so that all the movements of the head are transmitted securely to the atlas. The great occipital hole, just alluded to, pierces the occipital bone at the point of reunion of the posterior third with the two anterior thirds of the head.

ARTICULATION OF THE TWO FIRST VERTEBRÆ WITH EACH OTHER (ART. ATLOIDO-AXOIDIEN).

On the lower surface of the atlas will be found two slightly concave articular facettes, *c*, Fig. 1. These rest on corresponding slightly convex surfaces of the second vertebra or axis, *f*. Another small oval facette will be found on the inner side of the anterior arch of the atlas. On this plays a corresponding articular facette of the odontoid, *e*, process of the axis. A transverse ligament converts the anterior part of the hollow of the atlas into a ring in which is received the odontoid process, which cannot escape from this ring, the summit of the odontoid process being enlarged, and the ligament being further of great strength. Thus the atlas and the head, which always move together in semi-circular motions, plays on the odontoid process as on a pivot, which it really is. Fibrous capsules, 3, Fig. 1. *bis.* enclose the corresponding articular surfaces of the atlas and axis, strengthening, but at the same time limiting and regulating the action of these joints. Two short, but strong ligaments, connect the summit and sides of the odontoid process to the occipital bone.

The movements of the head then are universal so far as they go; the head moves forwards and backwards upon the atlas: with the atlas it moves through a quarter of a circle to the left, and through the same extent to the right, on the axis or second vertebra. But if the movements of rotation extend further than this, then the whole vertebral column contributes thereunto, and even the coxo-femoral or hip joint.

There exists a similarity and analogy in the articulations of the following twenty-two vertebræ, rendering it unnecessary to describe them in detail. What applies to one, with slight differences, applies to all. The details are given in Pl. VII. Fig. 1. 1. *bis.* 2. 2. *bis.*

and Pl. VIII. Fig. 2. 2. *bis.* Keep in mind that a vertebra, Fig. 2. Pl. VII. is composed of a body *a*, and two half facettes *b*, for the articulation of the ribs. 2nd. Superior and inferior articular processes, *e*, *e*. 3rd. A spinous process, *d*, united to the body by laminæ. 4th. Transverse processes, *e*. Finally, foramina or holes and notches, resulting from the re-union of the parts described.

The vertebræ articulate with each other, and with the ribs; above with the head; below, the column rests on the sacrum, which is itself but the continuation, under a slightly modified form of the column. Fibro-cartilaginous discs, inter-vertebral bodies, 2. 2. 2. Fig. 2. *bis.* Pl. VII. elastic cushions, to which the column owes both strength and flexibility, connect the bodies of the vertebræ to each other. These are further strengthened by the anterior, or common vertebral ligament, Pl. VII. 1. 1. Fig. 2. *bis.* and also by the posterior common ligament. The articular processes have also their strengthening ligaments.

The spinous processes are connected together by the inter-spinous ligaments, 6, Fig. 2. *bis.* Pl. VII. Fig. 2. *bis.* Pl. VIII. and by the supra-spinous ligaments, 6, Fig. 2. *bis.* Pl. VII. and 8. 8. Fig. 2. *bis.* Pl. VIII.; these extend uninterruptedly from the seventh cervical vertebra to the sacrum, connecting the summits of the spinous processes together. They are of a strong and elastic tissue, not strictly ligamentous.

The laminæ of the vertebræ are connected to each other by the *yellow ligaments,* substances of great strength and eminently elastic. These, though they serve as ligaments, are not strictly so. The last lumbar vertebra is united to the first sacral by a ligamentous apparatus similar to that just described.

From this mechanism, and from such a structural arrangement, it arises that the vertebral column can move in nearly all directions, rotating also upon its axis. There exist also salutary checks to a too extensive flexibility, which a sound anatomical knowledge will enable the student to determine and appreciate. Such for example are the common anterior ligaments of the vertebræ, as well as the anterior portion of the inter-vertebral disc; certain movements are regulated and confined within due limits by the spinous processes: this happens more especially in the dorsal portion of the column.

Other ligaments easily understood, check a too forward movement of the torso; the movements of the neck and loins, are much freer than those of the back. The transverse processes contribute their share towards limiting the extent of movement in the dorsal part of the column; whilst it is evident, that in any very violent torsion of the trunk, the movement must take place chiefly at the coxo-femoral joint.

THE SHOULDER JOINT OR, SCAPULO-HUMERAL ARTICULATION.

It might be supposed that the humerus and scapulum are the only bones that form the scapulo-humeral articulation; the clavicle, however, forms part of it, and it is therefore necessary to point out the manner in which the outward extremity of this bone is connected with the scapulum or shoulder blade bone. An articular (*d*, Fig. 3. Pl. VII.) surface situated on the edge of the acromion process corresponds to a similar surface, *b*, on the external extremity of the clavicle; they are united together by a strong capsular ligament, 4, Fig. 3. *bis*. which extends from one bone to the other. There are besides two articular surfaces, one on the clavicle, the other on the coracoid process, united together by the coraco-clavicular ligaments, the anterior of which is represented at 2, Fig. 3. *bis*.*

It may be seen on inspection of Fig. 3. *bis*. Pl. VII. that the clavicle and the processes of the acromion and coracoid form an arch completed by the acromio-coracoid ligament, 3, Fig. 3. *bis*. and that in this arch the head of the humerus, *g*, is placed moving on the glenoid cavity, *f*, Fig. 3. This cavity has its greatest diameter in a vertical direction, in order that the head of the humerus may be moved in this direction during those movements of elevation and depression, which are performed by the arm when extended from the body. The head of the humerus is almost hemispherical, and forms with the shaft of the bone a very slight angle; its direction is inward, and when the arm hangs down, the inferior border of the articular cartilage cor-

* This articulation between the collar bone and the sternum, which like the articulation of the lower jaw, has an inter-articular cartilage, has been already described, it is moreover surrounded by a fibrous capsule almost complete.

responds to the inferior border of the cartilage, which covers the glenoid cavity.

The bicipital groove *h*, which is converted into a canal by fibrous tissue, forms a passage for the long portion of the biceps, 9, Fig. 3. *bis.*, this bifurcates, spreading out on the border of the glenoid cavity, augmenting its depth.

The humerus and scapula are united by a fibrous capsule, 7, Fig. 3. *bis.* extending from the circumference of the glenoid cavity to the neck of the humerus, enveloping its articular surfaces. This capsule, very loose and of unequal thickness, would not suffice to maintain the articulation, were it not surrounded on all sides by powerful muscles, still further strengthened by their tendons, and by a fibrous band called coraco-humeral 6; of all the articulations of the body, that of the shoulder is the most moveable.

The humerus can be moved forwards, backwards, outwards, and inwards, as also in all the intermediate directions, and can likewise be turned on its axis in the manner of a pivot. The outward movement, or abduction, can be carried until the arm meets the head; after which, if the member be allowed to fall, it is arrested by the trunk, which prevents its being carried further inwards, unless it be carried forward, and even then it is quickly stopped by the tightening of the capsule, and of the supra-articular muscles.

The forward movement permits the arm to form a half circle, so as to place it in a vertical position; but the tightening of the capsule and muscles, and the existence of the scapular processes, prevent it from being carried further backward. The movement backwards is the least extensive; the head of the humerus coming against the coracoid process, is prevented moving further forwards, and the inferior portion of the member is thereby prevented moving further in that direction. The swinging movement results from a succession of the preceding, and is subject to the same limits. The rotation of the bone on its axis extends to about the quarter of a circle, which is very easily proved by bending the fore-arm at right angles to the arm, and then executing a rotary movement. It must not be forgotten that both the clavicle and the scapulum participate more or less in all the movements of the scapulo-humeral articulations. The mobility of the clavicle on the sternum, although limited, is of the greatest importance, for were it a fixed joint, considerable discomfort would arise during the movements of the arm.

THE HUMERO-CUBITAL ARTICULATION, OR ELBOW JOINT.

The inferior extremity of the humerus spreads out in a fan-tail form to favour the contact of the two bones of the fore-arm. The trochlea is marked *d*, Fig. 6. Pl. VIII.; the condyle, *e*. The sigmoid and olecranon cavities, *a*, Fig. 6. correspond generally to the articular cavity *g*, to the depression on the head of the radius *m*, to the sigmoid process *h*, and to the olecranon process *f*, of the ulna.

The Figures 3 *bis* and 6 *bis*, show the four ligaments which give strength to the articulation, 1, Fig. 5. *bis.* the anterior ligament, 2, *idem.* the internal lateral ligament, 3, *idem.* the external lateral ligament, 1, Fig. 6. *bis.* the posterior ligament. All these ligaments are inserted superiorly to the humerus, and inferiorly to the radius and ulna forming a kind of capsule which encircles the articulation on all sides. The fore-arm can perform but two movements as regards the arm, the one forwards, the other backwards. When the fore-arm is naturally bent on the arm, the former is not parallel to the latter, on account of the pulley-like surface of the inferior extremity of the humerus (on which the ulna glides) being directed obliquely from without inwards, and from behind forwards; the articular notch of the ulna, therefore, following of necessity the same direction, causes the fore-arm to approach the front of the body. To enable the fore-arm to meet the arm, a movement of rotation must be performed by the humerus, sufficient to carry the radius and ulna in an outward direction. The flexion of the fore-arm can be carried to the meeting of the coronoid process and sigmoid cavity, and although it has been said that the fore-arm could be flexed until it meets the arm, that is only true as regards the part nearest the articulation, for it is impossible to bring the shoulder and the inferior extremity of the fore-arm into contact.

Extension is limited by the olecranon, the point of which meets the bottom of the olecranon cavity, and then the arm and fore-arm are situated almost on the same plane. I shall not speak of the tension of the ligaments during flexion and extension, they playing but an unimportant part in these movements, when compared with the sigmoid and olecranon processes.

THE ARTICULATIONS OF THE RADIUS WITH THE ULNA.

A cavity, *i*, Fig. 5. Pl. VII. hollowed out on the inner side of the articular notch of the ulna, receives the side of the head of the radius, whilst inferiorly it is the radius which has a small articular facette at *O*, corresponding to the head of the ulna on which it glides ; it will be seen further on, that this particular disposition of the bones of the fore-arm favours their rotation. The superior articulation of the bones of the fore-arm is united by the annular ligament, 4, Fig. 6. *bis.* which is a small band attached by its extremities to the ulnar notch, at the same time embracing the superior extremity of the radius.

Inferiorly, the bones of the fore-arm present an almost analogous disposition, but it is here no longer a small girdle fixed to the radius, and encircling the ulna, but two ligaments attached by their extremities to the radius and ulna, causing the movements of this articulation to be less extensive than those of the superior extremity of these bones.

There is likewise a kind of ligament that is called inter-osseous, 5, Fig. 5. *bis.* which is of but little importance to the artist. The bones of the fore-arm move on each other, either forward or backward, the first of these is called pronation, the second supination.

In order that the movement of pronation be effected, the head of the radius must turn from before backwards, in the ring formed by the annular ligament, and the notch of the ulna, whilst the inferior extremity of the radius turns round the head of the ulna. The contrary movement takes place during supination. We find the first impediment to the exaggerated movements of pronation and supination in the anterior and posterior ligaments of the carpal extremity of the fore-arm; but if we understand well the movements performed by the radius and ulna, we shall find that during pronation, the radius crosses the ulna, forming with it two acute angles, contiguous by their summits, and that then the ulna, and the soft parts situated between the two bones successfully resist the further progress of the radius in that direction; Fig. 3. Pl. XV. and XVI.

The ulna is then a fixed point, around which are performed the movements of the rotation of the fore-arm; but these movements become much more extensive when the humerus adds its own to them; under these altered circumstances, the thumb may be made to describe nearly the three fourths of a circle around the axis of the fore-arm.

WRIST JOINT; RADIO-CARPAL ARTICULATION.

The inferior extremities of the bones of the fore-arm form by their union an articular cavity, whose great diameter is transverse, and which in a great measure belongs to the radius. The styloid processes of the radius and ulna increase the extent of the articular surfaces; *p*, *t*, Fig. 5. Pl. VII.

Three bones of the carpus, the scaphoid *q*, the semilunar *r*, and the pyramidal *s*, Fig. 3. articulate with the bones of the fore-arm; the two first with the radius, the last with the ulna. Ligaments placed on all sides of the joint, maintain these bones in their position, and permit extensive motions of circumduction, or universal, limited only by the tension of the ligaments, and by the presence of the styloid processes.

The carpus plays an important part in the movements of the wrist-joint; all the small bones, articulated with each other, and at the same time slightly moveable, form a medium of transition between the arm and fore-arm; they increase the extent of flexion and extension at the wrist joint, adding at once to the grace and strength of its movements.

ARTICULATIONS OF THE HAND.

(*Carpo-metacarpal, metacarpal, metacarpal-phalangean, and phalangean.*)

A minute description of all the articulations of the hand would be most fastidious to the reader. My remarks then shall be extremely brief, referring the student for further information to the osteological details already submitted to him, and to the engravings, which he will find to have been executed with the greatest care.

The first metacarpal bone, *z*, Fig. 5. Pl. VII. articulates with the trapezium, *u*, to which it is united by an orbicular capsule, 11, Fig. 5. *bis.* It may be made to move in all directions, and it determines the motion of opposition of the thumb to the other fingers, a motion peculiar to man. All the other motions of this important joint are limited by the tension of the capsule, excepting that of adduction, regulated by the other metacarpal bones. The metacarpal bones of the fingers are nearly immoveable, being strongly connected by ligaments. The forms of the articular surfaces of the phalanges and the ligaments connecting them, secure to them the requisite strength and mobility. The first phalanges rotate on the metacarpal bones, but the others move only in flexion and extension. These latter movements are checked or limited by the disposition of the articular surfaces, and by the tension of the ligaments.

COXO-FEMORAL, OR HIP JOINT.

The head of the femur *h*, Fig. 3. Pl. VIII. is received into the cotyloid cavity *g*; a fibro-cartilaginous ring attached to the border of the cavity increases the depth, and serves to maintain the head of the femur in its place. The round ligament, *i*, Fig. 3. unites the head of the femur to the bottom of the cotyloid cavity. A fibrous capsule, 8, Fig. 3. *bis.* attached on the one hand around the cotyloid cavity, and on the other to the base of the neck of the femur, envelopes the joint on all sides. On the external and superior surfaces, this ligament is of great strength; but not so internally where it is lax and thin. A fibrous fasciculus, Fig. 3. *bis.* extending from the anterior superior iliac spine, and also from the inferior spine to the inner part of the base of the neck of the femur, strengthens still further the orbicular capsule of the joint. But this ligamentary apparatus, strong though it be, is wholly unequal to the protection of the joint during violent action; its safety depends then on the vast strength of the surrounding muscles and their tendons.

The ball and socket character of the hip joint admits of motion in nearly all directions; nevertheless its movements are limited upwards by the brim of the acetabulum, and backwards, or in extension, by the direction of the ligaments. These same ligaments limit the movements of adduction when combined with flexion.

On the mechanism of a ball and socket joint, of the most admirable construction, depend the facility with which the thigh bone performs the movements of circumduction and of rotation.

KNEE JOINT: FEMORO-TIBIAL ARTICULATION.

The osseous surfaces, encrusted with cartilage, contributing towards the formation of this joint have been already described. Semi-lunar or *inter*-articular cartilages intended still further to strengthen the joint are firmly secured by ligaments to the superior surface of the tibia, Fig. 6. *ter. l. l.* They follow all the movements of the tibia.

The lateral ligaments of the knee-joint are internal and external, represented in 5, 6, Fig. 5. *bis.* and 2, 3, Fig. 6. *bis.* The rotulian ligament, and the nature of its connexion with the rotula and spine of the tibia, merit the deep attention of the artist. The rotula called also patella, in addition to the powerful rotulian ligament, and its intimate union with the tendons of the extensor muscles, has two proper ligaments, 3, 4, Fig. 5. *bis.* attached to the back part of the tuberosities of the tibia.

The posterior ligament forms two fibrous capsules, enveloping the back part of the condyles; and a middle fasciculus, 1, Fig. 6. *bis.*

The anterior crucial ligament, 3, Fig. 6. *ter.* connects the spine of the tibia to a hollow on the inner surface of the external condyle; the posterior, 4, *idem.* crossing the direction of the former, establishes similar relations between the spine of the tibia, and the outer femoral condyle. In the second part of this work, I shall describe more particularly the fatty accumulation behind the rotulian and tricipetal tendon, and its displacements during the movements of the knee-joint, modifying remarkably the outline of this important articulation.

The knee-joint is further strengthened by the surrounding tendons and aponeuroses. Its movements are those of flexion and extension, with a slight rotatory action.

The flexion of the leg on the thigh, is limited by these segments of the limb coming in contact. A careful observation of the sliding of the tibia, over the articular surfaces of the femoral condyles during flexion of the leg, will enable the artist to understand the relative changes in the position of the bones. In *passive* extension, the rotula is free and moveable in all directions, limited however within due bounds by its ligaments, so that, in point of fact, the rotula absolutely never changes its relation to the tibia beyond a limit regulated by the length of the rotulian ligament.

In active extension of the leg, that is when the extensor muscles are in full play, the patella, drawn upwards, slides over the condyles and pully of the femur; in flexion of the leg it performs the same action, inversely; in the meantime its absolute relation to the tibia is not altered in either case.

The rotatory motion is extremely limited, and is freest from within outwards.

PERONEO-TIBIAL ARTICULATIONS.

The superior and inferior articular facettes of the perone or fibula articulate with the tibia; four ligaments, two anteriorly and an equal number posteriorly, maintain these bones in contact; an inter-osseous ligament unites them nearly throughout their whole length.

TIBIO-TARSAL ARTICULATION, OR ANCLE JOINT.

The *astragalus, C,* Fig. 7. is received into a deep square-shaped cavity, formed by the lower extremity of the tibia and fibula, *a, d,* Fig. 7. these together form the ancle joint. Three external lateral ligaments proceed from the peroneal malleolus, and one from the tibial, to the calcaneum and astragalus. The external fasciculi are marked 5, Fig. 7. *bis.* and 4, Fig. 9. also 3, Fig. 9. and 6, Fig. 7. *bis.* The internal is seen at 4, Fig. 7. *bis.* The movements of the joint are those of flexion and extension, limited by the osseous margins, and by the tension of the ligamentous bands; slight lateral movements are also perceptible during the action of the joint; but these are unimportant.

TARSAL ARTICULATIONS.

The movements of the foot take place chiefly in the articulation of the astragalus and calcaneum, and in those of the first and second rows of tarsal bones. Numerous ligaments, 7, Fig. 7. *bis.*, called dorsal and interosseal, strengthen all these joints.

The astragalus and calcaneum articulate with the scaphoid and cuboid bones; several ligaments exist here, I shall merely allude to one, the inferior calceo-cuboid ligament, 1, Fig. 8. a broad ligamentous band connecting the lower surface of the calcaneum to the posterior part of the cuboid. The astragalus moves slightly on the calcaneum; the movements of adduction and abduction of the foot take place between the first and second rows of tarsal bones; whilst the general mobility of the foot is increased by the sum of all the lesser movements, originating in the other articulations of the tarsal bones.

The metatarsal bones scarcely move on the tarsal; the first is as fixed as the others.

The phalanges of the toes resemble in their movements those of the fingers, but they move much less freely: extension is the most marked movement they perform at the metacarpo-phalangeal joints. Their other movements require no special notice.

In studying the articulations of the body, the influence of the surrounding tendons, aponeuroses, and muscles, in protecting, strengthening and limiting their movements must never be lost sight of.

CHAPTER V.

ANIMAL MECHANICS.

Station is the vertical attitude of man on a solid surface.

When a perfect line, passing through the centre of gravity, falls perpendicularly on the space covered by the feet, this space is called the *base* of *sustentation.*

All parts of the body must be in equilibrium around the centre of gravity, in order that it remain in repose.

It will be readily understood that the position of the centre of gravity must be regulated by the form of the body, and the disposition of the ponderous material.

In man the centre is situated between the pubis and the sacrum ; in order than that *station* or *standing* be possible, a line, perpendicular to the soil or earth must pass through this point, and fall between the two feet.

The centre of gravity may be supported or suspended ;

ordinary standing (*station*) is an example of the first; the second happens in suspension by the arms.

To remain, then, standing and immoveable in any position, the vertical line, regulated by the centre of gravity, must always fall on the space covered by the feet, so that all parts of the body may mutually counterbalance each other.

When the line of gravity falls beyond the base of sustentation, the body inclines, and must of necessity fall, unless its equilibrium be instantly restored by muscular efforts.

By separating the feet laterally, the base of sustentation is enlarged in that sense, but it requires in this case a feeble impulse to overthrow the person: the contrary happens when the feet are placed one before the other.

In sitting, a large portion of the muscular system remains relaxed; it is a position then chosen most frequently as one of repose; in resting on the knees, the base of sustentation is much narrower than in sitting; hence to avoid the fatigue certain to arise, the body is thrown backwards, that the line of gravity may pass through the limbs nearer to the feet; thus the base of sustentation is much enlarged.

The standing erect on one foot, is a position which cannot be maintained long without great efforts, and much fatigue; but by placing the other somewhat forward and in front, so as to aid in balancing the body, the attitude becomes easy, and is frequently used, especially by women, to whom it gives a peculiar grace. These different results are caused simply by altering the direction of the line of gravity.

Wrestlers, rope-dancers, &c., understand practically the effects we now speak of and all their causes. Compare the loaded carriage, and the danger it runs of being overturned when passing over uneven ground, with the movements of man similarly situated, and observe how quickly he, or any other animal, restores the equilibrium by balancing the weight around the centre of gravity.

Pregnant women, fat over-fed men, persons carrying a weight before them, assume an upright attitude, thus counterbalancing the forward inclination. The porter carrying the load on his back, adopts the precisely reverse position.

The means by which these varying results are produced, are the muscles and their tendons; the ligaments and the aponeuroses. Muscular contraction, under the influence of the will and other agents, acting with consciousness or without, is the main spring of all these movements. The tendons connect the muscles to the bones, or passive levers of locomotion. Whilst acting, the muscular fibre contracts or shortens itself, swells, and becomes extremely hard. All muscles have antagonists, or at least antagonistic forces; when both act together with equal strength, the part remains immoveable, or moves in the diagonal of the acting forces.

In a lever, there are three things to be considered: the point of support, the power or force, and the resistance to be overcome.

There are also three kinds of levers: in the first, the point of support is placed between the force and the resistance. Of this kind, the balance is an example. In the second kind, the resistance is intermediate to the two other terms; in the lever of the third kind, the power or force is intermediate. The oar is a lever of the second kind. A large tree laid on the earth, and which it is desired to raise and place in its upright position, presents an instance of a lever of the third kind.

It is this kind of lever which most usually occurs in animal mechanics. By attaching the muscles near to the extremities of the bones, rapidity of motion is gained at the expense of force: this happens frequently in man.

The alternate action of the muscular forces, renders gentle exercise much less fatiguing than standing still: this last attitude can be maintained in man, for any length of time, only by great muscular efforts.

In physiological treatises, the student will find ample details of the whole theory of animal mechanics; it is sufficient here to call his attention to the leading facts. These are simple, and should be observed on the living model. Study the movements of the torso and the limbs during progression, observe the alternate shifting of the line of gravity from one foot to the other, the constant and careful balancing of the body, and the action of the long muscles of the back,* occupying the vertebral grooves. As the foot quits the soil to be carried forward, the muscles in the corresponding vertebral groove swell and contract, whilst those of the opposite groove are not so distinctly in action.

* Gerdy.

CHAPTER VI.

CONTOURS, EXTERNAL SURFACE OF THE SKIN, CAUSES OF FORMS, PROPORTIONS.

If artists were to view, in an isolated way, only, the particular forms which nature has modelled over all the surface of the body, the study would be dry, fastidious and unproductive. It might even happen that a hardness of style, a stiffness, with anatomical exaggerations might be the result of such a mode of study. To produce large masses, adapted to please, and rightly to represent nature, all these depressions, all these prominences must be grouped, or rather the masses themselves must first be studied and finally analysed.

For a long time, and oftener than once have attempts been made to include the body, and its various parts, within a geometrical analysis; this in my opinion is a bad system.

The figures adopted are never perfect, and for the most part serve only to lead the student into error, giving them routine habits, by inducing them to believe that it is possible to substitute, for the study of nature, the use of the rule and the compass.

It seems to me preferable to describe simply the forms of the large masses of the body as well as their contours. Viewed in front, the human frame is circumscribed by large flexuous lines of remarkable simplicity. At first there is the ovoid of the head, whose larger extremity is the highest; next the two lines of the neck, formed by the projecting sterno-mastoid muscles following the direction of these muscles from behind forwards, and from above downwards, and from without inwards; next come the superior margins of the trapezii muscles, the direction of which is downwards and outwards, becoming rounded towards the shoulders, followed by the contours of the deltoid muscles, thus forming a curve descending to about the middle of the arm. The upper extremity is limited in its two margins or sides by two extended slightly flexuous lines, almost parallel at the upper part, widening below the elbow to follow the swelling of the fore-arm, and after again approaching each other towards the wrist, separating once more to form the appendages of the hand. If we follow the contours of the torso, we shall find them limited by two lines, proceeding from the armpits, and directed obliquely from above downwards as far as the level of the last ribs, then proceeding in an opposite sense to the iliac crests, where the profile of the thigh commences.

In its general form, the thigh resembles a reversed cone, but of the two lines limiting this cone, the one starts from the iliac crest, proceeding at first outwards, and begins to descend inwards only when it has reached the level of the pubis, where the inner line commences: at the knee a slight swelling marks the articulation of the extremities of the bones, and the two lines separate speedily to circumscribe the calf of the leg; approaching again until within a short distance of the malleoli, they separate once more, becoming rounded as they pass over the instep; finally disappearing behind the foot by the fore-part of which they are entirely concealed.

The outline of the body is quite as simple when looked at in profile. First, there is the ovoid of the head elongated from behind forwards, rounded and enlarged above and behind; prominent below and forwards where it forms the chin; next comes the neck, the anterior line of which is elevated over the larynx, and continued as far as the upper part of the chest by the lower end of the sterno-mastoid muscles. The posterior line of the neck, longer than the anterior by a half, commences at the occiput, on a level with the mastoid process, curves greatly backwards, and is prolonged as far as the spine of the scapula.

An ample curve or arch, with the convexity anteriorly extending from the sternal extremity of the sterno-mastoid muscles as far as the pubis, limits the trunk anteriorly. Behind, a curved line arises at the spine of the scapula, and terminates below the inferior angle of the same bone, bending forwards as it descends to the level of the umbilicus; from this point it curves rapidly backwards to form the prominence of the hips. Whether viewed in profile or in front, the thigh is conical, its posterior limit may be traced from the hip to below the knee; anteriorly the crural line, convex forwards, commences at the superior iliac spine; and terminates below the knee, a little higher than the posterior line. The profile of the knee is designed by an interrupted line, at first oblique from above downwards, and from behind forwards, then vertical, and finally oblique from above downwards, and from before backwards. To the projection caused by the rotula, succeeds the tibial curve, convex anteriorly, and continuous below with the curve of the back of the foot, and terminating almost horizontally over the toes.

Behind, another line with a marked convexity defines the prominence of the calf of the leg, and the marked outline of the tendon Achilles; it next passes over the heel, and is continued almost horizontally to the extremity of the toes. If we examine the inner part of the foot, this line will be found to be no longer horizontal, but curved with the concavity downwards, terminated by a horizontal line forwards, as far as to a level with the base of the great toe.

In this description of the contours of the body, I have had simply in view, the attracting the attention of students to the elements of the general form; so soon as they can pourtray the body by these great forms, let them proceed to details. In following this plan, I merely imitate the sculptor, who gives to the block of marble its great outlines before he occupies himself with that minute chisselling on which must ultimately depend the beauties of his work. The treatise I am engaged in is not one of design, but of forms.

Some remarks on the colour of the skin may follow, naturally, the description of the contours. The projections, the depressions, the folds, the furrows spread over all the integumentary envelope, play an important part in the production of the tints or colouring of the surface. The skin is not of a uniform colour, but varies in the different regions, a difference often due to an accidental condition of the cutaneous tissue. Fine and velvet-like white and rosy, the skin of children presents scarcely any other folds saving those of the joints, all the more marked that the fat is abundant. In woman the skin preserves nearly the same delicacy, but the folds harmonize; they are no longer edged by a sort of rings or rounded swellings, the hair shades certain parts, the papillary folds, and those produced by the movements of the body and limbs, become more strongly marked; these appearances destroy the uniformity of the surfaces, producing a play of lights and of coloration, at times the richest possible. But it is in the adult, above all, that the external covering or envelope must be studied. The development of the hair is remarkable in some persons, and especially in the brown or dark complexioned. The beard gives to the human face a character of strength, energy, power, which we in vain look for in other animals, denoting his superiority above all. Several other regions of the body, besides the head and face, are also covered with hair, as the chest, the abdomen, the pubis, the external parts of the upper extremities, the thighs and legs; and occasionally the hair so abounds, as give to man a sort of covering as if to lower his pride, forcing him to recollect that he owes his superiority only to his intelligence.

Folds of different kinds furrow the adult skin: when caused by muscular contractions, they are perpendicular to the muscles themselves, and cross their direction. The fleeting folds of the forehead, of the external angle of the eyelids, of the cheeks, of the mouth, belong to this category. To the second, belong the folds observable on a level with all the articulations, and wherever the movements take place uniformly in one direction, as may be seen in the palm of the hand. These folds are effaced during extension or flexion, when the joints form prominent angles, as at the elbow, the knee, the phalanges, &c.

The skin becomes tense occasionally over the articulations; on such occasions the capillary vessels empty themselves, and the integument becomes blanched, recovering its original colouring and folds, so soon as the limb is abandoned to itself.

Under the third and last category, we shall place the papillary folds or wrinkles seen on the soles of the feet, the palms of the hand, and on the fingers.

To the prime of life, to the energies of adult age, succeed quickly, feebleness, inactivity, and the languor of old age; then man becomes stripped of all those gifts of which he was so proud. The hair of the head gets daily more scanty; if it remain at all it whitens, as if to advertise him of his approaching end; wrinkles once fleeting, now become permanent; the subcutaneous fat, so called from being placed immediately under the skin, disappears in part, and the integumentary covering of the body having lost its contractility cannot now return on itself, but remains folded and pendulous, acquiring at the same time an earthy and unpleasing white colour, as if to harmonize with its last dwelling.

Unquestionably the artist cannot represent all those wrinkles and folds of skin, but he must endeavour to give the effect of the coloration which they produce, their study then must be simultaneous with that of forms.

The skin presents also varieties in tint, produced by other causes; it is white and smooth on the forehead, nose, chin, neck, &c.; coloured on the cheeks, lips, palms; and generally browned on the abdomen, and back part of the thighs; as also on the neck, especially when exposed to atmospheric influences; browner on the outer than on the inner side of the limbs, and more especially on the back of the hands; smooth in certain regions, as on the neck, breast, back, abdomen, anterior surface of the arms and inner surface of the lower extremities; somewhat rough and studded with papillary projections on the back of the arms and external side of the thighs and hips. The rugous or rough surfaces, scarcely reflecting the light, have a flat and more solid tone than the smooth parts, to which a luminous reflexion gives greater brilliancy, and a sort of remarkable transparency, especially in woman.

The influence of the professions and of the social position of individuals, strongly affects the integument.

The rich, brought up in indolence without a due cultivation of their intellectual faculties, have a skin generally of a splendid whiteness; or if nature has given them the brown and voluptuous tint of the southern populations, the skin in that case is smooth and polished, and premature wrinkles appear only under the influence of passions or debauchery.

Men engaged in intellectual labours, may be distinguished from the idle, by the wrinkles which early mark the forehead, and which extend soon to other parts of the face: the colouring of the cheeks disappears, and often before a third of their existence has been passed, the hair falls, or rapidly whitens. Acute passions, violent chagrins, incurable remorse, all the physical and moral sufferings produce the same results.

Shut up in an obscure prison-house, the prisoner becomes pale, and the skin assumes almost an Albino tint; condemned to the rude labours of the field, the peasant becomes bronzed wherever exposed to the influence of the sun. If deep furrows mark his forehead, they are seldom premature. His hands become fissured and bent, from their daily contact with the soil; and the handling the instruments of labour, gives to the palm the hardness of horn. Look for example at the working bakers. Are they men or ghosts? That crisp and colourless skin, those hoary locks, they owe to their sad profession.

After having studied the integumentary covering of man, let us endeavour now to render an account of the origin, of the cause of forms.

The different parts, hard or soft, covered by the skin occupying different planes, and not forming a smooth and continuous surface throughout, must of necessity shew themselves on the exterior by eminences and depressions more or less marked. This in fact takes place, but these different parts are not always immediately subjacent to the skin; cellular tissue and aponeuroses constantly separate them; their forms then are modified, softened by intermediate layers. Moreover, were the skin merely stretched over the muscles and bones, that were sufficient to alter the forms, because the integuments do not dip into all the depressions on the surface, occasionally of considerable depth, and its thickness suffices to efface certain details and amplify others. Observe carefully the difference between the *écorchée*, the dead body deprived of its integuments, cellular tissue and aponeuroses, and the same body clothed as it naturally is with all these structures! What has led artists in fact to the exaggeration of form (muscular form), but the isolated study of the muscles, forgetting the cellular tissue and the integuments. The Italian artists who succeeded Michael Angelo, desirous of imitating the style of their great master, fell almost all into this exaggeration. A perfect knowledge of the *écorchée* is not sufficient of itself; it may lead even into error if so considered—that is, if studied apart; all the elements of form must be studied together, and for these reasons, we have always represented, side by side with the bones and muscles, the limbs covered by their integuments.

The depressions observable on the surface of the body correspond generally to bones or to ligamentous parts; almost all the prominences are produced by muscles. The cause of this is simple enough: the muscles are attached to bones either in order to their being put in action, or as a point of support; the same bones then give attachments to several muscles, and these fleshy masses necessarily form reliefs around the free osseous portions. It is the same with the ligamentous portions and the aponeuroses to which the muscles happen to be attached. During the muscular contractions, the depressions deepen in the ratio of the strength and size of the muscle; but when muscles terminate by slender and elongated tendons, the bones under these circumstances give rise to prominences, and osseous forms may be seen side by side with the tendinous cord. The following examples are intended to explain these views.

The hollow existing throughout the length of the sternum is caused by the prominences of the muscles attached on either side the median line to the bone itself. This median or mesial furrow is continued downwards on the abdomen, indicating the limits of the abdominal muscles which proceed to be attached to the common aponeuroses. The deep hollow line of the back, and half flattened surface of the inferior and posterior part of the arm, the depression of the iliac crest, that surmounting the knee, those of the calf of the leg, &c., are so many examples of this arrangement. The articular prominences of the fingers, those of the wrist, of the rotula, of the malleoli, &c., are not effaced nor converted into depressions during the action of the muscles, being situated in the neighbourhood of flat or elongated tendons.

Certain forms undergo scarcely any change during the movements of the body; others, on the contrary, assume an entirely new appearance. I shall name the first, constant forms; the second, variable. Thus the cranial protuberances of the frontal bone, the median furrow of the chest, the projections of the collar bones, the vertical hollow of the back, those depending on the iliac crests in fleshy persons, the tibial crest, the malleolar eminences, and that of the heel, are constant forms, whilst all muscular prominences undergo very evident modifications during the contraction of the muscles on which such swellings depend. It is then most important to acquire a perfect knowledge of the constant forms, seeing that they serve in some measure as guides for the reproduction of those ever varying forms in their neighbourhood. I shall conclude this chapter by an exposition of the different systems proposed for the measurement of the human body, intended also to establish those relations which exist between the dimensions of its different parts. Of all those methods that of Jean Cousin, in despite of its defects, seems to me the best. I have myself made many efforts to discover a better, but without success, and it is my firm belief, that no method superior to that of Cousin will ever be invented.

According to Diodorus, the Sicilian, the Egyptians divided the whole length of the human body into twenty-one parts;* but I have been unable to discover whether this division had a reference to anatomy or to statuary. Polycletus endeavoured to reduce the variable proportions to a common type: he formed a statue representing a man in an upright attitude, bearing a lance. This statue has been ever since known by the name of the *Canon* of *Polycletus*. At all times endeavours have been made to determine as exactly as possible the proportions of the body, and it were easy for me to cite more than thirty authors who have written on this subject at different epochs. But as such a display of a literature without utility could not benefit the artist, I shall limit my observations to the making him acquainted with the systems most in use, and best calculated to assist his views.

In the first place, I frankly admit that I have been unable to comprehend the method of Albert Durer;† his is a curious book, more interesting to book collectors than to artists. The work of Gerard Andran‡ is

* V. Fr. Junius, lib. 3. ch. ii. § 11.

† The Four Books of Albert Durer, painter and excellent geometrician, &c. Translated by Loys Meigrel, of Lyons, from the Latin tongue into French. Amhen, 1613.

‡ The Proportions of the Human Body, measured on the finest figures of Antiquity, folio, 1683.

much clearer. This engraver studied the proportions of some antique statues, but his work wants method, and he gives no positive rules, measuring merely the statues, but without drawing any conclusions from his researches. After he has told you that the head is divided into four parts, each part into twelve minutes, and these again into the half, third, and fourth of a minute; after he has drawn some handsome figures, and measured them from the crown of the head to the sole of the foot, he has nothing more to teach you, and leaves you all to do. Is there, in fact, great merit in revealing to you, that the Laocoon measures seven heads, two parts, three minutes in height; the Farnese Hercules, seven heads, three parts, seven minutes; the Antinous seven heads, two parts, &c.? Gerard Andran was then a mere measurer of statues, and gave to the artist no useful proportional rule.

Jean Cousin's work* is conceived in quite another spirit. If he has given us at the end of his work, the proportions of some antique figures, it is after having taught the general rules of these proportions; it is after having discovered measures applicable to every kind that he then made the individual applications; this system, therefore, has prevailed. The principles of Jean Cousin are generally followed in the schools.

I shall transcribe exactly then the system of Jean Cousin, following, however, another arrangement. The

* The Art of Design, by Master Jean Cousin, small oblong 4to. April 25, 1685.

author commences by the proportions of the different parts of the face: I shall give first the general proportions of the body.

The height of the body is eight heads;* this division is made in the following way:

	HEAD
From the summit of the head to the lower part of the chin.	1
,, ,, inferior part of the chin to the nipple .	1
,, ,, nipple to the navel . . .	1
,, ,, navel to the genitals . . .	1
,, ,, genitals to the middle part of the thigh	1
,, ,, middle of the thigh to the knee .	1
,, ,, knee to below the calf . . .	1
,, below the calf to the heel† . . .	1

He divides the head into four equal parts.

* When the arms are fully extended, eight heads measure the space between the extremity of the middle finger of one hand and that of the other. Variety of height in man depends chiefly on the varying proportions of the limbs.

† J. Cousin gives the length of the trunk apart. Anteriorly, the trunk has three heads from the shoulders to the genital parts; from the shoulders to the nipple, one head; from the nipple to the navel, one head; from the navel to the genitals, one head. Behind, from the shoulders to the inferior angle of the scapula, one head; from this angle to the haunches, one head; from the haunches to the buttocks, one head.

	PART
From the summit of the head to the setting on of the hair or commencement of the hairy scalp	1
„ „ commencement of the hair to the root of the nose	1
The nose :	
From the lower part of the nose to the inferior part of the chin . . .	1

A fifth part comprises the length of the neck, as far as the supra-sternal fossette or cavity.

	HEAD
From the shoulder joint to that of the wrist .	2
„ „ wrist joint to the extremity of the middle finger	1
„ „ genital parts to the sole of the foot .	4

The hands are as long as the face, and are divided into three lengths of the nose, with an additional length for the wrist. The first finger should terminate on a level with the middle part of the last phalanx of the middle finger; the third finger should extend to the upper third of this same phalanx; the little finger to the last joint of the ring finger, and the thumb to the first joint of the index.

The length of the foot, seen in profile, is four times the length of the nose, or one head.* It is divided into

* Although Jean Cousin measures always by the length of the

three parts, equal to the diameter of the lower part of the leg. From the instep to the metacarpo-phalangean articulation of the great toe, we reckon one part two thirds. The foot being equal to four parts, the little toe commences at the last third of the third part, and does not extend beyond the half of the phalanx of the great toe. The succeeding toes increase progressively by the length of the nail.

Such are the proportions of length indicated by Jean Cousin ; let us now examine his method of measuring the breadth and thickness of the body.

He divides the line passing before the eyes into five equal parts ; the eyes occupy the second and the fourth ; the nose the third.

The eye itself he divides into three parts, the middle one of which comprises the transparent cornea ; the aperture of the eyelids is equal to one of these parts.

On the middle of the third line dividing the height of the face, the nose occupies a space equal to the size of the eye ; viewed in profile, it is narrower by a fourth ; the length of the nostrils equals the half of the breadth of the nose. The mouth should measure the length of the eye and one half ; the height or depth of the upper lip equals the eighth of its length ; that of the lower, a fifth.*

nose, I shall generally employ the expression, *part,* since the nose is equal to *one part* of the head.

* Some measures of height and length occur here which I could not readily separate from those of breadth or width.

The ear extends from the line of the eyes to that of the nose; it is not so broad by a half.

In front, the neck viewed from the height of the nasal line, measures half a head in breadth; but on a level with the supra-sternal fossette it is as wide again; at the commencement of the shoulders, the width of the neck equals a half of the five parts into which the length of the head and neck may be divided.

From one shoulder to the other we reckon two heads; the diameter of the haunches on a line with the navel, as well as the width between the trochanters, measures six parts.

Viewed in profile, we find five parts (noses), from the shoulder to the nipple; to the line of the navel, one head; to beneath the buttock, five and a half parts.

Anteriorly and at the elbow, the arm measures in breadth a third of a head; one part at the wrist, and three fourths of a part at the articulation. Externally and internally, the thickness of the arm equals two parts towards the shoulders, and one part two thirds at the elbow; a third of a head below the bend of the elbow,* and one part at the wrist.†

The transverse diameter of the thigh, measured on a

* Jean Cousin has no doubt committed an involuntary error, when he says that the arm at this point measures three parts of a head; it is perhaps merely the error of the press.

† The author (Cousin) divides the wrist transversely into four equal parts, and gives but three to the same part viewed in profile.

level with the genitals, equals three parts; in the middle of the thigh the same diameter measures two parts two thirds in breadth; the leg, on a level with the calf, gives two parts one fourth; under the calf, one part three fourths; under the ankle, one part.

On the inner as well as outer side, the upper part of the thigh measures three parts one fourth; in the middle, three parts; the knee, the calf of the leg, and the part below the calf, have the same diameters as in front, and the part situated above the ankle measures in breadth a third of a head.

Anteriorly, the diameter of the anterior part of the foot equals one part two thirds; it is usual to divide this diameter into three equal parts; the first comprises the great toe; the second, the two following toes; and the third, the two last.

Behind the lower part of the leg, the part above the ankle, and the back part of the foot measure each one part in breadth.

Viewed in profile, we find one part and a half from the sole of the foot to the instep towards the junction of the foot with the leg.

The great divisions are the same for woman as for man, but from one shoulder to the other six parts only are reckoned in her, and five parts at the waist or girdle; the diameter of the haunches equals two heads.

In profile, the antero-posterior diameter of the trunk on a level with the bosom and the haunches equals five parts; at the waist, one head; the thigh, below the buttocks, also measures one head. The knee has the same diameter as the neck, or one part five sixths. The wrist and the leg above the ankle, measure in breadth, one half the neck.

Jean Cousin recommends the artist to give to the stature of woman, one part less than to that of man.

The child has five parts of woman, or five heads in height; three from the summit of the cranium to the genitals; and two for the lower extremities. The navel is placed three parts and a half of a head below the nipple, and the inferior fold of the belly, half a head below the navel. The foot measures the distance between the commencement of the hairy scalp and the mouth, or two parts one third of a head. The length of the hand is two parts and a half. The diameter of the shoulders and waist are equal, being each one head.

Viewed in profile, we reckon four parts and a half to the waist, one head to the haunches, three parts of a head to the arm-pits. The upper part of the thigh, viewed in front, has a diameter of a *third of two heads* (I copy Jean Cousin), and when seen in profile, three parts and a half of a head. The knee measures two fifths of a head; the leg, above the ankle bone (cheville), is as broad as the half of the neck. The fore or anterior part of the foot is as broad as the knee. The wrist measures in breadth the fifth part of a head.*

M. Gerdy has modified, or rather completed this

* These proportions are those of a child about three years old. From three to four years, the entire height is five heads and a half; from eight to nine, six heads; from twelve to fifteen, six heads and a half; from fifteen to seventeen, seven heads.

system of proportions. Regretting that I am unable to find a place for the entire chapter containing the results of his researches, I cannot however refrain from offering to the reader a *resumé*.*

" The height of the body being divided into eight equal parts, the first comprises the head, the second extends to the nipple, the third to the navel, the fourth to the genitals, the fifth to the middle of the thigh, the sixth to below the knee, the seventh to the middle of the leg, and the eighth to the sole of the foot.

" M. Gerdy divides the whole length or height of the head into four equal parts: namely, the summit covered with hair, the forehead, the nose, the mouth and chin. These regions, or parts, serve as comparative measures for the other portions of the body, and he, therefore, calls them *parts*.

" The head measures three parts in breadth, four in thickness. The middle of the line of thickness is for the head, immediately in front of the ear.

" The face measures three parts in height, two and a half in breadth.

" The neck measures one part, that is to say, it is a third less in breadth than the head, and not so thick by two parts.

" The chest measures five parts in breadth under the bosom, six under the arm-pits, and consequently in its widest part three more than the head. It measures five parts in thickness on a level with the shoulders, and

† Anatomie des Formes extérieures du Corps humain, &c. par P. N. Gerdy, p. 318.

four and a half below, consequently, one more than the head.

" The abdomen measures five parts in breadth on a level with the fold of the flane, and about four in thickness on a level with the navel.

" The pelvis is from four to five parts in height, from the haunch to the fold of the buttock; the haunches measure six in breadth, and consequently equal the chest under the arm-pits; on a line with the pubis, the thickness varies from four to five, and are therefore still equal to the chest.

" The upper extremity has a length of five parts to the elbow, four to the part immediately above the wrist, and four to the end of the fingers.

" The arm measures one part and a half in breadth, and two in thickness; the fore-arm one and a half in thickness, and two in breadth; in breadth, the hand measures two parts.

" The lower extremity has three parts in the thickness and breadth of the thigh; one and a half below the knee, two at least at the calf of the leg; the foot measures four in length."

M. de Montabert, in his great work on design, endeavours to simplify the metrical notions of his predecessors.* A want of space compels me to limit my account of this new system, to a mere transcription of the mode of dividing the stature, or height of the body.

M. de Montabert, like those who preceded him,

* Traité de la Peinture, vol. v.

divides the head into four parts; the full height of man he divides into one hundred equal parts; the pubis corresponds to the centre, or fiftieth division. The different regions of the body are measured as follows, proceeding from above downwards.

	CENTIMETERS
From the sole of the foot to the centre of the malleolus internus	5
" " to below the gemelli	15
" " to the middle of the rotula	28
" " to the highest part of the iliac crest	56
" " to the navel	$58\frac{3}{4}$
" " to the highest part of the arch of the ribs under the xiphoid cartilage	69
" " to the nipples	72
" " to the fold of the axilla or arm-pit	75
" " to the fossette of the neck	$81\frac{1}{2}$
" " to the top of the shoulders, on a level with the acromion	$81\frac{1}{2}$
" " to the middle of the protuberance of the neck towards the section of the shoulders over the neck	84
Length of the neck	5
From the sole to the end of the nose	90
" " summit of the head	100
Height of the foot at the top of the arch	$3\frac{1}{2}$

	CENTIMETERS
Length of the arm from the acromion to the bend of the elbow . .	19
,, ,, arm from the acromion to the extremities of the fingers .	43
,, ,, hand, one face or . . .	10
,, ,, medius finger . . .	$4\frac{1}{2}$
,, ,, head	$13\frac{1}{4}$

From the preceding table may be comprehended the system of M. de Montabert. Its division into centimeters or hundredths seems open to all the objections which have been made to others, with this additional one, that it forces the artist to make for each subject a new division, whilst in the older method, each model contains within itself its scale of proportion, or the terms of comparison.

In conclusion, the metrical method of Jean Cousin is at once the simplest, the most convenient, and the most natural; and if it possess not always extreme exactness, allowances must be made for individual varieties; nature's caprices as regards human conformation must also be considered and admitted.

END OF PART I.

PART II.

CHAPTER VII.

PRELIMINARY REMARKS.

How comes it that we experience a painful sensation when contemplating certain pictures, even though executed with the most scrupulous exactness? Everything has been copied after nature; the most experienced eye can discover no omission, the slightest error in form; and yet we remain cold, unexcited in presence of this work, or even perhaps affected with a painful, inexplicable feeling; it is this; the artist, wholly occupied with the material execution, has forgotten the ingenious fiction of the ancients, that Galathea of marble, which quivered and became animated by the warm caresses of the sculptor Pygmalion. Hopeless will be the efforts of the student to reach the rank of the great masters should he forget the study, the profound study of expression, and of the animated form. Ceaselessly may he spread colours over the canvass; ceaselessly may he hew the marble; ending always in the same results; a representation of inanimate nature; a figure without life.

The *chefs-d'œuvres* of the great masters are frequently the result of inspiration; but what could they have done, had not the philosophic study of man unfolded to them the mysteries of his organization, and the numerous sensations affecting him? Overcome by the depth of their thoughts, but unable to translate them, fatigued by their unavailing efforts, they must have abandoned their unfinished work, rather than be the authors of pale, cold, imitations of nature. How many youth there are, who covetous of renown, are eager to submit to public criticism their first essays, before they have acquired the least idea of anatomy and physiology, these real bridles to disordered imaginations!

First, a study of the Forms, next of the Movements and Expression; this is the course to follow in analysing man, and in recomposing his figure by artistic means.

The exterior forms of the human body are produced by prominences and depressions of the sub-cutaneous parts, viewed separately or taken as a whole. These forms, distinctly enough marked in some persons, are scarcely visible in others; but it may be held as a rule by the artist, that they are much less distinct than is generally believed, even when the muscular system is powerfully developed; that they may be modelled distinctly, it is necessary that the body enter into action, and that the different parts composing it, move on each other. The ordinary movements scarcely affect or modify the exterior; appreciable changes, bold reliefs, profound depressions display themselves only during energetic efforts. Although for example all the muscular powers contribute in the support of the body when standing, and that every individual movement, however gentle, requires the combined action of a great number of muscles, so perfect is the arrangement of the forces and the levers, the resistance yields so punctually to the slightest contractions of these muscular powers, that their displacement is effected without exacting any great muscular efforts. Thus, in moving the thigh, the arm, the foot, or hand, in the habitual and ordinary actions of life, the contractions of the muscles by which all this is effected, is seen with difficulty. But in fierce struggles to overcome an enemy, or any strong physical resistance, then the contractions become more energetic, the muscular fasciculi small, and are crowded as it were together, and their powerful action may easily be traced in the bold reliefs they form under the integuments.

The conscientious artist ought scrupulously to avoid any tendency to exaggerate the superficial forms of the body; nothing is more simple, more calm; nothing shews a grander breadth of design than the human body; the muscles assist by their re-union in the production of the general forms; the special forms are scarcely visible.

The whole object of artistic anatomy is completely misunderstood by those artists who represent living man, with the angular forms of the dead dissected body of the anatomical schools; the cellular tissue and the integuments play a part sufficiently important to merit also the attention of the artist.

In my description of the forms and of their producing causes, I have avoided as much as possible all mention of the deep muscles, nor do I think that I shall be blamed for this. The plates of this work represent only the superficial muscular layer, because it suffices for the explanation of almost all the forms. It will, I know, be objected that it is impossible to offer a satisfactory theory of the movements of animals or of man, without a description of each particular muscle, be it superficial or be it profound, inasmuch as all contribute their share in producing motion. But a treatise on the anatomy of forms is not a treatise on physiology, and provided the artist be enabled by the treatise now presented to him, clearly to comprehend the chief results of muscular actions, this work may be considered as fulfilling its engagements much better than if it had contained the minute description of the three hundred and sixty-eight or four hundred muscles, and their so varied actions. Is it not a fact, moreover, that the superficial muscles are almost always the more powerful, and play the principal part in the movements of the body? Do they not give rise to the more remarkable movements? Any notice taken then of the deeper layers of muscles is merely exceptional to my general plan, and caused by special reasons: such, for example, as the prominent swelling produced underneath the trapezius by the action of the supra-spinetus muscle during elevation of the arm, a muscle at other times not visible, being completely concealed by the trapezius.

A more formidable objection may be made to my work, in its not including a more detailed history of the aponeuroses and muscular sheaths; but the detailed description of these aponeuroses, of their insertions and replications is long and fastidious. Rightly to understand these details, it would require on the part of the students the most assiduous dissections. Now the main object of this work, is to enable the artist to avoid the repulsive labours of the dissecting room. To those whom a noble ambition leads to the study of nature, and to profound anatomical and physiological studies, I say frankly, a treatise on forms is not necessary. But how few there are equal to such studies!

In despite of these considerations, a certain degree of doubt still induced me to hesitate and to reconsider my decision in respect of a detailed description of the aponeuroses. I consulted thereon, painters and sculptors; from them I learned that it sufficed to know the general arrangement of the aponeuroses; that the muscles were held in their respective positions by unyielding sheaths; that the whole body itself was enclosed in a similar envelope, transmitting to all parts inter-muscular partitions, constituting special sheaths; none seemed to think it requisite to be acquainted with the particular disposition and direction of the aponeurotic sheaths, sufficiently indicated, as they thought, by the muscles themselves, to which they are so exactly applied. For these reasons, I resolved on excluding from this work a detailed description of the aponeuroses, already done justice to by Mr. Gerdy.

The attitude of the model represented in the plates of this work, I have thought the best to display all the parts of the body. The arm is supported to prevent the dorsal aspect of the hand and fore-arm from becoming anterior, and the palmar aspect posterior. Although a very natural position, anatomists have not adopted it; with them, the dorsal aspect of the fore-arm and hand is the posterior; the palmar is the anterior aspect.

The arrangement adopted in the plates, is also an economical one; it enables us to represent two movements of the limb, without multiplying the plates.

It has not been judged necessary to describe minutely all the new forms produced by locomotion; this attempt would have led to an immense and useless iconographic work, seeing that the model must always be referred to; the principal modifications of form then have alone been attempted. The superficial muscles being once well known, will enable the artist easily to analyse their diverse actions on the model. I have also thought it best to give the explanatory text of the muscular attachments in the atlas.

I cannot too strongly recommend to the artist, a careful re-perusal of Chapter IV. of the First Part of the work, before studying the modifications produced by motion, a thorough knowledge of the articulations is essential to him. Every muscle when acting must have a fixed point to act from; hence the necessity for the action of other muscles to fix that point. The surrounding muscular regions take a share in the movements. The muscle which bends the limb on the trunk may with equal ease bend the trunk on the limb: the principal form will be the same in both cases, but there will arise remarkable changes in the surrounding regions.

In a word, the study of forms, and the changes they undergo by muscular contractions, require on the part of the artist, the utmost attention and assiduity.

CHAPTER VIII.

FORMS PRODUCED BY THE SKELETON.

The bones composing the skeleton, play an important part in the production of forms; over nearly all the regions of the body, depressions and prominences dependent on the bones are met with, a knowledge of which is essential prior to a study of those produced by the other parts, because the osseous forms are constant, or at least undergo but slight modifications during motion, and they moreover serve as land marks to the student.

The configuration in fact of the bones cannot be altered like that of the soft parts, continually modified by a multitude of causes, such as contraction, distension, change of direction, &c. The movements of bones in no way change their proper forms, and when we see a bony projection become changed into a depression, and *vice versâ,* we look for the cause, not in the bone itself, but in the surrounding parts. It is also to be observed that the extremity of a bone, will always occupy the same position relatively to the bone of which it forms a part; only it will produce, as I have just said, sometimes a projection, sometimes a depression, according to the position or the movement of the limb. Take for example, the form caused by the olecranon of the cubit.

When the fore-arm is stretched on the arm, the situation of this process is marked by a depression; but bend the limb, and the cavity is transformed into a marked projection; nevertheless the projection and the depression will under all circumstances be situated at the same distance from the lower end of the cubit.

This unvarying relation of the different parts of the bones to each other offers us the means of determining the length of the upper and lower limbs.

When the arm is extended by the side of the body, the lower end of the humerus, or rather the inner condyle of that bone, corresponds to the middle portion of the space between the last rib and the iliac crest. The styloid processes of the cubit and of the radius descend to the level of the sciatic tuberosity, a little below the great trochanter. The lower end of the middle finger, in this position of the arm, reaches to the middle of the femur.

The length of the thigh, measured from the trochanter to the inner tuberosity of the thigh bone, is nearly equal to that of the arm, and of the upper third of the fore-arm, taking the measurement from the projection of the acromion; from the inferior angle of the knee-cap, to the extremity of the outer malleolus, is nearly of the same length; the distance between the malleoli measures the space which separates this point from the lower portion of the heel. Keeping always to the osseous forms, we find that the length of the thigh, from the anterior and superior iliac spine, as far as the centre of the rotula, is equal to that of the trunk from the supra-sternal cavity to the pubis; it is also equal to that of the leg, measured from the centre of the rotula to the sole of the foot.

The bones of the head deserve the first consideration in respect of forms. Above, they determine the configuration of the cranium, of its superior ovoid, of the frontal projections, of the orbitar and superciliary ridges; the curved temporal line, the mastoid eminence, the parietal protuberances, also the occipital, belong all to the skeleton. Covered by the muscular and the fatty tissue, the bones of the face influence its form greatly; the direction of the nose depends especially on its proper bones, and on the ascending processes of the superior maxillary bones. The inferior arch of the orbit, the malar projection, the zygomatic and angular processes of the lower jaw bone, and that of the chin, are almost exclusively formed by the skeleton. The maxillary bones, with their double row of teeth, support the lips. In a word, the fine proportions of the head, and all the varieties of form characterising the different races of men, belong to the skeleton.

In the neck, the osseous forms disappear entirely;

here all conspires to favour motion; to the mobility of the cervical column, massive bones would have proved an obstacle; numerous muscles and the important organs which here surround the vertebræ, conceal those slender forms, whose asperities must otherwise have injured the harmony of this fine flexible column. But let us continue our analysis, and we shall see the bones resume all their importance. Hollowed out in the median line of the chest, and terminated above by the supra-sternal cavity, the groove of the breast bone terminates below in the xiphoid cavity; laterally and above, the collar bones produce two sigmoid prominences below which may be traced in thin or aged persons, the two oblique projections of the costo-cartilaginous joints. Anteriorly and below, the chest has for its limits the cartilages of the false ribs, which may be traced externally by a long convex prominence, proceeding downwards and outwards from the xiphoid hollow.

Behind, the torso presents a large vertical furrow or groove, in the bottom of which may sometimes be seen, especially in thin persons, the spinous processes of the vertebræ; more particularly in the region of the neck. The projections formed by the inner margin, inferior angle, spine of the scapula, and by the continuation of the ribs, complete the osseous forms of the chest.

In the lower part of the trunk we have the pubic projection; somewhat more outwards, the anterior and superior iliac spine; laterally and behind, a furrow usually marks the situation of the iliac crest. This furrow commences at the spine of the ilium, becoming gradually effaced after describing a curve, whose convexity is upwards.

The osteography of the limbs is unquestionably of the most importance to the artist; on the form, and especially on the direction of the bones, depend those of the limbs, whose articulations with the trunk it will be found impossible rightly to understand without an attentive study of their particular forms. In examining the shoulder, we remark first, the acronio-clavicular prominence, then the rounded eminence produced by the head of the humerus elevating the deltoid muscle. The articulation of the arm with the fore-arm presents anteriorly no osseous forms; but posteriorly there is the olecranian prominence, the cubital fossette, and the radio-humeral depression. On the radial side of the joint may be observed the external condyle of the humerus, and on the cubital side, the well marked projection of the inner condyle of the same bone.

At the upper and posterior part, and towards the inner edge of the fore-arm, there is a furrow, following the direction of the olecranon process: it corresponds to the posterior margin of the ulna.

On the external side of the wrist arise two small eminences, the one formed by the metacarpal bone of the thumb, the other by the lower end of the radius and its styloid process; on the inner side the process of the cubit is prominent. Behind may be seen the cubital and radial projections, and in front those of the pisiform and scaphoid bones.

The five metacarpal bones are seen on the back of the hand only in thin persons, and even then it is easier to distinguish the tendinous cords of the extensor muscles.

Finally, I may notice the phalangean and metacarpo-phalangean articulations, as indicated by little depressions in a fat or plump hand.

In the lower extremity is seen the prominences of the haunch and of the knee, formed by the great trochanter and by the rotula; lower down is the spine of the tibia, then the head of the fibula, and inwards, the internal condyles of the femur and the tibia.

The osseous forms of the leg are produced internally by the anterior and internal surface of the tibia; outwards and downwards by the fibula. The peroneal and tibial malleoli limit outwards and inwards the ankle joint.

The bones of the foot which give rise to prominences, are inferiorly the heel bone and the heads of the metatarsal bones; on the inner side, the scaphoid and the articulation of the large toe; externally, the posterior extremity of the fifth metatarsal bone; behind, the heel bone, and in front the articulation of the toes.

All these osseous forms being described in detail in the following chapters, I have but indicated here the place they occupy, and the bones which produce them: so soon as the student shall be able easily to recognise their situation, let him then study their details, passing afterwards to the consideration of the other surrounding forms.

CHAPTER IX.

EXTERNAL FORMS OF THE HEAD.

ANATOMISTS divide the head into cranium and face; but this division, so suitable to the anatomist, complicates uselessly to the artist the study of forms.

How can we separate the forehead from the face, of which it is one of the most beautiful ornaments? How indicate distinctly the limits of these two regions, without entering on anatomical details, a knowledge of which is not indispensable to the artist? Let us avoid by all means mutilating the model, by arbitrary divisions, whose least defect is to augment the aridity of the description.

The head has a spheroidal form, which it always preserves, whatever be the region examined; superiorly, forwards, laterally, and at the base, the spheroid is more or less flattened. The volume of the head varies according to the age, and in individuals of the same race; rigorously to establish its general proportions is then impossible.

The study of the face, that is of the anterior surface of the head, is undoubtedly the most interesting to the artist. The forehead, limited by the line of insertion of the hairs, or in other words, by the margin of the hairy scalp, varies greatly in height and in breadth. Sometimes it is prominent or rounded, sometimes it presents a plane and large surface, terminating abruptly at the root of the nose; occasionally may be observed upon it finger-like marks and varying eminences; or, again, its upper part is depressed, sloping rapidly backwards. In some persons the forehead is low and narrow, whilst in others it has ample proportions.

We sometimes find towards the middle and upper part of the forehead a single rounded eminence surmounting a depression or median groove; but more generally there are two protuberances, more or less evident, situated above the orbits and superciliary arches, the internal angles of which correspond to the frontal sinuses. The orbitar arches extend further outwards than the preceding, becoming more and more evident, until they fuse with the orbitar processes. An oblique depression separates these two arches (the superciliary and orbitar), but the investing tissue frequently conceals this form, in which case the two arches seem to constitute but one, still further augmented by the orbicular muscle of the eye-lids (3, Fig. 5. Pl. IX). The inner or large extremity of the eye-brow is almost always placed under or below the inner portion of the superciliary arch, and not on the arch as it is usually represented. The triangular frontal depression, occasionally oval, which separates the superciliary eminences, is more or less apparent, according to the prominence of these arches. The lateral part of the forehead is directed backwards, forming the half-flat temporal surface on which may be observed in the meagre, a curved line or crest, hollowed out into a groove, when the muscular system prevails. In the first case, it is produced by the curved line (crest) of the temporal bone, strongest anteriorly, and gradually decreasing in strength; when the temporal muscle is large, 2, Fig. 5. Pl. IX. it swells above its insertion, and the osseous crest becomes then a furrow. In some persons, the vena preparata shews itself on the forehead, and at the sides may always be found, more or less perceptible, the ramifications of the temporal artery.

The nose is generally of a pyramidal form: the base of the organ is turned towards the mouth, its summit terminates in the frontal depression. Two folds exist here, most commonly in those devoted to intellectual labours.

Above the two grooves, at the sides of the wings of the nose, may be seen the prominences of the common elevator muscles of the ala of the nose and upper lip, which we shall again have to notice in describing the cheek 5, Fig. 5. Pl. IX.; the back of the nose, formed by the union of the two lateral portions, varies much in thickness and direction; it extends from the frontal depression to the lobe. The lobe or lobule, which presents so many varieties in form, sometimes puts on the appearance of two lobules, not very apparent. These correspond to the two cartilages. The openings of the nostrils vary much in different individuals; they look outwards and upwards.

The upper lip is hollowed out into a groove in the middle, with projecting edges, which terminate upwards in the septum of the nose. The thickness of the upper lip varies considerably. The lower lip is adapted perfectly to the upper. The angles or union of the lips is called the commissures, and at this point they disappear in two furrows or grooves, at first sufficiently marked, but which afterwards lose themselves by the sides of the chin, descending obliquely from above downwards. When the lips are in contact, they give rise to a deep angular horizontal furrow, with raised or depressed angles in certain persons. The lips being opened, display the dentar arches; the superior arch most frequently overlaps the lower.

The chin varies extremely in form, nevertheless it is always rather rounded, and represents externally pretty accurately the osseous forms, slightly modified by a dense cellular tissue, and muscles by no means well marked. In lusty persons a dimple frequently appears on the summit, beneath which is a fold. A groove, more or less marked, according to the prominence of the chin, separates it from the lower lip.

The osseous orbit is nearly quadrilateral; but during life, or rather when clothed with all its soft parts, it has somewhat the form of an ovoid. The superior margin or arch of the orbit, is much more prominent than the inferior. Its direction has been already described. The lower edge, always less marked, unites with the upper externally; internally it unites with the lateral surface of the nose; finally, to these two arches the eyelids are intimately united, and they form two inclined planes, of which the superior is very strongly marked, especially internally.

To these two planes succeed immediately the eye-lids. When these are open, they enclose the eye-ball in an ovoid, of which the slender extremities form two angles or commissures. The external angle, which is very acute, is prolonged into a furrow, following the direction of the upper eyelid, and losing itself towards the temple in the midst of folds, whose numbers and depth increase with age. Towards the internal angle, the palpebral margins assume suddenly a horizontal direction, reunite and form a loop embracing the caruncula lachrymalis.

The upper eyelid is curved gracefully; a fold follows the curve, caused by the puckering of the tissues, and of which a trace remains, even when the eye-lids are closed. The edge is of considerable thickness, cut into a chisel form, or bevelled from before backwards, and from above downwards. The lengthened eye-lashes (cilia), which belong to this eye-lid, do not quite extend to the commissures.

The lower eye-lid is shorter than the upper; on it we find two or three folds, and a furrow rendered more distinct by excessive labour or pleasure. The eye-lashes are shorter than those of the upper eye-lid. When the eye-lids are closed, the inferior scarcely elongates, and the curves of both eye-lids assume the form of a transverse line, with a slight convexity downwards.

It is not necessary to describe minutely the globe of the eye.

The white fibrous membrane, called sclerotic, occupies the largest visible part of the eye. The transparent disc placed in the centre of the eye, is called the cornea. The iris is the coloured zone, the circumference of which is traced by the sclerotic; its centre is pierced with a roundish aperture of ever-varying dimensions; this opening is the pupil of the eye. Small blood-vessels may occasionally be distinctly traced on the sclerotic.

The direction of the eyes is generally oblique, that is to say, a straight line drawn through the centre of the inner, and extended beyond the external commissures or angles, would not intersect or pass through these, but would emerge a little below them.

Under the temples may be observed the zygomatic arches, springing from the cheek bones, contracting by degrees and disappearing towards the opening of the ear; the formation of these arches by the malar and temporal bones, *C.* Fig. 1. Pl. IX. has been already described. M. Gerdy has pointed out, in addition to these arches, the zygomatic fossa, and the projection of the condyle of the lower jaw bone; but although these forms have of course an actual existence, they are so little apparent on the surface, that I have deemed their description here unnecessary.

In lusty, fat persons, the cheeks do not present those beauteous and graceful contours which occasionally embellish the physiognomy. They are rounded and prominent over the cheek bones; plane on a level with the body of the lower jaw, *E*. Fig. 1. Pl. IX. In front of the ear are the half-flat masseter surfaces, elongated and quadrilateral, (12, Fig. 5. Pl. IX.) The angle, formed by the union of the cheeks and nose, varies with the conformation of the latter. A furrow, not very apparent, proceeds from the sides of the nostrils, obliquely downwards and outwards, losing itself in the cheek; it corresponds to the anterior margin of the common levator muscle (4, Fig. 2. Pl. IX.), and may be called the nasal groove.

The finely formed ear destroys by its position the monotony of the plane surfaces on the side of the head and face; its form varies, although the component parts are always identical, or nearly so. We speak of the external ear. This presents two surfaces, a cranial and an external. The outer margin or border, folded on itself, forms the helix; the lobe terminates the ear inferiorly. Anteriorly is another eminence, called the tragus; opposite to it is the anti-tragus. There is besides an ante-helix, which assists in forming the cavity called navicular. The concha, or funnel-shaped entrance to the tube of the ear, is situated between the tragus, anti-tragus, and inferior branch of the ante-helix. A deep groove separates the ear from the cranium.

Behind the ear is the mastoid process, producing a marked elevation in this direction. Its summit is nearly imperceptible, by reason of the attachment of the tendon of the sterno-cleido mastoidens muscle. Behind the process is the sub-auricular groove.

The portion of the head covered by the hair is the most extensive. The parietal and occipital protuberances become much more conspicuous as the hair disappears; the fronto-parietal suture may then be seen. The median prominence, existing just below the chin and lower jaw, is produced by the genio-hyoid muscles, and the two lateral depressions correspond to the cellular tissue, covering the mylo-hyoid muscles, 20, Fig. 5. Pl. IX. These forms disappear completely in lusty persons, and are replaced by a rounded surface, marked with transverse folds, more or less numerous.

Finally, and altogether externally, the base or inferior border of the lower jaw bone and its angles are met with. All these forms are confounded or mingled with those of the neck.

§ II.

FORMS PECULIAR TO DIFFERENT AGES, AND TO WOMAN.

A. *Infancy.*—It is difficult at birth to determine the true form of the infant. A little time must, in fact, be allowed it to become habituated to the new element in which henceforward it is destined to live. The flexed constrained position, which it was forced to assume during the whole period of gestation, must of necessity influence the form of the torso and the limbs. The soft parts, scarcely supported by so flexible a frame work, forced as it were against each other, flattened, depressed, display no forms interesting to the artist, however curious they may be to the physician; thus it is that the infant is presumed to be already some days old, before the artist finds in it any forms fit to be represented by the chisel or pencil.

Of all the parts of the body, the head seems to be the most rapidly developed in the child. For the first two or three years of life, the ovoid is sufficiently regular, the larger extremity is formed by the upper and posterior part of the cranium, the smaller by the chin. The cranium is proportionally much larger than the face, corresponding to and dependent on a proportionally larger brain. The occiput is prominent, especially shortly after birth; the hair of the head is scanty, but already some hairs are an inch in length. The prominences called frontal protuberances are more remarkable at this period of life than at any other. When a mesial vertical crest or ridge exists in the frontal bone, it is due to the thickness of the margins of the frontal suture. Neither the frontal sinuses, nor the superciliary protuberances exist; a slight down marks the future place of the eye-brows. The eye nearly fills the orbit; it is prominent and widely open, but without expression, until the instinctive intelligence be sufficiently active to give to the eye its observing powers; from this comes expression, the great charm in human physiognomy. The eye-lids seem of equal length, and their margins are occasionally furnished with eye-lashes, contrasting with the rest of the system of the hair.

At this age, the nose is generally compressed from before backwards, and the base chisel-shaped. The extremity of this organ is slightly turned upwards, the frontal depression is always well marked, whilst the furrows of the cheeks and nose are scarcely visible. The development and prominence of the upper jaw, the absence of teeth, and the first functions to which the mouth of the child are destined, determine its form in the infant. The lower lip recedes somewhat, is embraced by the margin of the superior, and is admirably adapted for suction.

The absence of teeth, and the presence of a large pellet of fat, explain perfectly the roundness of the cheeks. The angles of the jaws are scarcely formed, and the want of development of the teeth and jaws, accounts readily for the form of the infantile chin.

The adult forms are not to be looked for at this age on the inferior and lateral parts of the head; the external ear is rounded and without a lobule, but finely modelled.

The skin of the head fine and velvet-like, is at first nearly uniform throughout its whole extent; modifications of structure are scarcely to be observed; a deep rose colour pervades the whole surface almost identical throughout. The lips have a peculiar brilliancy, constantly diminishing with age. But soon the development of all the parts of the head progresses; the hairs of the head grow, and assume their future colour; the superciliary arches enlarge, and the eye-brows are more distinctly defined; the nose lengthens, the eyes still prominent, become brilliant and sparkling; the upper lip now less projecting, elongates, forming with the lower a graceful curve; sharp teeth of a pearly whiteness, adorn the mouth; the swollen appearance of the cheeks has been effaced, the ears are elongated, and the sub-auricular depression and mastoid prominence are now visible; the body of the lower jaw enlarges and deepens proportionally as the angles and chin become more prominent. From this period all parts of the frame progress in their development, until they attain the perfection of that maturity which we have adopted as the type of our figures, and of their description.

B. *Old age.*—Time has now withered with his icy touch, the brilliant exterior of youth; the head loses its most beautiful ornament, the hair; a few silvery locks merely remain at the back part. The hairy scalp is now smooth and polished, and eminences and depressions appear in various parts. Numerous wrinkles, deepened quite as frequently by passions as by age, disfigure the forehead with transverse folds; a mesial vertical one appears also occasionally, extending to the root of the nose. This organ contracts and occasionally projects over the lips. The loss of the teeth produces an interval between the jaws; the maxillary bones then approach, and the lips, unsupported by the teeth and by the alveolar processes, recede or project, as the case may be; the upper is sometimes covered by the lower. The nose and chin all but touch; the withered cheeks hang down by the sides of the face, whilst deep grooves separate them from the nose and mouth; the eye-ball sinks within the orbit, the margins of which become more and more prominent. The lustre of the eye is extinguished, numerous wrinkles extend from the commissures, some towards the root of the nose, others towards the temples. The ears are elongated, and the auditory passages become obstructed with numerous hairs. The sub-auricular depression deepens more and more, the skin of the face acquires an earthy hue, and a net work of smaller wrinkles covers it, forming as it were, a basis to the principal ones. Under the chin the skin is pendulous, and loose; the two lateral depressions are deeply hollowed, and the body of the jaw together with its angles, are now strongly marked.

C. *Forms of woman.*—In her the outlines are voluptuous and full of grace. Long and silky tresses constitute one of her most beautiful ornaments. In place of frontal protuberances, there is frequently a smooth, plane and handsome surface, on which are spread out some branches of the vena preparata. In fine individuals the orbitar prominences are scarcely perceptible; the eye-brows thin and elongated; eyes not deeply set in the orbits, and somewhat more lengthened than in man; the fronto-nasal prominence and depression scarcely perceptible, and the nose straight and slender, enlarges slightly towards the alæ. The lips are thin and rosy, the chin rounded and finely modelled.

On the cheeks, the elevations of the levator muscles, and the masseteric half-flat surfaces are scarcely perceptible. The lower jaw is smaller than in man; the ears, placed nearer to the cranium, are small and formed most delicately. The skin fine and transparent; it is sometimes of a brownish flat colour; at others white and rosy.

The type I have sketched, is taken from the antique statues, admirable *chefs-d'œuvres* of the great masters; but I do not mean to assert that no fine models worthy the deep study of modern artists, do not exist.

§ III.

CHANGE OF FORMS WHICH THE MOVEMENTS OF THE HEAD GIVE RISE TO.

These movements have a reference either to the individual parts composing them, or to the structures supporting them. These latter belong to the neck: the movements peculiar to the head belong to its anterior part, with the exception of the movements of the hairy scalp.

The frontal wrinkles are caused by the contraction of the anterior part of the occipito-frontal muscles, 1, 1, Fig. 5. Pl. IX. which also raises the eye-brows. The orbicular muscle of the eye-lids, 2, Fig. 2. Pl. IX. draw these membranous curtains nearer to each other, and apply them strongly to the surface of the eye. The superior portion of the muscle lowers the eyebrow, rendering it more prominent; the lower portion slightly raises the cheek.

The occipito-frontal muscle acts usually alone when the forehead wrinkles, and the eye-lids widen largely, to express joy, admiration, surprize, stupefaction, &c.; it is assisted by the orbicular, when terror prevails, or suffering, or passion, or during deep thought.

It is scarcely necessary to say that the upper eye-lid is raised by the levator muscle; nor need I speak of the pyramidal muscle of the nose, which but little influences the physiognomy.

Authors are not agreed in respect of the action of the triangular muscles of the nose (3, Fig. 2. Pl. IX.); by some they are deemed dilators, by others constrictors; it is probable that they act in both ways, but they certainly dilate the nostrils with more energy than they contract them. The triangular is in action during laughing, attention, olfaction, fury, pain, &c.; the common elevator muscle assists it. This last, and the proper elevator, have a similar action; it need not be more particularly described.

The great and small zygomatic muscles, 6, 7, Fig. 2. Pl. IX. impress the same movements on the lips, but they at the same time cause the cheek to project, and they hollow the labial furrow. The zygomatic are called into play in laughing, crying, gaping or yawning, grieving, closing one eye whilst gazing with the other, through an optical instrument.

It is the orbicular of the lips which effects the contraction of the mouth, Fig. 2. Pl. IX. and its protrusion; when assisted by other muscles, it enlarges the mouth, stretches the lips, presses them against each other, and against the dentar arches, or carries them inwards towards the cavity of the mouth. These movements are striking during profound meditation, excessive passion, suppressed laughter, &c.

The masseter muscle, 12, Fig. 5. Pl. IX. with the assistance of the temporal, 2, Fig. 5. acts very powerfully; in contracting they raise the lower jaw, and bring the teeth strongly together; the masseteric half flat surface (meplat) is at that moment replaced by a swelling or prominence, anterior to which the cheek seems to become hollow, although it in reality undergoes no change. The temporal and masseter act simultaneously, so that they swell or contract together; the results of their action may readily be traced in the living body. During their contraction, the temporal artery swells and may easily be traced.

The masseter and the temporal enter into action during mastication, violent passion, pain and great efforts.

The triangular muscle of the chin, 9, Fig. 2. Pl. IX. which depresses the commissures of the lips, the quadratus or depressor of the lower lip, 10, Fig. 2. Pl. IX. the muscle called the levator of the chin, which also pushes upwards the lower lip, act with but little force; thus they do not effect any great physiognomical changes.

The isolated movements of which I have spoken, combine in different ways to compose the expressions, intended to express visibly or externally the emotions of the soul. The limits I have prescribed for myself, forbid me attempting a description of these expressions, which, moreover, vary infinitely. To the artist appertains the task of applying the mechanism, the wheel-work of which he has just studied. I have thought it my duty to point out to him the action of such and such a muscle in certain expressions, but have not presumed to present to him ready-made physiognomies, whose application he would with difficulty discover, and which he must soon reject, giving a preference for the beautiful models furnished him by the study of nature.

It ought however to be observed, that in general, in powerful emotions, the traits or expression concentrate towards the middle of the face; whilst they spread out, removing from this centre, in expressing pleasure, and agreeable emotions.

CHAPTER X.

EXTERNAL FORMS OF THE NECK.

It is by reason of the mobility of the articulations of the neck that the head turns so readily in all directions; it serves as the " look out," ever ready to forewarn against coming dangers. The movements it executes add much to the grace of the whole figure.

A horizontal section in the middle of the neck, would present an ovoid figure, flattened on the sides, with the larger extremity posteriorly.

Anteriorly, and on the median line of the neck, is the marked, wedge-shaped prominence caused by the thyroid cartilage of the larynx, 3, Fig. 2. Pl. x.; the prominence is known by the common name of Adam's apple.

Lower down is a slight enlargement on the front of the neck, produced by the thyroid body; this in diseased conditions acquires occasionally an unsightly size. A little lower down is the supra-sternal fossette, *b*. Fig. 2. Pl. x. forming a remarkably deep hollow in meagre persons; in some scarcely apparent. The hollow is caused by the projecting edges of the sterno-mastoid muscles, 2, Fig. 2. and the advanced position of the sternum. The wind-pipe, which may be felt at the top of the space, rapidly recedes from the surface, to proceed into the interior of the chest, and so reach the lungs.

Along the inner or anterior margins of the sterno-mastoid muscles, may be traced an elongated cervical depression, a continuation of the sub-auricular, forming with that of the opposite side a V, the two branches of which limit, laterally, the anterior part of the neck. In the bottom of this groove may occasionally be seen the outline of the external jugular vein, Figs. 1 and 2. Pl. x. and xii.

The prominence caused by the collar bones, *B*. Fig. 1. and 2. Pl. x., has a sigmoid form, convex internally and concave externally, that is, nearer to the shoulder joint. This clavicular prominence is always well marked. Its extremities are not situated in the same plane with the exceptional cases to be mentioned afterwards; the outer being the more elevated. The articulations of the collar bones with the breast bone, and with the acromion, also shew slight elevations, but these are extremely slight.

Anteriorly, the sterno-mastoid muscle is distinctly seen underneath the skin; its anatomical disposition has been already traced, *D*. Fig. 2. Pl. x. and Fig. 2. *idem*. By the separation of its two portions, the sternal and the clavicular, a triangular depression is formed more or less deep, according to the *embonpoint* of the individual. The sterno-mastoid muscle is twisted on itself;

its anterior margin is convex, and looks forwards and upwards; the posterior is concave, and looks backwards and downwards.

Above the collar bone is the supra-clavicular hollow, 5, Fig. 2. Pl. x., triangular in form; the internal jugular vein may also occasionally be seen crossing this hollow. In thin persons, the absence of the subcutaneous adipose tissue in this hollow adds greatly to the prominence of the collar bones. Moreover, the collar bone is always more prominent superiorly, because the latissimus colli muscle, 1, Fig. 2. *ibid.* which is inserted here, is too feeble to prevent the integuments being applied to the contours of the osseous surfaces, *f.* Fig. 2. *ibid.*

Behind the superior extremity of the sterno-mastoid muscle, we find the attachment of a strong bundle of muscles, forming externally a rounded surface, continuous with the posterior surface of the neck. To understand this fleshy mass well, we must commence with the trapezius muscle, 2, Fig. 2. Pl. IV. and XII. Fig. 2. Pl. XI.

The anterior edge of the trapezius muscles may be traced from the occipital bone, to which their upper margin is attached, quite down to the collar bones. Behind them, and at the sides, the neck presents two sweeping and fine lines, uniting the head harmoniously to the chest, Fig. 1. Pl. XI. These lines are formed by the rounded margins of the trapezii muscles, slightly twisted on themselves; above, and in the mesial line, is the occipital depression, or cavity of the nucha or nape

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of the neck, almost always concealed by the hair. This cavity is formed by the separation of the greater complexi muscles. As they approach each other, these muscles produce a rounded surface, to which succeeds the half flat cervico-dorsal ovoid, caused by the presence of the aponeuroses of the trapezii, *C.* Fig. 2. Pl. XI. The spinous processes of the sixth and seventh cervical vertebræ project as it were over this half flat ovoid; these processes are marked, *C.* Fig. 2. Pl. XI. The rounded surfaces at the sides of the neck, continuous with these flattened aponeurotic ovoids, are caused by the muscles already described.

§ II.

FORMS PECULIAR TO DIFFERENT AGES, AND TO WOMAN.

A. *Childhood.*—The neck of the child is extremely short. It soon elongates, but still assumes no distinct form. It is rounded, and its slenderness causes the head to seem disproportionately large. The prominences and depressions described above, shew themselves only at puberty.

B. *Old age.*—The neck inclines forward, the skin is flabby, loose and pendent; two deep folds of skin extend from the chin to the top of the breast. The larynx becomes extremely prominent, the submaxillary depressions deepen more and more, as well as the supra-sternal, sterno-mastoid and supra-clavicular *fossettes* or cavities. The sterno-mastoid muscles are as distinct as if they had been dissected. The collar bone and the spinous process of the seventh cervical vertebra are conspicuous and well defined.

c. *Forms in woman.*—In woman the neck is longer and more slender; beautifully inclined towards the chest, it resembles in the simplicity of its forms the neck of the child. In the young person, and before marriage, the thyroid prominence and supra-sternal hollow are scarcely apparent; but after giving birth to several children, the thyroid body almost always enlarges, and the neck increases in thickness.

§ III.

CHANGES IN FORM PRODUCED BY THE MOVEMENTS OF THE NECK.

The movements of the head are extremely varied, yet they may all be referred to flexion, extension, lateral inclination and rotation; circumduction is the combined result of these motions.

Extension.—In extension it is the muscles of the back of the neck which act; the skin and muscles of the fore part are put on the stretch, the folds are effaced, the larynx projects, and the supra-sternal fossette becomes deeper. Behind, the enlargements shew transverse folds, the jugular vein swells, and raises the skin; the aponeurotic ovoid of the trapezii is still distinct, although the surrounding muscles are in strong action. The sterno-mastoid muscles assist in almost every movement of the neck, or rather of the head on the neck; the attachments of these muscles to the occipital and temporal bones above, and to the sternum and collar bones below, sufficiently explain this circumstance.

An attentive consideration of the position of the mastoid processes, and of the course of the sterno-mastoid muscles, will sufficiently explain the extensive influence these muscles have over the movements of the head.

Flexion.—The larger portion of the head being placed in front of the condyles of the occipital bone, it would, if left to itself, of necessity fall forwards in flexion. To counteract this, the more powerful muscles are placed naturally on the back of the neck. But there are flexor muscles also; the latissimus colli, the depressors of the lower jaw, the sterno-mastoids produce flexion, causing visible changes in the forms, as well anteriorly as posteriorly. In front, the prominence of the thyroid cartilage disappears, the skin wrinkles transversely. The anterior fasciculi of the sterno-mastoid muscles contract, whilst posteriorly the integuments become tense, the neck seems to become thinner, the occipital fossette disappears, and the spinous processes become very prominent. In the horizontal posture, flexion of the head requires the strongest efforts of the sterno-mastoid muscles.

Lateral flexion.—On the flexed side the skin falls into folds, and the forms are effaced. On the opposite side, the neck is lengthened, the skin becomes tense, and the muscles somewhat more apparent. But if any obstacle present itself, so as to interfere with the flexion, then the neck changes its appearance. A simple experiment suffices to display this altered form.

Rotation.—When the head rotates on its pivot, or axis, the principal muscular actions are always to be looked for on the side opposite to that towards which the face is turned. When the face turns to the right, the corresponding side of the neck wrinkles obliquely, from above downwards, and from behind forwards; a depression and a furrow appear behind the angle of the lower jaw, whilst to the left the textures are elongated and distended; the trapezius and sterno-mastoid muscles become more apparent; the sternal portion of this last muscle raises the skin strongly, and the supra-sternal fossette becomes deeper. Any resistance offered to the rotative energy, exaggerates greatly all these forms.

It is not necessary that I should describe the accidental forms produced by circumduction, or by the other complex motions of the head or the neck; a simple analysis will enable them to be easily understood. All the forms produced by these complex motions are derived from those already described.

CHAPTER XI.

EXTERNAL FORMS OF THE TORSO, OR TRUNK.

§ I.

THE trunk follows the neck immediately; it is composed of the chest, the abdomen or belly, and the pelvis; but in a work on artistic anatomy, I believe it would be an error to view separately three regions so intimately united with each other. It is preferable then, to describe the torso as one viewed merely in different aspects; thus shall we avoid repetitions and the establishment of arbitrary limits; divisions, in fact, which have no real existence in nature.

In the mesial line, and just under the supra-sternal fossette, the sternal furrow commences, *D.* Fig. 1 and 2. Pl. x. extending from this point to the pit, or hollow of the stomach. The bottom, or deepest portion of this furrow, corresponds to the breast bone, and follows its direction.

The pit or hollow of the stomach, which terminates this sternal furrow or groove, is caused by the prominence of the cartilage of the seventh rib, *F.* Fig. 1. Pl. x. Its shape would be triangular but for a ligament uniting the cartilages spoken of, converting thus the notch into an arch. The pit of the stomach is thus arched, and the xiphoid appendix occasionally gives rise to a distinct prominence. The sternal furrow, interrupted by the hollow of the stomach, resumes its course, or is continued into the abdominal furrow as far as the umbilicus (navel), or a little lower, gradually ceasing as it approaches the pubis, *K.* Fig. 2.; this furrow or groove corresponds, in fact, to the interval or space between the recti muscles, 12, Fig. 1. and which necessarily disappears as these muscles approach each other; now this takes places below the umbilicus, or the navel. Finally, and quite at the lower part, there exists the pubis, to which we shall return, and the genital organs, composed of the penis and the scrotum. A *raphe*, or elevated cord, divides this latter into two parts. Of the two preparatory male organs (testes), enclosed within the scrotum, the left generally hangs lower than the right.

The extensive mesian line I have just described, separates forms perfectly resembling each other; that is, the two sides of the torso are, or ought to be, quite symmetrical.

The sternal groove, as I have already said, is formed by the bulging of the pectoral muscles; a few digitators, corresponding to points of attachment, are occasionally seen here. On the same level are the projections of the sterno-costal articulations, Fig. 1. Pl. x. More outwardly, is a handsome smooth surface or plane, which I shall call pectoral, being formed by the muscle of that name, 8, Fig. 2. *idem.* The form of this fine surface will be best understood by a description of the muscle.

The great pectoral is triangular; its mesial attachment on the sternum is prolonged as far as the cartilage of the sixth rib; superiorly, the pectoral is divided into two fasciculi, the smaller of which is attached to the collar bone, from which it proceeds downwards and outwards to the humerus. This smaller fasciculus is separated from the deltoid by an interval filled with cellular tissue; occasionally in muscular persons, it is not easy to distinguish this inter-muscular space. Near the collar bone, the division between the muscles is marked by a triangular sub-clavicular fossette. The inferior edge of the muscle is twisted inwards before its attachment to the humerus. In its passage, this lower margin becomes thicker from its inner to its outer extremity. Of the three angles of the muscle, one, the external, is nearly acute; the superior angle is truncated by the collar bone, the inferior is rounded and follows the contour of the cartilage of the sixth rib, to which it is attached, as well as to the aponeuroses of the great oblique muscle, 10, Fig. 2. The direction of the fibres of the muscle is best explained by the engraving. Let it be remembered also that occasionally the muscular fibres are raised by the subjacent bony structures. In short, this plane of the pectoral muscle is triangular, its surface is slightly rounded, and its direction is obliquely upwards, backwards, and outwards.

The nipple, not so distinctly marked in man as in woman, is placed near the lower portion of the pectoral plane, nearly on a level with the superior margin of the fifth rib.

On the sides of the sternal groove, projections appear in thin persons, formed by the costal cartilages. They form an oblique line from above downwards, whose course will be best understood by an examination of the articulated skeleton.

The more elevated portion is a prominent arch, formed by the cartilages of the false ribs, corresponding with the level of the pit of the stomach; this arch follows necessarily the direction of these cartilages obliquely downwards and outwards, Fig. 1 and 2. In certain people, and in the ancient sculptures, this arcade is less strongly arched, and is wider; this form depends on the greater strength of the superior extremities of the recti-muscles, which fill the xiphoid hollow or cavity. The convexity of this arcade limits the chest inferiorly, and limits on either side a triangular region (more rarely quadrilateral), the superior margin of which corresponds to the inferior edge of the pectoral plane. This plane, which may be called serrated or notched, is rounded, shewing also eminences and elongated depressions, corresponding to the superior portion of the rectus muscle, 12, Fig. 2. to the costal cartilages, and to the digitations of the large oblique muscle, 10, Fig. 2. interlocked with those of the serratus magnus muscle, 9, Fig. 2. We shall afterwards return to the arrangement and number of these digitations. A furrow, generally but little marked, follows the superior margin of the cartilaginous arcade, limited below by the projecting extremity of the cartilage of the tenth rib.

From the concavity of this arcade proceed the two planes of the recti-muscles of the abdomen, 12, Fig. 2. situated on either side the abdominal groove already described. The reunion of these two planes forms an oval surface, extending from the xiphoid hollow quite to the pubis. The large muscular masses formed by the recti are traversed by hollows or grooves, also transverse, corresponding to aponeurotic or tendinous intersections, to which the skin and subjacent cellular tissue adhere. These transverse grooves or hollows are almost always two or three on each side; more rarely, five have been observed. When two only exist, the inferior is placed on a level with the navel, or a little higher. In the anatomical subject which was our model, the recti-muscles were divided into four parts, and the lowest transverse line or groove was placed pretty nearly between the pubis and the umbilicus. These tendinous intersections divide the recti-muscles into quadrilateral cushions, which yet are distinctly seen only in very muscular persons. Below the navel, the straight abdominal planes become narrower and more prominent. At the lower part of the trunk, just over the genital organs, are the hairs shading the triangular prominence of the pubis, and announcing puberty.

The grooves or furrows, following exactly the contours of the recti-muscles, are seen on the lateral parts of the abdomen. They indicate the line of division between the recti and the great oblique muscles.

External to the lateral groove is a surface nearly triangular, depressed, circumscribed by the lateral groove and the fold of the groin. Having an oblique direction upwards and outwards, it proceeds from the pubis, enlarging, until it terminates in the curved prominence formed by the well marked fibres of the great oblique muscles. The depression of this plane is owing to this circumstance, that here the abdominal walls are formed merely by the tendinous or aponeurotic expansions of the muscles.

The projection formed by the inferior fibres of the great oblique muscles, is limited by the convex iliac groove, *K.* Fig. 1 and 2. Pl. x. and *E.* Fig. 2. Pl. XII. which forms a portion of the great inferior groove of the torso. The iliac groove corresponds to the crest of the iliac bones, whose anterior and superior spine is extremely well marked in meagre persons, *K.* Fig. 2. Pl. x. This groove is caused, like so many others, by the fullness of the adjoining fleshy fibres, compared with their aponeurotic attachments to the bones themselves. The bones, then, form the bottom of the grooves or hollows, and are always the better marked that the muscular system is more developed. In very thin persons, the bones, instead of forming hollows and grooves, give rise to projecting crests and spines, and prominences, seen only in the meagre.

Above the muscular swelling of the oblique muscle, the abdominal walls are depressed, re-uniting with the superior arch of the torso, and are lost in the serrated plane.

Finally, quite at the lower part of the trunk, is the great inferior groove or arch, uniting with the iliac grooves on a level with the anterior and superior spinous processes of the ilium. This large superior groove commences at the anterior and superior iliac spine, extending downwards and inwards as far as the pubis. In this course nearly the margins of the anterior notch of the pelvis, Fig. 1 and 2. Pl. x. The sinuosities of this great notch are effaced by folds or aponeurotic ligaments, extending from the superior spine to the pubis. These inguinal or crural ligaments, covered merely by the integument, give rise to the groin or inguinal folds, the depth of which is still further increased by the prominence of the abdomen. The trunk is then distinctly limited in front by this concave fold, which the iliac grooves re-unite to the inferior angle of the lozenge-shaped dorsal plane. On the other hand, the superior abdominal arch proceeds backwards, and reaches the superior angle of this same dorsal lozange-shaped plane; thus the thorax, the abdomen and the pelvis have natural well defined limits.

The lateral regions of the trunk terminate superiorly in the axilla or arm-pit. This hollow is arranged, so as to lodge the upper part of the arm, which is completely concealed when the limb is placed against the trunk ; but with the elevation or abduction of the arm, the hollow becomes more and more apparent. In the engraving, the arm has purposely been represented in forcible extension, the more fully to exhibit the hollow, called the axilla. This hollow, Pl. XVII. is formed by the skin, which is here very lax, and shaded with hairs; the cellular tissue beneath it is abundant, and it consists of some important vessels and nerves. Two powerful folds of skin, springing from the superior and inner part of the arm, proceed, diverging, to join the anterior and posterior regions of the trunk; these folds of skin shut in the axilla, anteriorly and posteriorly. In the anterior fold of skin, we find the inferior margin of the pectoral muscle; in the posterior, are portions of the broadest muscle of the back, the great and small teretes or round muscles, and a portion of the deltoid. The muscular fibres, which thus assist in the formation of these two great axillary folds, are rolled or turned on themselves; the margins thus acquire strength and fullness. It is in the bottom of the axilla that the arched form of the ribs may be best seen when the arm is raised; their oblique course from above downwards; the inter-muscular spaces or grooves corresponding to the inter-costal muscles, which are not so prominent as the ribs themselves. These inter-costal grooves enlarge or widen in proportion as the obliquity of the ribs increases.

The muscular projections I have already spoken of, as seen upon the sides of the chest, are formed by the digitations of the serratus magnus muscle, 12, Fig. 2. Pl. XII. interlocked with those of the great oblique muscles, 11, *idem.* thus forming a notched or serrated line, commencing towards the anterior third of the inferior margin of the pectoral muscle, and proceeding downwards and backwards, following a curved line, the convexity of which is turned forwards; it disappears at last under the external margin of the latissimus dorsi muscle, 13, *idem*. The course of the digitations of the serratus magnus, external oblique and latissimus dorsi muscles, as seen on the sides of the torso, merit a careful study on the part of the artist. The lowest digitation of the serratus magnus, is attached to the tenth rib. In very thin persons, other forms besides those described may occasionally be seen, as has been well remarked by M. Gerdy; such as the costo-cartilaginous articulations, and even the prominences formed by the union of the cartilages of the false ribs. The great costo-abdominal groove becomes well defined during flexion of the trunk laterally, Fig. 2. Pl. II. and IV. This groove is followed by the very obvious swelling caused by the external oblique muscle already described. The iliac groove, corresponding to the iliac crests and their mode of formation, have been already noticed.

Under this groove is a depressed surface, corresponding to the middle glutei muscles, 15, Fig. 2. Pl. XII. and to the tensor of the crural aponeurosis, 16, *ibid*; next comes the prominence of the trochanter major, *K.* Fig. 1 and 2. to which succeeds behind a depression caused by this, that the skin is here applied directly to the aponeurosis of the gluteus. Behind this depression, the powerful gluteus maximus, 14, *ibid.* produces an ample convex prominence, which extends backwards as far as the median fissure, and downwards to the large inferior groove of the thigh.

The posterior surface of the torso is grooved mesially by a long furrow, extending from the seventh cervical vertebra to the fifth lumbar, from *C.* to *E.* Fig. 1. Pl. XI. The depth of this groove depends on the prominence of the lateral muscular masses, 12, Fig. 2. which extend along the vertebral column. In thin persons, and during flexion of the body forwards, the spinous processes of the vertebræ and the supra-spinous ligaments may be seen in the bottom of the groove. The muscular masses we now speak of shew themselves distinctly through the superficial layers, forming two elongated swellings, extending from the hips quite to the upper part of the trunk; but they decrease in size towards the superior part of the column. By tracing the groove upwards, we reach the oval depression, formed by the aponeurotic expansions of the trapezii muscles, already described, *C.* Fig. 2. and at the sides, the plane of the trapezii themselves, 4, Fig. 2. uniting the torso to the neck. A well marked rounded prominence, forming the inferior margin of this plane of the trapezius, proceeds from below upwards, towards the shoulder; this prominence is caused by the spine of the scapula, *K.* Fig. 1 and 2; it assumes the form of a groove in very muscular persons. But for the most part, under the prominence formed by the spine of the scapula, there is a depression, caused by the aponeurosis of the deltoid, 5, Fig. 2. and by that of the trapezius, which at this point passes over the inner or spinal

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margin of the scapula. The limits of the smooth surface we now describe, are not well circumscribed or defined, excepting in thin persons, or during the contraction of the shoulder and of the arm. The projecting deltoid is limited below by a longitudinal depression, produced by the rounded margin of the deltoid itself; the infra spinatus and teretes muscles give rise to a plane surface below this margin. In muscular persons, it is easy to trace the triangular form of the trapezius. The inferior angle of the muscle, and of the triangle it forms, corresponds pretty nearly to the spinous process of the tenth dorsal vertebra; nevertheless the muscle extends to the eleventh, and even the twelfth spinous process, by means of a thin aponeurosis.

Lower down, and following the direction of the muscular masses, 12, Fig. 2. will be found a furrow, not very apparent at first, but which deepens in descending as it approaches the haunch. Towards the upper extremity of this furrow, and within the inferior angle of the scapula, there exists a slight triangular prominence, formed by a portion of the rhomboid, *O*, Fig. 2. which here becomes sub-cutaneous. The large plano-convex surface, extending from the lateral dorsal groove as far as the superior extremity, indicates the situation of the latissimus dorsi muscle, 11, Fig. 2. The external margin of this muscle, producing the furrow or groove just spoken of, extends from the posterior part of the fold of the haunch to the superior extremity of the arm, where twisting on itself, it forms, along with the teres, major muscle, the posterior wall and edge of the axilla.

This margin becomes especially apparent on raising the arm, Pl. XVII.

The plane of the great dorsal is slightly varied by the costal intervals and prominences; and the course of the last ribs is further rendered distinct, or may be traced by a shallow groove, commencing on a level with the inferior angle of the trapezius, turning towards the lateral parts of the trunk, and terminating in the costo-abdominal groove. It is caused by the swelling fibres of the latissimus dorsi attached to the lumbar aponeurosis, 12, Fig. 2.

Two great arcades or arches, opposed to each other by their concavities, embrace the anterior surface of the trunk; two angles, the reunion of which give rise to a lozenge-shaped figure, are found on the back; this peculiar shaped surface corresponds to the lumbar aponeurosis. The angles and boundaries of this lumbo-dorsal lozenge-shaped figure may be thus described; the superior angle corresponds to the summit (*lower angles*) of the trapezius, the inferior to the median fissure of the hips; the two lateral angles correspond to the *fossettes* terminating the iliac grooves backwards. I shall give the name of iliac fossette to the depression hollowed out on the external angle of the great posterior lozenge-shaped figure, as being produced by the concavity formed by the bones of the ilium at this point. The two superior edges or margins of the lozenge are formed by the swelling of the muscular fibres of the latissimus-dorsi and their attachment to the aponeurosis.

The two inferior, the convexity of which is turned outwards and upwards, follow the direction of the iliac crests, and of the transverse processes of the sacral vertebræ; these lines or margins are caused by the fibres of the great and middle glutei, attached by their aponeurosis to the osseous eminences. In the bottom of the lumbar portion of the mesial groove may be felt, sometimes seen, the spinous processes of the lumbar vertebræ; these are followed by a depression which I shall name lumbo-sacral. In this region we shall find the reliefs formed by the sacro-lumbar muscular mass with their lateral furrows; two rather depressed, regions exist laterally, due to the natural deficiency of the muscular fibres at these points.

Finally, beneath the great inferior triangle, are the hips, separated by a deep groove or fissure, commencing at the inferior angle of the great lozenge-shaped figure. The gluteus maximus, which is very large at this point, is raised inferiorly by the sciatic tuberosity. Quite below, the buttock is circumscribed by a concave furrow, deep especially towards the medial fissure; but this groove is effaced externally, and disappears on a level with the depression situated behind the great trochanter.

§ II.

FORMS PECULIAR TO DIFFERENT AGES, AND TO WOMAN.

A. *Infancy.*—In early infancy the forms of the torso are but little marked; the chest is sufficiently large at its base, but it seems flattened laterally; the union of the cartilages with the ribs is very obvious, and gives rise on each side the chest, to an angular prominence, commencing at the upper part of the chest, proceeding thereafter downwards and outwards, describing an arch with the convexity turned inwards and downwards.

The nipple is placed nearer to the collar bone than to the hollow of the stomach, which is indeed scarcely apparent. The belly, of enormous size compared to the other parts, is distended by the liver, always large in newly-born children. The navel is placed towards the inferior third of the abdomen, and pretty nearly in the middle of the body; the genital organs are surmounted by a fatty cushion or ring, and two well marked folds separate the trunk from the lower extremities.

The vertebral furrow is not deeply hollowed out, and the dorsal part of the chest is narrow. The vertebral column is curved forwards, due to the position of the child in the womb. The buttocks, surmounted occasionally by two little fossettes situated on either side the vertebral groove, are circumscribed inferiorly by two well marked grooves. About the third or fourth year the chest becomes developed, although its upper part continues small; the abdomen diminishes, the ovoid it forms becomes shorter, the costo-cartilaginous projections become less marked, the middle of the body no longer coincides with the umbilicus, but somewhat lower; the pit of the stomach is better defined, as well as the groins; the two lumbar fossettes shew themselves more and more, especially in plump and well-fed children; the pelvis is always narrow. All these parts are still rounded, masked as it were by cellular tissue, the forms can scarcely be made out; all is rounded, dumpy, undefined, until the epoch of puberty; it is then that the various parts of the body begin to assume those forms which afterwards characterize the adult.

The chest continues to extend as it were over the abdomen, and partially to enclose it; it elongates and enlarges in all directions; the costo-cartilaginous articulations become partly effaced, the costal arches elevate the integuments, the sternal groove begins to form between the pectoral muscles, the hollow of the stomach is formed, the abdomen flattens, the middle of the body corresponds to the pubis, or, nearly so, the folds of the groins become more oblique inwards, losing their curve in part; the dorsal groove is now deeper, and the summits of the spinous processes may be observed; the curvatures of the spinal column are well formed; the iliac grooves begin to appear, and the body gets thinner, and lengthens; virility shews itself by the development of the generative organs, by the appearance of hair in the arm-pits, on the thorax, the pubis, &c. Finally, the transformation is speedily accomplished, the infant becomes an adult, and the work of nature is complete.

Old age.—Short is the brilliant period of force and beauty; decay speedily appears, enveloping all forms in a heavy massive envelope, or wasting the frame, until the body seems a living dissection.

The forms of the skeleton may be traced distinctly through the wrinkled skin. The vertebral column generally bends forward, and thus the face becomes prone, looking towards the earth; wrinkles, folds, furrows cover the surface everywhere; the hair whitens, falls, and soon, of all those beauteous forms which nature had lavished on the human torso, there remain but the sad vestiges—a wasted, fleshless trunk.

We describe not the overgrown and bloated carcase, surcharged with fat, leaving such to be sketched by the satirical quill; the historic artist takes no note of them.

c. *Forms of the torso in woman.*—If the torso of man be remarkable for the richness and the energy of its forms, in woman it is equally so for the unsurpassable beauty of its voluptuous contours and graceful inflexions. Sometimes a white and diaphanous skin permits the azure net work of veins to be seen through the surface; sometimes it is tinged with the warmest colouring, betraying the presence of ardent and imperious passions. The chest is shorter, and its summit is narrower than in man; its base occasionally contracted under the pernicious influence of corsets. The suprasternal fossette and the mesial sternal groove are scarcely to be seen; the recti muscles of the abdomen and their intersections can be just visible through the integuments; two or three folds, convex inferiorly, surmount the pubis, which is more or less shaded with hair.

The skin of the bosom or mammæ is remarkable for its whiteness and delicacy; the nipples, surrounded by a rose-coloured areola, project slightly from the surface, looking outwards; above, the bosom passes without interruption and insensibly into the clavicular region; below these exists a groove or furrow, with the convexity downwards. Moreover, these organs vary considerably in different individuals and at different ages. In some they become pendulous and the nipples elongate; they acquire a brownish colour, and this extends to the areola, the circle of which enlarges. Occasionally we see women whose chest resembles the male; in others, the breasts grow to an enormous size, or all but disappear.

The breadth of the pelvis is remarkable in woman, nevertheless its transverse diameter is generally inferior to that of the shoulders, which it sometimes equals:

the haunches project outwards, but are harmoniously rounded. The contours of the back are of the most admirable purity; the region of the kidneys is elongated, the scapulæ scarcely visible; the loins grandly curved forwards, the haunches prominent and rounded; in short, the posterior surface of the torso in woman is unquestionably the *chef-d'œuvre* of nature.

In general, in woman, the depressions of the torso are less strongly marked than in man, and the projections less distinct; the osseous and muscular systems are no doubt strictly arranged on the same plan, but the forms and the proportions differ; these two systems are moreover enveloped in a layer of celluloso-adipose tissue, softening the depressions, and contributing powerfully to give to the body of a fine woman, those seductive forms which secure to the weaker sex absolute dominion over the stronger.

§ III.

CHANGES IN FORM PRODUCED BY THE MOVEMENTS OF THE TORSO.

The movements proper or peculiar to the trunk are four, namely: flexion, extension, lateral flexion, and rotation or torsion. These movements, which after all are not very extensive,* depend on the mobility of the vertebral column.

Flexion.—This movement has no influence over the

* See Chapter V.

forms of the thorax, but the abdomen seems as it were divided during flexion into two parts, by a deep transverse fold, appearing a little beneath the cartilaginous arches of the false ribs, opposite the second transverse intersection of the recti muscles. Where these two muscles meet the great oblique, two fossettes appear in the course of the fold already described.

During flexion, all the extensor muscles placed on the back are strongly stretched ; the superior fasciculi of the trapezii are flattened ; the spinous processes of the vertebræ and the shoulder blades form strong projections ; the depth of the vertebral groove diminishes ; the great dorsal muscle is more closely applied to the subjacent parts, and the arches of the ribs are more distinctly visible.

The iliac fossettes disappear, the lumbar curve straightens, the dorsal part of the column bends still more strongly forward, the haunches become hollowed laterally, and the back part of the iliac groove disappears. All these forms become more apparent on the person meeting with resistance.

Extension.—The movement of extension is not confined merely to the raising of the trunk into the upright position ; it includes also the flexion of the back, posteriorly. Such movements form a portion of the display of the circus.

A much stronger effort is required in extension of the torso than in flexion ; this requires no explanation. The forms are more sharply defined therefore in extension than in flexion of the trunk. As soon as the trunk is strongly extended, so as to be flexed or curved backwards, the aponeurotic depressions, corresponding to the spine of the scapula and to the great aponeurotic lozenge-shaped figure of the loins, immediately appear. The muscular masses filling the vertebral grooves swell, and the mesial groove deepens; this happens especially in the loins. All the muscles of the back and haunches are seen to advantage, whilst the osseous prominences disappear, or become at least less distinct. In the mean time the integuments and muscles on the front of the body become tense; the muscular forms are less distinct, but the inferior arcade or arch of the chest projects more than usual, and the digitations of the great oblique and serratus, interlocked, may now be easily made out.

Resistance produces on the trunk the same results during extension as it does during flexion; the experiment may easily be made, by causing the living model to pull at a cord; but in this case it will be observed that both sets of muscles enter simultaneously into action, because the body oscillates as it were between the two movements.

In wrestling, both sets of muscles may be seen at the same moment in full contraction, especially when the wrestler attempts to raise and throw his adversary at the same time.

Lateral flexion.—The muscles by which we extend and bend the trunk, produce also the lateral flexion; the forms assumed during this movement by the two sides of the trunk need not be minutely described. Folds of the integument predominate on the flexed side, and a smooth tense surface, displaying more or less of the anatomy, on the extended side.

Torsion.—This motion is very limited; the vertebral column assists, and the torso rotates on the thighs. In ordinary torsion, the alternation in the forms is not remarkable; but it is different with forced or painful torsion. The muscles then contract vigorously. Let us suppose that the torsion of the trunk is from left to right, and from before backwards. At first, the skin becomes tense from left to right, and from below upwards; swellings, more or less distinct, according to the force employed, will be found to correspond to the inferior half of the trapezius, to the great dorsal, to the inferior angle of the scapula, to the great pectoral, to the serratus magnus; these take place to the right.

To the left, it is the gluteus maximus, the great oblique, and the rectus abdominis which enter into action. The sacro-lumbar masses will be found to be rather depressed than prominent.

The *linea alba* of the abdomen (corresponding to the mesial vertebral line) will follow a course from left to right, the dorsal groove proceeding in an inverse direction. The other muscles remain in repose, ready to restore the trunk to its natural position.

I cannot repeat too frequently to the artist the fact, that all the accidental forms produced by the movements of the torso are but little marked when its motions meet with no resistance, and that it requires an energetic action, as in overcoming an obstacle, to throw the muscular masses into strong relief. I dwell the more on this point, knowing that the artist is naturally prone to exaggerate muscular forms at the expense of truth.

CHAPTER XII.

EXTERIOR FORMS OF THE THORACIC EXTREMITIES OR ARMS.

§ I.

THE root or commencement of the superior extremity is formed by the shoulder, rounded and projecting over the lateral parts of the trunk. The first object to be remarked, is the angle formed by the meeting of the collar bone with the acromion process, terminating the scapular spine, *B*. Fig. 1 and 2. Fig. XIII. The articular (scapular) extremity of the collar bone always elevates the integument a little; occasionally the prominence becomes too conspicuous, and the artist ought then to endeavour to soften it. External to the scapulo-clavicular articulation, there is a depression preceding the deltoid swelling, and caused by the relief which the muscular fibres of the deltoid give rise to. The deltoid muscle, 3, Fig. 1. is strongly marked in the upper part of the arm; it represents a rounded eminence, continuous with the external part of the arm, and with the anterior and posterior aspects of the trunk it forms distinct planes. This great prominence is caused by the head of the humerus raising up the powerful fibres of the deltoid, pushing them upwards, outwards and forwards. The two edges of the muscle which we have already described, proceed from the trunk obliquely towards the external portion of the arm, thus forming the deltoid angle, easily recognizable in muscular persons, Fig. 1 and 2. Pl. XV. In them also the grooves, more or less numerous, running in the course of the fibres of the deltoid, indicate the course of the aponeurotic septa separating the muscular fasciculi from each other. These grooves run from above downwards. Towards the back part and below the outer extremity of the scapular spine, there exists a half-flat surface, caused by the compression which the aponeurosis produces on the subjacent parts.

The angle of the deltoid is perfectly indicated by a small and nearly triangular fossette, of a depth proportional to the strength of the adjoining muscles. Anteriorly on the arm may be seen the oblique depression, caused by the anterior margin of the deltoid, then a powerful oval relief, formed by the biceps muscle, terminating below in the bend of the elbow, and there forming a well marked half-flat surface (*saignée*). The elevated oval relief is formed by the belly of the biceps muscle, 4, Fig. 2. Pl. XIII. and the depression by the tendon of the muscle, as it proceeds to its point of attachment in the radius. The depression of the bend of the elbow, and its mode of formation, will be best understood by a reference to the engraving. The inferior extremity of the biceps plunges into the interval left by the muscles of the fore-arm, hence arises a triangular-shaped depression, the edges of which are formed by the long supinator on one hand, 7, Fig. 2. Pl. XIII. and by the teres pronator on the other, 10, Fig. 2. Pl. XIII. which meet about the middle of the fore-arm. The summit of the triangle is lost in a shallow groove, which is itself effaced towards the middle of the limb. This median depression is formed by the muscular masses attached above to the inner and outer condyles of the humerus; these masses give rise to two reliefs, of which the inner is the more prominent, being elevated by the pully of the humerus. A half-flat surface succeeds these two reliefs; in the middle of this surface is a longitudinal shallow groove, limited by two tendinous cords; the external cord, which is the larger, is formed by the tendon of the great palmar, or radialis flexor muscle, 11, Fig. 2. Pl. XIII.; the tendon of the long palmar, 12, Fig. 2. Pl. XIII. forms the inner cord.

These tendons divide the fore-arm into two parts, slightly hollowed towards the lower part; in the external or radial groove, may occasionally be seen a slightly prominent cord, produced by the radial artery. Quite at the lower part of the fore-arm, a gentle prominence marks the position of the base of the styloid process of the radius, 7, Fig. 2. The inner and larger of the two grooves is not so deep, being partly filled by the tendons of the superficial flexor muscles of the fingers, 13, Fig. 2.; the tendon of the flexor carpi ulnaris, 14, Fig. 2. limits the groove internally. All this anterior surface of the arm is marked by superficial veins, which though they vary much as to their arrangement in different persons, do yet on the whole pretty generally accord with what we have represented in the figure. The two veins of the arm follow nearly the course of the biceps; the external is called the cephalic; the internal, the basilic. At the bend of the elbow these two trunks bifurcate, producing four branches, of which the internal and external follow the cubital and radial margins of the fore-arm, whilst the two middle and larger branches proceed towards the median groove of the fore-arm, where they reunite to form the median vein. Of these two middle branches, the external is called the median cephalic; the inner, the median basilic. The triangular space of the bend of the elbow is rendered more evident by the angle which these veins form at their re-union.

A slight fold, perceptible even when the hand is forcibly extended, marks the bend of the wrist joint. The groove is sometimes double, but the upper fold is always the least marked.

Two osseous eminences are situated in the line of the groove of the wrist. The inner one is the pisiform tuberosity, produced by the bone of that name, *E*. Fig. 2. the outer corresponds to and is caused by the scaphoid bone, *D*. Fig. 2. a small depression surmounts the superior angle of the palmar aponeurosis, 12, *idem*, separating the commencement of the thenar and hypothenar eminences, which assist in its formation. These two eminences occupy the lateral parts of the palm of the hand, circumscribing on either side the palmar depression; the thenar eminence tends towards the thumb, the hypothenar towards the little finger. The first is the larger. Its most prominent point corresponds to the short abductor, 18, Fig. 2. and to the short flexor of the thumb, 3, Fig. 4.; and the inferior depression to the adductor, 6, Fig. 4. and to the external expansion of the palmar aponeurosis.

The hypothenar eminence is formed by the adductor muscles, 2, Fig. 4. and short flexor of the little finger, 4, Fig. 4.; the cutaneous or short palmar, 19, Fig. 2. assists also towards its formation. The palmar aponeurosis adheres closely to the skin of the hand, and gives rise to the palmar depression. It terminates towards the fingers in four slips of fibres, which are attached to the distal end of the metacarpal bones, and may be distinguished on the surface by as many depressions, alternating with eminences, which the cellular tissue forms, bound down in the intervals by these aponeurotic fasciculi. By causing the thenar and hypothenar eminences to approach each other, folds and lines are produced in the palm of the hand, which at last become permanent. The large groove thus formed commences nearly on a level with the scaphoid eminence, terminating at the radial margin of the index, where it mingles with a particular fold, very distinct when the index finger is flexed. Another groove commences on the cubital margin of the hand towards the base of the little finger, terminating in a cutaneous fold between the index and the medius fingers. From the lower extremity of these furrows proceed the two last grooves, which cross in the middle of the hand, the inner one extending to the pisiform eminence; they are uniformly less distinct than the two others, Fig. 1. Pl. XIII.

At the base of each finger, there are two articular folds, with the exception of the index, which has but one; the fold of the thumb turns towards the upper part, disappearing towards the radial side of the hand; the four others, with the cutaneous and sharp folds placed between the base of the fingers, form a festooned arch, the internal extremity of which descends lower than the external. The first articulation of the phalanges has also its double articular folds opposed to each other by their concave sides; and finally, the four last fingers have a fold corresponding to the last joint. These articular folds or grooves are not placed on the same line; the groove of one finger is hollowed out opposite to the swelling of the next finger. The fold of the thumb is nearly on a level with the lower end of the first portion of the figure *M*, formed by the palmar grooves. The first groove of the index corresponds to the extremity of the thumb; the second to the middle of the second phalanx of the medius, the two folds of which are situated, the first opposite the middle part of the second phalanx of the ring finger, the second opposite the pulp of the same finger. The folds of this last, the ring finger, divide almost exactly the two first phalanges of the medius; those of the little finger are both below the first phalangean articulation of the ring finger. These arrangements vary, no doubt, but never widely, from that I have pointed out.

These articular grooves separate rounded eminences, of which the first are the most prominent; the last, or pulps of the fingers, have a peculiar rounded nipple-like shape; they are limited towards the back of the fingers, by the groove separating them from the nails. Between the pulp of the thumb and its articular groove there appears, during flexion, a sufficiently distinct fold, which occasionally persists even during extension of the thumb. The cutaneous fold uniting the thumb to the index is much more extensive than the others.

On the posterior surface of the arm is an elongated prominence, extending from the posterior edge of the deltoid, as far as the middle part of the limb, where it becomes changed into a plane prolonged as far as the elbow. Here may be recognized the biceps and its tendon spread out on the posterior aspect of the muscle, 4 and 4′, Fig. 2. Pl. XIV. Externally, the inferior portion of the posterior brachial depression is limited by a deep groove, to which a prominence succeeds, angular superiorly, and turning round towards the outer edge of the fore-arm; this prominence marks the position of the long supinator and of the extensor radii longus muscles, 6 and 7, Fig. 2. Pl. XIV. The olecranon process of the cubit, *C.* Fig. 2. *idem*, gives rise to the angular projection of the elbow, which disappears more and more as the fore-arm is extended, and is finally transformed into a somewhat large fossette. A plane surface, but more frequently a depression, corresponds to the interval existing between the olecranon and the inner condyle of the humerus, *B*. Fig. 2. which the soft parts do not fill up.

A well marked fossette limits the olecranon process externally; it is caused by the hollow space existing on a level with the humero-radial articulation, increased by the mass of muscles of the fore-arm attached to the outer condyle of the humerus. Below and a little external to the olecranon process, the anconeus, 8, Fig. 2. forms a triangular plane, limited externally by the belly of the posterior cubital muscle, 13, Fig. 2. which a shallow groove, produced by the aponeurotic partitions, separates from the longitudinal eminence of the common extensor of the fingers and proper extensor muscle of the little finger, 11 and 12, Fig. 2. Proceeding always towards the radial edge of the fore-arm, we find a second groove at the external edge of the common extensor muscle; then the little marked prominence of the second radial extensor, 10, Fig. 2. terminating in a point with the preceding under the edge of the relief formed by the first radial and the long supinator, 6 and 7, Fig. 2. Quite internally, there is a groove limiting the anconeous and separating the posterior cubital from the anterior, 9, Fig. 2. This last muscle forms all along the posterior and inner part of the fore-arm, a well marked prominence, the size of which is increased by the muscles which are attached to the inner condyle of the humerus.

The cubit, *C*. Fig. 1. forms the bottom of the groove

I have just described, and its posterior edge raises sensibly the integuments at the back part of the fore-arm, and gives rise to a longitudinal ridge or prominence, succeeding the groove and extending to the wrist. On the radial side of the fore-arm, above the wrist, and in the interval which separates the long extensor from the radial carpal muscles, there is a prominence passing obliquely over the radial side of the fore-arm; at this point the skin is raised by the long abductor and short extensor muscles of the thumb, 14 and 14′, Fig. 2. the first of these is attached inferiorly to the upper end of the first metacarpal bone; the second to the same extremity of the phalanx of the thumb. On the inner side of this eminence may be discovered in thin persons the tendinous cord of the common extensor of the fingers, 11, Fig. 2. A line drawn around from this tendon to those seen on the front of the arm, will be found to divide the limb into two nearly equal parts.

Two eminences of unequal height exist on the back of the wrist; the external, the most distinct and rounded, is formed by the head of the cubit, *D*. Fig. 2. the internal, always situated lower than the external, is formed by the lower end of the radius, *E*. Fig. 2. No transverse furrow crosses the back of the wrist, the movements of extension being more limited than those of flexion. The back of the hand is slightly concave from above downwards, and convex transversely. In thin persons, the projecting tendons of the extensor muscles are readily seen through the integuments, spreading out like a fan towards the roots of the fingers.

The first of these, reckoning from without inwards, and at the same time the most distinct, is that of the long extensor of the thumb, 16, Fig. 2. the three following belong to the long extensor of the fingers, 7, Fig. 4. The last is the tendon of the extensor proprius of the little finger, 12, Fig. 2.

Quite on the outer side may be seen a sixth tendon, proceeding from the wrist to the hand, towards that of the thumb already described, to which it seems united at the point of junction; it is the tendon of the short extensor of the thumb, 14, Fig. 2. The result of this arrangement is a deep hollow triangular space. The other tendinous cords are separated by grooves, increasing in breadth towards the fingers, where may be perceived the reliefs of the inter-osseal muscles. This arrangement is mostly remarkable in the first interval, where the inter-osseous muscle is perfectly well seen through the skin, 4, Fig. 4. On the inner side, the back of the hand is bounded by the muscular mass of the opponens and adductor of the little finger, 6, Fig. 4.

The articulations of the fingers with the hand give rise to well marked prominences in thin persons; they do not, however, all equally project; that of the medius finger is most distinct; next come the articulations of the index, the thumb, the ring and the little finger. In a dumpy or fat hand, these eminences are replaced by depressions, hollowed out on the summit of a little adipose cushion.

The skin covering these articulations is furrowed with a great number of folds or wrinkles, crossing each other in all directions; less marked over the articulations of the little finger; on the thumb they follow the direction of the other wrinkles of the skin. On the dorsal surface of the four last fingers there is scarcely to be found a trace of the extensor tendons, which lose themselves about the middle of the first phalanges, whilst the tendon of the long extensor of the thumb disappears only at a level with the phalangean articulation. The posterior aspect of the fingers is convex transversely, the articular folds are numerous and circumscribed in an oval space on the first phalangean articulations, whilst the last are indicated by folds, nearly transverse. These folds or wrinkles are not placed exactly on the same level with the anterior folds, but below and above them.

Finally, the extremity of the fingers is covered, behind, by the nails, commencing about the middle of the last phalanx, and on the lateral margins of which the skin is raised so as to form small grooves. Four deep inter-digital fissures exist; that between the thumb and fore-finger follows the external edge of the first dorsal inter-osseal, 4, Fig. 4. Pl. XIV. and owes its depth especially to the prominence of this muscle.

The lateral surfaces of the fingers are convex, like the anterior and posterior surfaces; slight enlargements on a level with the articulations is the only appearance meriting notice; the termination of the anterior articular folds may also be seen.

The dorsal surface of the hand, and of the inferior extremity of the fore-arm, is marked by veins whose arrangement is very irregular on the fore-arm, whilst on the back of the hand, they usually form an arch with the concavity looking upwards, whence proceed branches which ultimately join those of the fore-arm. Its convexity receives branches which come from the sides of the fingers, on the backs of which they occasionally form a small arch.

A groove arising at the deltoid fossette, passes along the external side of the arm, terminating towards the middle part of the limb. The interval existing between the outer margins of the brachialis flexor, 6, Fig. 2. Pl. xv. and of the triceps, 7, Fig. 2. gives rise to this groove, at the lower end of which the angular prominence of the long supinator and first external radial commences, 8 and 10, Fig. 2. This prominence enlarges and becomes elevated as it descends obliquely downwards and forwards from the posterior towards the anterior aspect of the limb, where it forms one with the outer belly and muscular mass of the fore-arm. It is limited behind by a groove commencing at the radio-cubital fossette, and terminates at the upper extremity of the eminence caused by the second external radial, 11, Fig. 2. in passing between the eminences of the long extensor, and of the first radial. Lower down is a narrow region, convex from before backwards, where the integuments cover only the tendons of the long supinator, 8, Fig. 2. of the two radials, 10 and 11, *idem*, and the radius. Above the wrist, the integuments are raised by a slight eminence, oblique from above downwards, and from behind forwards, the cause of which I have already explained when describing the posterior aspect of the limb. It is produced by the long abductor, 16, Fig. 2. and short extensor muscles of the thumb, which pass around over the margin of the radius. Under this elevation there is another, connected to the hand by a tendinous cord; the styloid process of the radius, *D. idem*, and the tendons of the long abductor, and of the short extensor of the thumb explain these forms. The tendinous cord gives rise to the outer edge of the fossette, which we have already considered, and which by reason of its oblique position, is equally well seen from behind forwards, and from within outwards, when the limb is looked at in profile.

Lower down may be observed a slight depression, then a relief commencing abruptly, this becomes rounded and proceeds towards the external edge of the thumb. It is the swelling of the opponeus muscle, 20, Fig. 2. forming the external part of the thenar eminence.

Of the veins on the outer border of the arm, the cephalic is the most remarkable, it sometimes occupies the brachial groove; the radial vein, placed at first on the outer muscular mass of the fore-arm, is directed afterwards towards the radial side; it traverses the radio-carpal fossette, and unites with the dorsal arch.

On the inner side of the arm, a groove, bordered by two elongated eminences, extends from the axilla as far as the lower third of the limb. Caused by the muscular swellings of the biceps and triceps, 3 and 6, Fig. 2. Pl. XVI. it is filled in part by important vessels and nerves. Near the fold of the arm, this groove widens out and forms a depressed triangular plane, corresponding to the inner part of the anterior brachial muscle, 4, Fig. 2.

The internal tuberosity (condyle) of the humerus, *B*. Fig. 2. forms always on the inner region of the elbow, an eminence more or less marked, according to the degree of *embonpoint*; a slight depression follows it immediately; next a fusiform fleshy plane, with its acute extremity downwards, corresponding to the anterior cubital, 12, *idem*, and to the muscles of the inner condyle.

Proceeding towards the lower portion of the limb, this plane, the upper part of which is slightly rounded, becomes a smooth or flat surface, limited behind by the cubit, and in front by the tendon of the anterior cubital. The styloid process of the cubit, *D*. Fig. 2. and a portion of the head of the bone, produce at this point two small prominences, separated by a groove scarcely to be seen. Below is a notch corresponding to the interval existing between the metacarpal and the lower end of the cubit.

Finally, the outer portion of the hypothenar eminence, convex in all senses, and formed at this point by the adductor, the short flexor, and the opponeus of the little finger, 2, 4, Fig. 4. Pl. XIII. and 6, Fig. 4. Pl. XIV. terminates on a level with the articulation of the little finger and last metacarpal bone. This joint is sufficiently prominent.

The basilic vein is often seen in the inner groove of the arm; the inner margin of the fore-arm is furrowed by the cubital veins, which unite with those of the fold of the arm, and to the internal portion of the palmar arch.

§ II.

FORMS PECULIAR TO DIFFERENT AGES, AND TO WOMAN.

A. *Infancy.* — The muscular forms are entirely masked by the cellular tissue; the deltoid prominence of the shoulder exists it is true, but the form of the muscle is scarcely to be made out. The arm and fore-arm are rounded, and distinguished from each other anteriorly by a groove, which is effaced during extension; posteriorly, by a fossette situated on a level with the olecranon. Two other curved grooves form a kind of bracelet around the wrist; small fossettes mark the position of the articulations. The elbow reaches pretty nearly the level of the base of the chest; the hand, to a little below the coxo-femoral articulation.

As the child grows, the limb becomes thinner, the forms shew themselves, becoming more marked, the acromio-clavicular prominence appears, and the point of the deltoid may now be seen; the fold of the arm elongates into a spear-shaped form, the veins appear, the posterior fossette is more and more effaced, the tendinous and osseous prominences of the wrist raise the integument, the hand lengthens, the tendinous cords and osseous columns of the metacarpus destroy the previous uniformity of the dorsal region of the hand; the fingers are more slender, their articulations become prominent, and the numerous folds of the wrist and hand deepen more and more. In young persons, the entire limb is almost always thinnest or most meagre on approaching puberty; the muscular forms model themselves distinctly only after this period of life, or rather, it is from twenty-five to thirty years that the muscular system displays all its power, unless its development be prematurely forced by violent exercise.

B. *Old age.*—The thoracic extremities of the old man are remarkable for their meagreness and angulosity. The muscles have lost that vigour so remarkable during the middle period of life; they become as it were atrophied in inaction; their contours are easily made out, having lost the celluloso-adipose cushion which once enveloped their forms, thus allowing the integuments to follow their dry and withered fasciculi. The veins are enormous, the skin becomes covered with numberless folds and wrinkles, principally on the back of the hand; longitudinal grooves appear occasionally on the nails, and the fleshless fingers scarcely admit of complete extension.

The acromio-clavicular articulation, the acromion process, the condyles of the humerus, and the lower ends of the bones of the fore-arm, the metacarpo-phalangean articulations, and the phalangean give rise to remarkable prominences, to which the withered skin is exactly applied.

C. *Woman.*—The *ensemble* of the arm of woman is more harmonious than that of man; the proportions between the arm and fore-arm are better observed. The acromio-clavicular articulation can scarcely be observed; the arm, strong and rounded, is finely attached to the trunk; the shoulder, the outline of which is of the highest purity, is continuous with the external surface of the arm, on which with difficulty can be discovered any traces of muscularity. The forms of the elbow are rounded by cellular tissue; even when the arm is flexed the purity of the outline of the fore-arm is scarcely disturbed by a few tendinous prominences; a fine, white, and translucent skin displays some azure filaments. The hand attached with the utmost elegance to a wrist of remarkable fineness, where the articular folds exist, is remarkable for the delicacy of its proportions. The projections or prominences, depressions, tendinous cords, denoting in man the strength of this instrument, are replaced in woman by forms finely rounded. The cutaneous folds are less marked, the fingers taper, terminating by delicate extremities slightly curved backwards; the nails are rose coloured and almond shaped; frequently when the fingers are extended, small fossettes appear on a level with the metacarpo-phalangean and phalangean articulations; finally, it is rare that hairs are developed over the general integument.

§ III.

CHANGES OF FORM PRODUCED BY THE MOVEMENTS OF THE UPPER EXTREMITY.

These movements are very varied, and hence the forms undergo numerous modifications. The shoulder, the fore-arm, the arm and the hand may all move separately, or all together, and it is this power which gives to the thoracic limb, the faculty of performing functions so varied. I shall endeavour to describe separately the modifications which each segment or fraction of the limb undergoes, with the exception of those of the arm and shoulder, which I shall describe together. We shall consider them: 1. Changes in the form of the arm and shoulder. 2. Those of the fore-arm; and 3. Those of the hand.

1. *Changes produced by the movements of the arm and of the shoulder.*

The arm can perform at the shoulder joint, universal motion; circumduction, rotation.

Extension outwards.—Abduction of the arm is always accompanied with elevation of the shoulder. The inferior angle of the scapula is carried upwards and outwards; the outer extremities of the collar bone and of the scapular spine are raised and approach the neck; the acromio-clavicular prominence follows consequently the same direction; but instead of becoming more prominent, it becomes by little and little effaced, and at first sight it might appear depressed. Muscular swellings, sufficiently well marked, correspond to the upper portion of the trapezius, to the supra spinatus, to the deltoid, to the superior fasciculus of the great pectoral, to the biceps; an irregular depression indicates the aponeurotic insertion of the trapezius and deltoid, the lower angle of which is lost in an angular fossette. Under the arm-pit may be observed prominences caused by the serratus magnus, the axillary hollow, and the two longitudinal reliefs produced by the distension of the muscles, shutting in the axilla, in front and behind.

All these forms produced by the natural elevation of the arm, are strongly modelled when the arm is raised with an effort. Then arise new changes. The external fasciculus of the sterno-cleido-mastoideus, and the upper part of the trapezius contract strongly; the omohyoideus shews itself passing across the supra-clavicular fossa, the depth of which is increased; but the relief formed by the supra spinatus is above all remarkable. The turgescence of the jugular vein must not be forgotten. At the same time the head is drawn away to the opposite side by the muscles of the neck, the forms of which become very apparent.

I need not describe the changes which take place when the arm is lowered merely by its own weight; it is only when lowered with an effort that the changes in form merit our attention; in such a case, as in pulling on a cord fixed to the floor or soil, the serratus magnus, great pectoral, and teres major, display their muscular forms.

Extension forwards.—The scapula rotates, but not so much as in lateral extension; the aponeurotic depression of the shoulder still shews itself, the three anterior fourths of the deltoid contract, the deltoid impression deepens, the supra spinatus, the biceps, swell slightly; the coraco-brachialis, and the superior portion of the great pectoral are scarcely seen, unless indeed it happen that the arm is powerfully supporting a heavy burden.

If we depress the arm with force, carrying it at the same time backwards, the head of the humerus raises the upper part of the shoulder; the muscular prominences will be formed by the teres major, the latissimus dorsi, the deltoid, the back part of the biceps, and the supra spinatus. To bring the arm forward with energy, the elevator muscles contract with more or less force.

If the action of the deltoid be suspended, the great pectoral, assisted by some elevator muscles, as the biceps, the coraco-brachialis, &c. carry the limb in front of the breast. If the arm be carried behind the torso by the teres major and latissimus dorsi, numerous folds form in the angle of re-union of the arm with the trunk, the scapula is carried inwards towards the vertebral column, and if both limbs perform the same movements together, the spinal groove deepens greatly, or rather the two reliefs which limit and form it will come in contact, and the scapula project from the trunk remarkably. On every occasion when the arm passes before or behind the trunk, the acromio-clavicular articulation becomes more prominent.

Circumduction is a result of the successive passing of the arm through the various positions, the mechanism of which I have just described.

Rotation.—This movement merits no particular description. The arm in Fig. 1. Pl. XIII. is represented as rotating outwards.

2. *Changes in form produced by the movements of the fore-arm.*

The fore-arm performs four movements on the arm: flexion, extension, rotation outwards, or supination, and rotation inwards, or pronation.

Flexion.—The results or form produced by this movement will be readily understood by a careful study of Pl. XIII. The swelling of the biceps, especially merits attention. The long supinator and all the flexor muscles enter into action; but the remarkable development of these muscular masses is in part due to the pressure of the fore-arm against the arm. This causes a bulging out of the muscular masses.

The forms of the elbow are deeply modified during flexion. The olecranon becomes very prominent, *A. B.* Fig. 4 and 3. Pl. XV. and *B. B.* Fig. 3 and 4. Pl. XVI. above this process a considerable meplat or semi-flat surface corresponds to the tendon of the triceps, 4, Fig. 4. Pl. XV. the fossette above the inner condyle of the humerus is quite effaced.

Extension.—There is no occasion for describing extension. But here again, as we have frequently pointed out, extension with an effort, or against resistance, displays the form of the triceps more strongly. The size of the fore-arm is also increased by forced extension.

Rotation outwards and inwards, supination and pronation.

I shall describe only *pronation ;* the limbs drawn in the atlas are chiefly in the act of *supination.* Figures 3 and 4 of Plates XV. and XVI. represent pronation. It is first to be observed, that this movement is accompanied by flexion of the fore-arm on the arm. I request my readers to re-examine with care, what I have said of pronation and supination, when describing the articulations of the radius and the ulna, in the first part of this work, before reading the following description.

The general aspect of the limb is modified by the rotation or torsion which all the parts of the limb undergo, more than by any muscular changes of form. The muscles attached on one hand to the inner condyle of the humerus, on the other to the radius, or to a point corresponding to this bone, contract, and the inner belly or muscular mass of the fore-arm swells, shortens, and terminates by an angular form in the inner condyle of the humerus. A transverse depression and some folds correspond to the aponeurotic expansion of the biceps, 3, Fig. 4. Pl. XVI. The tendons of the palmar muscles, 9 and 10, Fig. 4. Pl. XVI. raise the skin near the wrist. The muscles connected with the outer condyle are relaxed and flattened, but when the wrist and fore-arm are bent, the skin of the bend of the elbow is strongly raised, outwards, by the long supinator and radial muscles, 5, 6, 7, Fig. 4. Pl. XV. which a somewhat deep groove separates from the prominent mass of the common long extensor, proper of the little finger and posterior cubital muscles, 8, 9, 10, Fig. 4. Pl. XV.

The lower end of the cubit, *B*. Fig. 4. Pl. XV. strongly raises the skin, as well as the tendon of the anterior cubital, 12, Fig. 4. Pl. XV. and these two prominences are separated by an elongated fossette of considerable depth.

Near the elbow, the anconeus, 11, Fig. 4. Pl. XV. shews its angular form, and its apex terminates in a groove separating the posterior from the anterior cubital. Towards the lower end of the external edge of the fore-arm, a longitudinal eminence, oblique from behind forwards, from without inwards, and from above downwards, produced by the long abductor and short extensor muscles of the thumb, 13, Fig. 4. Pl. XV. and XIV. 15, Fig. 4. Pl. XVI. and by their tendons, crosses the direction of the radius. The contraction of the biceps, 3, Fig. 4. Pl. XVI. is very energetic during this movement, for the muscle is then not only a flexor, but also a rotator of the fore-arm inwards, or pronator, by reason of its lower attachment to the bicipital tuberosity of the radius. Thus, the muscles of the back part of the arm turn in such a way that their upper extremities do not change place. The anterior muscles turn in the opposite direction, and this torsion of the active superficial muscular powers explains perfectly the appearance of the limb.

3. *Changes in form produced by the movements of the hand and wrist.*

These changes are inconsiderable. *Flexion* gives rise to two or three large folds, having their concavity downwards, embracing the anterior part of the wrist. The triangular fossette, situated between the tendons of the short extensor, long abductor of the thumb and that of the long extensor of the same finger, is completely effaced. There are formed also two or three folds on the inner side of the wrist when the hand is flexed inwards, and the triangular fossette is rendered deeper by the projection of the tendon of the long extensor of the thumb. *Flexion outwards and backwards* produces a hardly perceptible puckering of the skin; but in forced extension, the extensor tendons raise the skin strongly, and produce on the back of the hand, three well marked branches, terminating at the indicator, the medius and the ring fingers. A small fossette limits them inwards, near the wrist, and another, deeper, limits them outwards, being itself circumscribed by a strong projection of the tendon of the long extensor of the thumb.

When the hand is closed, and at the same time flexed on the fore-arm, the anterior folds of the wrist are not so strongly marked, and the tendons of the anterior cubital, flexors of the fingers, radial flexor and long palmar, are readily distinguished; at the same time, the inner belly or fleshy mass of the fore-arm swells, and a long tendinous half-flat surface forms on the inner part of the limb. At the back, the muscles are tense and occasionally well defined.

Amongst the movements of the hand, the most remarkable are those of the thumb. When *abducted*, the tendon of the long extensor, and those of the short extensor and long abductor, raise the skin, giving rise to two fossettes, of which we have already spoken. In *adduction* these fossettes diminish the depth, and two prominences form, the first corresponding to the adductor of the thumb, the second to the first dorsal inter-osseous. The reappearance of the fossette may be caused by carrying the thumb backwards and outwards. If, on the contrary, the thumb be flexed strongly inwards, (*opposition*), the fossettes are obliterated, the muscles of the thenar eminence swell, the folds representing the first and second limbs of the figure M, formed by the palmar folds, are deeply hollowed out as well as those of the base of the thumb; the swelling of the dorsal inter-osseal disappears.

The second and fourth limb of the figure M, formed by the palmar folds, are best seen when the fingers are flexed; during this movement the anterior articular folds and those of the dorsal aspect of the fingers disappear, as well as the tendinous eminences of the back of the hand.

CHAPTER XIII.

EXTERIOR FORMS OF THE LOWER LIMBS OR EXTREMITIES.

§ 1.

THE thigh, the leg and the foot compose the lower extremity; the hip joint, uniting the thigh to the trunk, has been described with the lateral regions of the torso.

The femoral rectus, 6, Fig. 2. Pl. XVIII, forms a fine relief, at the top of which is a slight angular depression, caused by the separation of the tensor and sartorius muscles, 4, 5, Fig. 2. Pl. XVIII. and situated a little below the anterior and superior iliac spine, *A*. Fig. 2. Below, this relief contracts and terminates in a plane surface, nearly triangular, above the rotula, *C*. Fig. 1 and 2. This plane corresponds to the tendon of the muscle, bordered by the swellings of the muscular vasti, 7, Fig. 2. whose tendon unites inseparably with that of the rectus, to be inserted ultimately into the rotula. A slightly elevated prominence which, below becomes a groove, and which may be followed from the antero superior spine of the ilium as far as the inner side of the knee, is a form produced by the sartorius, 5, Fig. 2. Above, and towards the outer side of the thigh, is seen, first, the anterior portion of the tensor; next, a portion of the vastus externus, uniting with the common tendon of the rotula. Thus it happens that the femoral relief is due to the presence of two shallow grooves, caused by the prominence of its muscular fibres, those of the tensor of the aponeurosis, of the vasti and sartorius. But all these forms merge in a large convex surface, limited internally by the groove of the sartorius and the relief of the vastus internus, and terminating inferiorly by a profound depression.

A triangular plane, limited above by the fold of the groin and the groove of the sartorius, terminates by a depression produced by the passage of this muscle towards the inner side of the thigh. The inferior extremities of the psoas and iliacus muscles, 1, 2, Fig. 2. the pectineus, the adductors, and the anterior edge of the gracilis, 9, 10, 11, Fig. 2. give rise to this plane, which belongs in part to the inner side of the thigh, but which I describe in this place as being perfectly visible anteriorly.

The rotulian prominence, 6, Fig. 1 and 2. succeeds to the half-flat surface formed by the tendon of the rectus. This triangular prominence with rounded angles is continuous at its base with the half-flat (*meplat*) surface of the tendon of the rectus; its summit is confounded with the plane of the ligament of the patella, (rotular tendon), which connects the rotula to the anterior tuberosity of the tibia, *D*. Fig. 2. and with the fatty prominent cushions seen at the sides of the tendon. The fatty cushions or pellets extend as far as the anterior tuberosity, forming a band, the prominence of which is due, in part, to the ligament of the patella. It is evident, indeed, that the ligament is raised up by the adipose tissue, though still sufficiently resisting to force the tissue to the sides, where it gives rise to two eminences, rising above the level of the sides of the rotula; lower down, this elevated band or cushion disappears under the ligament above the anterior tibial tuberosity. Thus then the rotular triangle seems to lodge its inferior angle in the notch of an eminence, which in form resembles somewhat the figure of a heart as depicted on cards, slightly depressed on the median line, and terminating in a point at the tuberosity of the tibia. This last eminence is not so prominent as the preceding; it rises from the bottom of an angular depression, corresponding to the tibia. External to and above the rotula, the skin dips into a hollow space, situated between the vastus externus and the muscles of the leg.

The form of the leg is nearly prismatic; of its three surfaces, the posterior corresponds to the gemelli, the two others are placed, the one on the inner, the other on the outer side of the tibia. It results from this arrangement that, on looking at the anterior part of the leg, its internal and external aspects are seen at the same time; and hence it is not possible to avoid describing forms which are found at the sides. By dividing the leg into three surfaces, some of these repetitions might no doubt have been avoided; but such a division would neither have corresponded with that of the thigh, nor with the figures which represent the four sides of the limb.

The crest or anterior margin of the tibia, *D*. Fig. 1. convex forwards, extends from the tuberosity of the bone to the malleolus internus. This edge or margin is most distinct above, where it presents a slight curve, with the concavity looking outwards; a little lower down, it is concealed by the tibialis anticus muscle, 12, Fig. 2; and towards the inferior third of the limb it bends inwards and becomes rounded transversely. External to this crest, the tibialis anticus, on one hand, and the peroneal, the long common extensor, and the extensor of the great toe, form two planes of an equal size, 12, 13, 14, Fig. 2. Pl. XVIII. and 11, 12, Fig. 2. Pl. XXI. The first is fusiform, terminating in a point on a level with the tibial tuberosity; below, it contracts and changes its appearance. When the leg is thin, a trace of the tendon of the tibialis anticus may be seen. This first plane follows the direction inwards of the tibial crest. The second is not so large by a half; it follows the external margin of the preceding, below which it commences; afterwards it proceeds towards the articulation of the foot, being always of the same width or breadth; but above, the muscular fibres form a powerful fasciculus, which projects outwards, whilst lower down, they gradually disappear, finally giving place to the tendons. A slight depression usually exists towards the union of the superior third of the leg with the middle third ; this I believe to depend on the sudden cessation and contraction of the soleus muscle at this point. The tibial crest is accompanied throughout its whole length by a semi-flat surface, somewhat large superiorly, and twisted on itself below: it bends in the same direction to form the malleolus, this is the tibial surface or meplat, formed by the internal subcutaneous surface of the bone. The attachment of the tendon of the sartorius above, by elevating the skin, adds to the breadth of the surface.

Behind this osseous semi-flat, arise two distinct reliefs, separated towards the middle part of the leg by a groove, arising pretty nearly on a level with the anterior tuberosity of the tibia, following the inner edge of the bone as far as the middle portion, becoming effaced gradually, curving outwards and backwards. The superior of these two reliefs is stronger than the inferior ; it begins near the inner depression of the knee, *D*. Fig. 2. Pl. XVIII. swells towards the lower part, then becomes suddenly depressed above the furrow, to which succeeds the second relief. This is much less prominent than the superior, seemingly continuous with the tibial semi-flat surface, nevertheless descending towards the malleolus internus, above which it disappears. The thick edge of the genellus internus, 18, Fig. 2. produces the first relief; the second is formed by the edge of the soleus and the long common flexor of the toes, 19, 20, *idem*.

Under the malleolus internus is the union of the foot and leg. There is here a small depression due to the presence of the lateral and internal portion of the tarsal ligament, 20, Fig. 2. Pl. XX. and XXIII. Fig. 2. Pl. XVIII. the anterior band of which is visibly raised by the tendon of the tibialis anticus, directed towards the inner part of the foot. The other tendons on a level with the articulation, are visible only during the flexion of the foot on the leg. On the sides of the fold of the instep are two osseous prominences, *A. B.* Fig. 4. Pl. XXIII. which I shall describe with the lateral surfaces.

A surface, convex in all senses, follows the articular groove; it is the back of the foot. It has the form of a convex surface with a double inclination towards the toes and outer side of the foot, on which may be observed several eminences and depressions, which we shall now consider.

At first, there is the continuation of the tendon of the tibialis anticus, 4, Fig. 4. Pl. XXV. which disappears towards the inner side of the foot about the middle; next, the tendon of the extensor proprius of the great toe, directed obliquely from without, inwards, 3, Fig. 4. Pl. XXIII. and finally, the four tendinous cords of the common extensor, disposed like a fan, in a similar way to those of the back of the hand, and extending from the annular ligament to their respective toes, 2, Fig. 4. *idem.* It is rare that the tendons of the extensor brevis or pediosus, are to be seen between those of the extensor communis. All those tendons, scarcely visible when the muscles are not in action, limit grooves more or less deep, and increasing in size from the articular fold to the base of the toes.

The most elevated part of the dorsal region of the foot we now describe, is called the instep; it corresponds to the prominence caused by the first and second cuneiform bones, *E. G.* Fig. 3. Pl. XXIII. and by their articulations with the first two metatarsal. The tendon of the extensor proprius of the great toe descends along the middle portion of this eminence, and assists in its formation. The bases of the toes are situated on an oblique line from without, inwards, and from behind, forwards; they enlarge towards their extremities, the skin of which is elevated at the sides of the nails. Of the four clefts or inter-digital spaces, the first is large, and the short inclined plane, connecting the dorsal aspect of the foot to the plantar, may here be noticed; the four last toes are placed close to each other, leaving no interval. The last phalangean articulation is marked by a slight depression; the second toe is the longest, the third, fourth and fifth diminish gradually, so that the extremity of the little toe reaches no further than the last joint but one of the second toe, Fig. 3. Pl. XXIII.

The veins usually seen on the anterior surface of the lower extremity, have been sketched at Fig. 1. Pl. XVIII. They are the great saphena, seen in the semi-flat surface of the groin, and the internal or long saphena following nearly the course of the sartorius.

Externally, the thigh presents a large plane convex surface, contracting from the trochanteric prominence, *C.* Fig. 2. Pl. XXI. quite to the knee joint. The projecting portion of this form, produced by the vastus externus, *C.* Fig. 2. bound down by the femoral aponeurosis, becomes gradually less rounded as it approaches the knee. Another rounded prominence, situated behind the one just described, is separated from it by a wide longitudinal groove; the upper end of this groove ends in the depression behind the trochanter; inferiorly, it is lost on a level with the knee. This prominence or elongated swelling is caused by the biceps, 7, Fig. 2. and the groove represents the interval between this muscle and the vastus externus; the tension of the aponeurosis contributes towards its production.

The curved line limiting the profile of the thigh is completed above by the sartorius, 4, Fig. 2. Pl. XXI.

The arrangement of the muscular planes, and the oblique direction of the thigh on the leg, explain perfectly the depression on the outer side of the knee. The external angles of the rotula, and its adipose cushion in front; on the other side, the inferior tendon of the biceps, raised somewhat by the external tuberosity of the femur; next, a depression situated a little above the level of the anterior tuberosity of the tibia, under the tendinous elevation of the biceps, and corresponding to the head of the tibia, *F.* Fig. 2.; these are the forms of the outer surface of the knee.

Behind these eminences is the fusiform eminence of the external gemellus and soleus, 9, 10, Fig. 2. the small depression I have already mentioned, and the margin of a powerful tendinous cord, formed by the common tendon of the gemelli and soleus, 10′ *d.* and which is prolonged as far as the heel; a little more forward, a slight groove precedes the plane formed by the peronei muscles and the common extensor, 11, 12, 14, *idem*, also of the tibialis anticus, 8, *idem.* Above the articulation of the foot is the depression formed by the interval separating the tendon of Achilles from the peroneal muscles; this depression commences under the prominence produced by the external margin of the soleus, widening a little as it follows the direction of the tendon as far as the outer ancle (malleolus externus), at which point it turns forward. The tendon of the long peroneus embraces the lower end of the fibula, passing around it towards the sole of the foot. A triangular osseous plane is formed here by the fibula. In front may occasionally be seen the tendons of the extensor muscles of the toes, and of the anterior or third peroneus may occasionally be seen in front of this, the external malleolus. As the tendinous cords pass below the articular fold, they become suddenly effaced, being bound down by the annular ligament.

Quite at the back is the projecting tuberosity of the calcaneum, covered by a thick tissue above, and in front of which is a groove, rendered more distinct by the projecting fibular malleolus. A slight depression terminates forward at the projection of the fifth metatarsal bone; this unites with the base of the little toe by a rounded edge, corresponding to the abductor muscle of the little toe, 16, Fig. 2.

The external or short saphena, situated behind the malleolus, is the only vein requiring to be pointed out on the outer side of the limb. On the inner side of the lower extremity, there is the oblique semi-flat (*meplat*) of the sartorius muscle. A groove following the same direction, commences at the summit of the inguinal depression, and becomes effaced towards the inferior third of the thigh; finally, in front of the groove of the sartorius, and above the knee, is the well marked relief of the vastus externus, 6, Fig. 2. Pl. 20. terminating on a level with the internal rotular angle, and surmounting the prominent inner femoral tuberosity. Above and behind the sartorius, the inner muscles of the thigh, the gracilis, the third adductor, the semi-membranosus, semi-tendinosus, 9, 10, 11, 12, Fig. 2. Pl. xx. form a broad plane surface, rounded superiorly; it narrows gradually, forms a tendinous fasciculus, which follows the posterior border of the sartorius, proceeding to lose itself upon the inner side of the knee joint. The inner tuberosity of the femur, on a level with and behind the rotula, and the inner condyle of the tibia produce at this point a large rounded eminence, exceedingly well marked, on which may occasionally be observed a slight transverse groove, indicating the point of union of the articular surfaces. In front of the internal eminence of the knee, a vertical depression corresponds to the interval separating the inner condyle of the femur, *B*. Fig. 2. from the rotula, *C. idem*: next comes the internal angle of this bone, and the inner portion of its adipose cushion. A sufficiently distinct groove, the convex scale of which looks downwards and backwards, proceeds from the tibia, winds around the condyle of this bone, disappearing ultimately in the hollow of the ham. This groove, Fig. 2. Pl. xx. results from the presence of the reunited tendons of the sartorius, gracilis, semi-tendinosus, and semi-membranosus. The tendon of this last muscle may be distinctly seen through the integument.

From the convexity of this groove arises a large oval relief, depressed at one part of its extent; this relief corresponds to the internal genellus, and to its aponeurosis, 13, Fig. 2. and terminates inferiorly and behind by a long triangular half-flat surface, formed by the tendon common to this muscle and to the soleus. Anteriorly, this eminence of the calf is limited by the groove, which the muscular fibres of the gemellus give rise to by their reunion with the tibia. An eminence, less marked than the preceding, is continuous with this groove, extending to the neighbourhood of the malleolus internus, leaving between it and the tendon of Achilles a marked depression. This form is due to the soleus, and to the long common flexor of the toes, 14, 15, Fig. 2.

Before these muscular masses is the inner aspect of the tibia, *D*. terminated inferiorly, by the square-shaped surface of the malleolus internus, larger and more prominent than the osseous surface of the peroneal malleolus. A large groove, hollowed out behind this eminence, embraces it in its concavity. Produced by the union of the calcaneum with the astragalus, and of this last with the tibia, it is limited in front by the malleolus, and behind by the tuberosity of the calcaneum, whose prominence is increased by the tendon of Achilles, and the thick soft parts covering it, 13′ *idem*. The skin does not exactly follow this depression, which in that case would be of great depth; this is prevented by the groove being greatly filled up with adipose tissue, and with the tendons of the tibialis posticus of the long common flexor, of the flexor proprius of the great toe; the annular ligament assists also in filling up the space. This ligament extends from the malleolus to the tuberosity of the calcaneum. The groove so formed, proceeds obliquely downwards and forwards, towards the sole of the foot, assisting in the formation of the hollow of the arch. On the inner side of the foot are four projections; the first, caused by the scaphoid, is situated beneath the malleolus, and forward; the second, less marked, is formed by the tendon of the tibialis anticus, 18, *idem;* the third is produced by the articulation of the first metatarsal bone with the prominal phalanx of the great toe; the fourth eminence is situated on a level with the last articulation of the great toe; various circumstances combine to render this eminence quite distinct. The adductor muscle of the great toe, 19, Fig. 2. covered by a very thick skin, determines the rounded form of the inner side of the foot.

The great saphena is seen on the inner edge of the tibia above the malleolus, and on the corresponding side of the foot.

Looked at behind, the thigh presents a large transversely convex surface, commencing at the sub-gluteal groove. Formed by the relief of the biceps, semi-tendinosus, semi-membranosus, and, superiorly, of the third adductor muscles, 5, 6, 7, 8, Fig. 2. Pl. XIX. it is limited externally by the outer groove of the thigh, and the vastus externus, 4, *idem.* and internally by the groove of the sartorius. This convex surface flattens above the fold of the ham, and is continuous with the upper part of the limb, passing between two slight elevations, produced externally by the inferior extremity of the biceps, and internally by the tendons of the semi membranosus, semi-tendinosus and gracilis; in short by the ham-strings, 5, 6, 7, 9, Fig. 2. Pl. XIX.

In order fully to comprehend the forms just described, study attentively Fig. 2. Pl. XIX.

The gemelli or gastro-cnemii, 1, are covered and bridled down throughout the greater part of their extent by the expansion of their superior tendon. But two muscular bundles, sufficiently well marked, appear in the interval between these tendons, and the prominences they form are all the more striking that the muscles are bridled down by these expansions. Towards the middle of the leg, the muscular fibres form two fleshy and vigorous bellies, or rounded masses, separated by a small angular depression, rapidly bending forwards to proceed to an aponeurosis, common to the gemelli, and soleus; but the outer belly of the muscle descends much lower than the internal. The aponeurosis is triangular, its summit corresponds to the tuberosity of the calcaneum, *G.* Fig. 1 and 2. Above, the soleus extends beyond it, more especially externally; below, the aponeurosis becomes narrower, and is changed into a strong and thick tendon, spreading out above the calcaneum, to which it is attached. In its passage, this tendon describes a curve, with the concavity looking backwards, a form caused by aponeuroses, which draw it towards the bone. Inferiorly, it is forced again to extend backwards, in order to reach the calcaneum, to which it is attached.

The tendon of Achilles is then free from the lower fourth of the leg, as far as the heel, thus forming a sort of bridge, extending from the lower end of the soleus, as far as the calcaneum; hence the existence of two deep grooves, limiting this bridge laterally; the bottom of these grooves is occupied on the inner side by the tendons of the long common flexor, of the tibialis posticus, and of the flexor proprius; the peroneal tendons and muscles, covered by aponeuroses which bind them down, are situated to the outer side of the great tendon of Achilles. The back part of the malleoli limit these depressions, whilst, quite below, the calcaneum, surmounted by the tendon of Achilles and the integument, forms a large projection, rounded in all senses, but somewhat elongated from above, downwards. Study carefully these different arrangements, and you will experience no difficulty in modelling the posterior surface of the leg. All the five forms found here are but the gentle representation on the surface of the deeper anatomical disposition.

The muscles of the sole of the foot do not play an important part in modifying the forms of this region; they are marked in fact by the plantar aponeurosis, and by the great strength of the integuments. Behind, the heel presents an ovoid eminence, elongated from behind forwards, and flattened by pressure; it is continuous externally, with an elongated relief, which follows the outer edge of the foot, enlarges, and turns round towards the articulation of the last toe, thus forming behind the other appendages a rounded cushion, limited in front by a deep groove hollowed out at the base of the toes. This groove, less distinct under the great toe, describes a curve having its convexity anteriorly, and situated more forward than the notches on the dorsal aspect of the foot.

The pulps of the toes, flattened like the heel by the weight of the body, represent plane surfaces, nearly quadrilateral; these enlarge from the small to the great toe, the area of the plane of which is nearly double that of the second.

On the inner side of the plantar relief is a depression, forming the arch or hollow of the foot; this hollow joins the sub-malleolar groove. The sole of the foot, narrow behind, broadens out progressively as far as the level of the metatarso-phalangean articulations; it then again contracts to the extremities of the toes. Numerous folds furrow its surface, but they are especially visible under the arch. Some stronger marked longitudinal wrinkles, crossed by transverse folds, are imprinted on the external relief.

§ II.

FORMS PECULIAR TO DIFFERENT AGES, AND TO WOMAN.

A. *Infancy.*—A curved furrow, as has been already mentioned, limits the region of the hips; in the infant, other furrows or deep folds seem to separate the thigh from the trunk. The limb itself is arched within; a very deep fold appears in the middle of the thigh, another on a level with the knee; this joint is prominent inwards, and its forms are rounded. Other folds separate the limb from the foot, and exist as well behind as before. The lower extremities are shorter than the upper, their length being about a third of the entire length of the body. They have rounded forms, resembling cushions of fat separated by numerous folds. As development proceeds, they become always slender, the thigh and leg lengthen, until they have attained half the total stature of the person; the folds become effaced, the muscular forms are still scarcely perceptible, the calf of the leg begins to show itself, and the tendon Achilles soon becomes prominent.

B. *Old age.*—The lower extremities, ill supported by the enfeebled muscles, bend under the weight of the trunk. All the muscular projections become as it were dissected; the depression on the inner side of the upper part of the thighs is deeply hollowed; the prominences of the knees are no longer masked or rounded by cellular tissue; the crest of the tibia resembles a sharp wedge; the calf of the leg diminishes in size, and trembles in walking. The tarsal and malleolar prominences, the tendinous cords of the feet, numerous wrinkles and inter-tendinous depressions indicate the decay, and if I may so express myself, the withering up of man as he reaches the extreme term of his life.

Forms of woman.—The width of the pelvis in woman, causes the obliquity of the thigh bones; the thigh therefore slopes much more inwards in woman than in man; the knee joint is prominent on the inner side of the limb, and the graceful line limiting the thigh externally, is strongly hollowed out on a level with the hip joint, becomes afterwards elevated and rounded on the outer side of the leg. This inclination of the thigh on the pelvis, and of the leg on the thigh, which would constitute an imperfection in man, and a subject of mockery, gives to woman a peculiar charm; nature ever lavishes her favours on woman in respect of forms; in her the outlines are always undulating, and full of grace and suppleness; no stiffness, sharp angular projecting masses, lines straight and meagre; the thigh, strong and powerful at its base, where it is in contact with that of the opposite side, gradually becomes more slender as it approaches the delicately formed knee; to this succeeds the swelling of the calf, and the line of the tibia. The lower part of the limb has a grace and beauty, too well known to require any eulogy on my part; add to these, the malleoli or ankle projections of a child, a small foot most tastefully arched, a venous net-work, increasing by contrast the marvellous whiteness of the skin, and you will have traced the enchanting *tout ensemble* of the limbs in woman.

§ III.

CHANGES IN FORM PRODUCED BY THE MOVEMENTS OF THE LOWER OR PELVIAN EXTREMITIES.

I shall describe in succession: 1. The movements of the thigh on the trunk. 2. Of the leg on the thigh. 3. Of the foot on the leg. 4. Of the toes.

1. *Changes produced by the movements of the thigh on the trunk.*

The thigh can bend forwards, extend backwards; it performs the movements of abduction, adduction, rotation or circumduction; but various circumstances, obvious enough to the student, prevent the thigh being as moveable as the arm.

Abduction.—The gluteal muscles and the tensor fasciæ latæ contract vigorously, the iliac groove deepens, and a well marked depression shews itself on a level with the great trochanter. All the outer part of the thigh becomes tense, bridled down by the broad band (tendinous termination of the tensor fascia, and strongest portion of the aponeurosis itself), the extremity of which raises the skin a little.

Adduction.—If this movement be limited merely to bringing the thighs together, there is no sensible change of forms. But it is quite otherwise when the thighs are crossed. The adductors, the pectineus, the gracilis, in contracting, depress the inner part of the limb, whilst the sartorius shortens, enlarges, and may be traced to the inner part of the knee. Externally, the thigh remains tense, owing to the aponeurosis. The trochanter raises the skin, and the lateral portion of the hip flattens.

Flexion of the thigh on the trunk.—A long and broad ovoid prominence occupies the front of the thigh, terminating near the knee in a well marked half-flat surface, on the outer side of which is a pyriform swelling, the larger end of which is lowest. These changes result from the contraction of the rectus muscle, 1, Fig. 2. Pl. XXIII. pressing the vastus externus inferiorly on the outer side of the rotulian ligament. The action also of the sartorius is readily seen, of the psoas, of the iliacus, of the adductors and pectineus, 2, 3, 4, 5, 6, Fig. 2. When the thigh is strongly bent, a depression is seen between the upper ends of the sartorius and the tensor. The fold of the groin is deeply marked, and the gluteal depression appears between the gluteal muscles and the tensor, 1, 2, Fig. 2. Pl. XXII. the action of which is also called into play. The inferior fold of the hip disappears, and the back part of the thigh becomes tense and enlarges.

Extension bakwards.—This movement is extremely limited; to produce it, the muscles employed are, the large gluteus, the biceps, semi-tendinosus, and the membranosus. The fold below the hip augments in depth, whilst the original fold disappears, and the skin of the thigh is strongly stretched over the anterior muscles.

Rotation outwards.—The glutei, the biceps, the sartorius, are the principal agents in this movement, but the limb is not thereby much altered in appearance. The trochanter becomes more prominent. It is much the same in respect of *rotation inwards.* The triangular plane of the inner and upper part of the thigh is somewhat depressed during rotation inwards.

The circumduction of the thigh, requires no more consideration than did that of the arm.

The trunk can perform all the movements on the thigh, which the latter does on the trunk, but the forms of the thigh are in this case still less altered.

2. *Changes in form caused by movements of the leg on the thigh.*

The movements of the leg are four in number: flexion, extension, rotation, outwards and inwards. These latter are but little observable, and only seen under particular circumstances.

Flexion.—In proportion as the leg bends on the thigh, the tendons of the flexors raise the skin of the ham on either side; the soleus, and especially the gemelli or gastro-cnemii, are largely modelled; the two aponeurotic semi-flats are stretched, and depress the muscular masses, which become heaped up on themselves, giving rise to two powerful reliefs above the lower tendinous plane, external to which the soleus shews itself. But again, before such reliefs and forms are distinctly brought out, the muscular effort must be considerable, and this demands in addition the contraction of the sartorius, gracilis, semi-tendinosus, semimembranosus, gemelli, soleus, 2, 7, 9, 11, 12, Fig. 2. Pl. XXIII. and biceps, 5, Fig. 2. Pl. XXII. When flexion is complete, or forced, as in the Figures 1. 1. 2. 2. Pl. XXII. and XXIII. the muscular masses meet, and mutually oppose each other, and the calf of the leg may be seen to project on the two sides; whilst deep grooves appear on the margins of the muscles, and especially near the tibia.

The skin of the anterior part of the thigh becomes tense, the region of the knee elongates by little and little, the patella becomes depressed and fused with the surrounding parts, the triceps divides or separates under the pressure of its large tendon, the tuberosity of the tibia becomes more distinct, and the condyles of the femur are seen as two prominences, the innermost of which is the most distinct. All these forms are effaced in proportion as the triceps restores the limb to its extended state.

I require not to speak of the extremely limited movements of rotation, which take place in the knee joint; they produce no appreciable changes in form.

3. *Changes in form produced by the movements of the foot.*

When the extensors of the toes, and of the great toe, the tibialis anticus, and the peroneus alter or tertius contract, the foot is bent on the leg, numerous folds appear anteriorly on a level with the joint; the depression seen above the calcaneum is effaced, the tendons of the muscles just named raise the skin, and are separated from each other by angular fossettes, deep in proportion to the extent of the flexion.

Forced extension is produced by the gemelli, the soleus, flexor of the toes, peroneal, and tibialis posticus. If the foot meets with resistance, as happens when we rise on the toes, the forms of the calves are vigorously modelled; some folds appear above the heels, which are raised upwards and backwards, and the first cuneiform, *F.* Fig. 3. Pl. XXIII. becomes more prominent on the instep.

Lateral flexion.—Rotation inwards and outwards, are movements of too feeble a character to merit our attention.

The greatest analogy subsists between the motions of the toes and of the fingers. It is always by means of muscles and long tendons that the osseous skeleton forming these parts is moved, but the hand is destined for prehension, the foot to support the body. Moreover, flexion of the fingers is very extensive, extension very limited; the toes bend with difficulty, but extend easily towards the back of the foot. *Extension* of the toes brings out in relief all the extensor tendons, which become effaced during flexion; nevertheless extension may be passive, as for example, when we press the toes strongly against the ground, whilst bending the leg on the foot. At that moment, as is shewn by Figures 2. 2. Pl. XXII. and XXIII. the metatarso-phangean articulations, and especially that of the great toe, project towards the sole of the foot, the folds of which become effaced in part, whilst a large number form on a level with, and on the dorsal aspect of the articulations.

The folds seen in the sole of the foot, are much deepened during flexion of the lower extremity; they are in an especial manner remarkable towards the middle of the foot; the cushion-shaped eminences bounding these folds become at the same time more distinct.

The thickness of the integumentary envelope prevents the muscular forms being seen in this region.

CHAPTER XIV.

THE ANATOMY OF FORMS APPLIED TO THE CENTRE FIGURE OF THE GROUP OF THE LAOCOON. IDEAL DISSECTION OF THIS FIGURE, ONE OF THE MOST CELEBRATED OF ANTIQUITY.*

In this chapter, I shall endeavour rapidly to sketch the forms of the Laocoon, the *chef-d'œuvre* of Grecian sculpture. In this, as in all other cases, we are forced to take our models from the antique; not that certain modern works appear to me to want a real merit; not that, led away by prejudice, I worship antiquity, but because it is essential to choose the most perfect specimens or models (and these we find only in the antique), and because the great masters in the arts, in letters, often even in the sciences themselves, have uniformly sought their inspirations in the monuments of the past.

After having described the forms of the human body, and the various organs giving rise to these forms, it remains for me to prove to artists the utility of ana-

* Plate XXIV. is taken from the fine engraving of the Laocoon, by Bouillon.

tomy, to convince them how much a knowledge of anatomy may facilitate the study of the living model, and furnish them with valuable information, when, obeying their own inspiration, they attempt original works.

Amidst the admirable remains of ancient art, it would be difficult to find a work at once more perfect and better preserved than the Laocoon. Thus have we chosen it without hesitation as the purest, the most correct type, and, above all, as the most convincing, and so to speak, the most eloquent testimony in favour of the influence which anatomical studies exercise in perfecting works of art. When we contemplate works so sculptured, a feeling arises in the mind, that the marble lives and breathes; or that some supernatural power has instantaneously petrified a living animated being.

The attempt to analyze, to dissect as it were this magnificent work of the Rhodian sculptors, may seem to some too bold; but all is so perfect in this inimitable marble, that the analysis proceeds without an effort; the muscles seem to display themselves spontaneously.

The distinguished artist who assisted me in this analysis, has succeeded in forming an excellent *écorchée* figure of the Laocoon, and his success I do not hesitate to ascribe, in an essential manner, to his knowledge of anatomy.

It is not my intention to follow the many who have analysed the innumerable beauties of the Laocoon; the artist may on this subject, consult the writings of Winkelman, of Emeric David, and of Lessing, who has written a work devoted exclusively to a description of the Laocoon. Nor shall I particularly allude to the restored parts, in criticizing which M. David has uttered this somewhat exaggerated critique; "the movements of the head, of the left arm, and of the feet, indicate courage; that of the right arm, cowardice." I shall confine myself wholly to the expression, and especially to the forms, viewed anatomically.

The general expression of the Laocoon is that of mental and physical agony; he raises his eyes to heaven, as if to supplicate the gods.

This expression of pain or suffering pervades the entire frame; he emits no cries, no lamentations. His vast forehead shews the power of a superior man; the largely modelled superciliary protuberances may also be taken as an index of this quality.

The lower extremities are magnificently sculptured; you feel that, in despite of their gigantic and convulsive efforts, they are about to be fixed to the soil.

The convulsive efforts of the left arm cannot be described in words; unhappily, the right arm is soft and heavy; there is a something theatrical about it; the fire of genius, which inspired the original sculptor, was wanting in the *restorer* of the lost parts.

The master or masters who formed the original Laocoon, have neglected nothing which might express suffering; the expression of horrible agony extends even to the reproductive organs*.

* "La contraction du scrotum, le penis retracté."

In the face, with the exception of the orbicularis muscles of the eyelids and the zygomatic, the beard conceals much of the physiognomy; and, moreover, muscular action is not so strictly represented on the surface of the face as in the other parts of the body; I refer therefore to what I have said on the modifications which the face undergoes under the influence of motion.* Observe, on the other hand, the contractions of the left sterno-mastoid and the depth of the supra-clavicular and supra-sternal fossettes. The elevated shoulder draws with it the collar bone; the deltoid displays its aponeurotic depressions and various fasciculi; the intermuscular space dividing it from the powerful pectoral is quite distinct; the contracted fibres of these muscles deepen the sternal groove; by the strong action of the abdominal muscles, the great superior and anterior arch of the trunk becomes manifest. The intersections of the recti and the groove of the linea semilunaris are all distinctly marked; so also is the inferior arch of the trunk. The digitations of the oblique, and the still more powerful ones of the serratus magnus, have not been neglected.

How deep must have been the study of the superficial locomotive system before such a work as this could have been imagined and chiselled! Look at the left arm, the biceps, the brachialis flexor, and the triceps, as well as the osseous forms of the elbow! The ancon process, the long supinator, the radial muscles,

* Chapter IX. § III.

the posterior cubital, the common extensor of the fingers and its tendons, all these are shewn in the fore-arm; the hand yields in nothing to the excellence of the rest of the limb.*

In the thigh we find the same fidelity of execution; the long sartorius and tensor fasciæ latæ separate to lodge the superior extremity of the rectus muscle; between this last and the inferior portion of the sartorius the vigorous mass of the vasti may be seen in bold relief. Then succeeds the triangular plane of the psoas, iliacus, pectineus, first adductor and gracilis muscles. This plane is enlarged or spread out, being raised by the seat on which the high priest is placed.

The forms of the knee are without a fault; the rotula with its adipose cushion are embraced inferiorly by the tendon of the sartorius; the anterior tuberosity of the tibia is finely sculptured in the right limb. In a word, in the forms of the leg nothing has been omitted; neither the osseous plane of the tibia nor the two prominences produced by the gemelli, the soleus, and the long flexor of the toes, nor the large convex relief corresponding to the tibialis anticus, extensor of the toes, lateral peroneal, &c.

In the lower extremities, the superficial veins, swollen by the muscular action, give life to the marble; the foot and the hand need not be specially examined; they are in no way inferior to the rest of the figure.

* In the lithographic view, the fold of the serpent passing in front of the limb has been suppressed, in order to display the anterior muscles.

All the muscles are contracted under the influence of intense agony, so as to give to the body certain movements; great artists alone are equal to the combining noble and dignified attitudes under such circumstances, and our preceding chapters on the changes produced in forms by muscular action may be re-read in presence of this model with great advantage to the artist.

In conclusion, what I offer here is but a sketch, a mere abridgment of an anatomical analysis; but such as it is, the work, I trust, may still be sufficient to convince the student of art how important to him must ever be the anatomy of forms, whether he applies it to the study of the beauteous models of antiquity, or uses it as a guide in the seductive but painful career in which he is about to embark.

APPENDIX.

CHAPTER I.

SOME OBSERVATIONS ON THE ELGIN MARBLES.

The history of these noble sculptures is well known to the English public, I may say, to the world. Into this, therefore, I need not enter. The observations I here offer to the artist are entirely of a practical nature, and intended to be so. They were dictated by myself to my esteemed friend, Mr. Edward Thomas Coleman, a gentleman to whom I owe many favours. His practical knowledge of sculpture I have found of essential benefit in the course of these enquiries.

I take it for granted that the artist reads the following description of some of the Elgin marbles, and of various other statues in the galleries of the Museum, having the originals before him, or casts from these originals. In their absence, it is hoped that the accompanying drawings of the Theseus and the Ilyssus; of the Townley Venus; the bust of the young Memnon; and of the Hercules of Antiquity, may still enable him to profit by a perusal of the observations here offered him. The British artist is, I trust, aware that the

Parthenon with its sculptures constituted an immortal work, never again perhaps to be approached by human thoughts or hands. Though mutilated to a great extent, the fragments of the figures which once adorned the Parthenon, and which were transported by Lord Elgin to this country, cannot be too often drawn: I shall speak first of the Theseus, of which a drawing has been given, and then proceed to examine the other statues in the Elgin Gallery, premising that other figures besides those by Phidias are to be found in this apartment of the Museum.

The superiority of the Elgin marbles to all others, consists in this, that they represent the human frame draped and undraped, massive and beyond the natural size, in nearly every attitude, without the artist having in a single instance degenerated into coarseness, mannerism, or been forgetful of absolute truth—beauty ever kept in view.

Now, when we contemplate the number of figures, when we reflect on the difficulties of composition and the grandeur of the mind which pervades undeniably all these works, it becomes impossible to withhold from them the praise of being unapproachable. It is not meant that no single antique figures exist, or even groups, as the Niobe, which equal these; this is not what is meant. It is the astonishing effect produced on the mind by the unity pervading this great work, by its extreme truth, and by the artistic finish, which in most of the figures cannot be surpassed.

ELGIN MARBLES.

No. 70.

Although some parts of the anatomy of the full grown figure must of necessity be more brought out by the artist than in youth; knowing, as he must do, that the man of thirty-six has no longer the form of the man of twenty-seven, and that at fifty and sixty, the frame again alters by the natural laws of development, yet the artist has carefully avoided offending the eye, in as far as is consistent with strict truth, from which the Greeks never deviated.

Looking at No. 70, a mutilated fragment, and therefore quite unfit to give even the most powerful imagination a correct idea of what this noble fragment must otherwise have been; a headless, armless, and lifeless fragment, with the surface deeply corroded by time, removed from its original position, it yet offers the grandest field of observation to the artist.

Commencing with the neck, we see the utmost care in avoiding any display of collar bones; the pectoral muscles full; the depressions over them, and over the eusiform process of the sternum, beautifully marked. Nothing can be softer than the way in which the artist has shewn the serratus magnus of the right side, the overhanging of the oblique muscle of the abdomen over the right iliac crest, the marking of that crest, the hollow between the crest and the middle of the thigh, the twisted position of the trunk, the delicacy with which he has traced the abdominal regions. In what remains of the limbs there is no coarse anatomy, indeed, entirely the opposite. It would bear the most minute inspection no doubt originally. The outline of the vastus internus, the groove between it and the tendon of the rectus, the knee joint following the roundness which he has given to the tibia; below, the little hollow between the top of the right tibia and the bulging of the triceps extensor of the foot, and the fidelity with which he has represented the mass of the calf of the leg, as it lies without action and forced upwards, the limb reposing upon an unyielding flat surface on its outer side; these are points which, in beauty and fidelity, no language could possibly exaggerate, nor perhaps any human hand ever excel; so that we do not wonder that when these statues came to be carefully examined, even in their present deplorably mutilated condition, artists of high taste, became filled with enthusiasm, and not knowing well how to explain to the public, the sources of that enthusiasm or the cause for it, their ideas appeared to thousands, mere exaggeration. No part of the male figure placed in the gallery nearly in front of the Townley Venus shews any thing approaching the beauty of this figure. As the right arm is at ease, the artist displays no peculiar markings in the region of the acromion process; but the figure reposing on the left limb, with the left arm placed behind the line of the trunk, and the elbow half bent, the head of the humerus is of necessity thrown forward; this stretches the deltoid over it prominently in front, particularly its clavicular and acromial portion. They are not in action, but they are stretched over the head of the humerus, this again tilts up the scapular end of the collar bone, which is raised consequently somewhat above the plane of the acromion, and although from the closeness of this joint, such displacement can never go to any great length, yet however small it be, the artist has marked it here with inconceivable beauty and fidelity. Now as a general remark, we would observe as very probable, that all the Elgin figures were finished by the same masterly hand, and that in some respects they must excel all other works of antiquity, taking into consideration the object which the artist had in view. In respect of the back, all that is necessary to state is that the artist has scrupulously avoided shewing the skeleton at any one point; the depression on the outer side of the hip is strongly marked, corresponding to the size of the limbs, the mesial line is as fine as in woman, and the right scapula can be made out only by the size of the fleshy masses which lie upon it; the ribs are not to be seen anywhere; we venture to think this also a peculiar excellence, for as the figure lies, the ribs would be kept widely apart, and could not be seen.

No. 93. THESEUS.

In physiognomy, the Theseus has the general character of the Greek figures in the triglyphs. The neck perhaps is longer than we should look for in the strong man, but the artist did not intend that he should be represented as a particularly strong man or athlete, and there are no such indications in the figure. Everywhere we find the same delicacy in pourtraying the surface, which we have just described in the Ilyssus. I have fancied that the carving of the left limb might be taken by artists as a model of the male limb, retaining much of its beauty. Let the artist attend to the following points: the crest of the tibia, the size of the tibialis anticus, the attachment of the ligament of the patella to the tuberosity of the tibia, the depressions outside that ligament, the broad surface of the tibia over which the ligament plays protected by a bursa, the square edges of the adult patella, the outline of the outer and inner condyle of the femur, all these are points of beauty which the perfect anatomist alone can rightly appreciate ; the fidelity of their execution, omitting not the slightest trace which is in nature, fills the mind with astonishment and admiration.

In the meantime, tracing the trunk upwards, we find the outline of one or two ribs and one or two digitations of the serratus magnus muscle attached to them. As the left arm lies close to the body, the artist has given to the pectoral muscle of that side a bulging out, forced upon it by position. The left deltoid is sculptured so as beautifully to display the varying position of the head of the humerus, sometimes forward, sometimes back, putting the deltoid on the stretch at various points, in this instance forward and upward, with a general elevation of the whole shoulder, I mean the collar bone and scapula.

Looking as carefully as the position of the figure admits of, we perceive that the finishing of the shoulder had been of the highest kind, and that the artist has with great fidelity carried the end of the collar bone and acromion processes as high as he could, knowing that the humerus and fore-arm together form the lever which was sustaining the weight of the trunk and head, and that therefore the bones of the shoulder, yielding to the weight, would of necessity be elevated as high as they could go. Let me call the attention of the artist to the back of this figure, notwithstanding its unfavourable position. The left arm is a finished production, and the marking of the olecranon process and the little inter-muscular groove on the outer side leaves nothing to desire. Note also the differences, imperceptible to the eye of the common observer, in the living body between the configuration of the various parts of the deltoid, which the artist divides into three portions; the groove immediately above those portions, marking the spine of the scapula, which being bone, cannot be altered under any circumstance, and which groove again is a delusion, though often represented as an abominable elevated ridge of bone, unpleasing to the eye; the bulging of the trapezius above that spine, not caused by muscular exertion, but by the shoulder being thrown up mechanically; the little triangular depression between the spine and the posterior margin of the scapula, the swelling of that portion of the trapezius between the base of the spine of the scapula and spinal column, arising not from action, *but from want of room.* The strength of the trapezii muscles, about the middle of the neck, causing a flatness in the line of the ligamentum nuchæ, all these, being the only parts we can make out in this light, leave on every mind the same impression, that nothing can excel these figures in beauty and fidelity, and if the collection had come entire into Britain, it must have made the school in which it was placed, the standard of taste for the world. Of the right arm all we shall say at present is, that there cannot be the least doubt of the execution being equal to the left. As the deltoid supports the weight of the arm, it is uniformly in action ; it makes one graceful rounded swelling, of the accuracy of which in form any one may, satisfy himself by elevating their own arm, and watching the action.

No. 33. FRIEZE.

The female figure has strongly the character of the Asiatic Greek rather than the insular. It is to be observed that the face is looking towards the right, whereas all the others look towards the left. The face being injured a little, renders the exact form uncertain, but the face is so different from the others, as to leave no doubt of the intention of the artist.

No. 205. FEMALE FIGURE.

In carving the massive figure which occupies the centre at the left end of the Elgin Saloon, we must bear in mind the different views which have been taken of the comparative value of the figure; that we are still to a certain extent ignorant of the original intention of the artist; what ideas possessed his mind, whether the figures were secondary, as merely ornamental in aid of architecture, or whether he intended, as seems to us, to leave a monument of grandeur in sculpture in a particular direction, which in our opinion never was equalled. The difficulty then is to get at the conception of the artist, which could easily have been arrived at by any man of taste, could he have seen the Parthenon as it originally stood, and not in fragments, so seriously injured by time as to remove that exterior form which it was the purpose of the artist alone to represent. Looking, for example, at this piece of sculpture, we have the headless figure of a woman, a broad girdle binds the waist. The drapery encloses limbs, which you see are perfectly proportioned, and whether you regard the line of the leg or tibia, the convexity of the right thigh, and the accuracy with which the patella is shadowed forth under the robe, it is clear that any modern artist, in attempting a figure of this kind, would have been but too apt to forget the element of correct form and beauty, sacrificing these to some idea of massiveness and grandeur in his own mind, not to be found in external nature; a subjective source for an objective—the former almost certain to mislead—the latter seldom or never. So Fuseli might have found the terrible in nature, but he did not look for it there. Any one acquainted with the anatomy of the body, can easily satisfy himself of the close observance of truth in nature on the part of the sculptor, even in this mutilated fragment; the claws of the lion's foot, their elevated base and folds of integument running towards it, are all depicted with inimitable accuracy, even the rudimentary claw has been attended to, and is perfectly sculptured. The skin of the head of the lion or leopard, brought under the right bosom and secured by the girdle, is also finely represented; also the effect of the girdle on different parts of it, altering the direction of some of the teeth; even the opening of the ear is present; in short, we shall only add one other remark; there cannot be a doubt, that before the sculptor engaged in this work, there sat a noble human figure, whom the artist was engaged, not in copying, but in representing. The artist's attention is finally called to the position of the left thigh, to its more rounded form than in the other, its greater elevation than the right, all dependent on the position of the left leg. There are seven female figures draped, which if examined, give ample proofs of the correctness of those views we shall consider more fully, after we have examined the male figure; selecting, therefore, No. 67;

we may call artists attention, not merely to the beauty of proportion, for in that these figures never fail, but to some details which might escape them. The neck of the figure was evidently delicate, the bosom broad and expanded, and of great beauty; it will bear examining in every light; it has no pictorial effect. The recumbent figure,

No. 63;

the artist can never draw too often who is desirous of acquiring a just knowledge of the proportions of the body. They must have been admirably finished. There is a general resemblance in the drapery, yet it is not disposed alike in any two figures; the charm of the variety of life pervades every part; but the bosom is always covered; and without seeming to aim at this, there is less of the naked figure exposed than in the modern dressed lady; there is the same delicacy in finishing the parts which are exposed, as in the finest statues of antiquity; upon these figures no large protruding collar bones are seen, no swollen deltoids or pectoral muscles. Though large and massive, they are not athletæ.

BACK VIEW.

The outer side of the knee of the last recumbent figure has the robe drawn tightly over it, and yet so exquisitely is it sculptured, that you might tell the sex to which that limb belonged without seeing any more of the figure. It is the same with the arm of the figure supporting her, of which we have only a fragment, but a fragment which tells us that this collection of marbles could have had no equal as a collection when perfect, seeing that no other artist could have so steadily kept in view the combination of beauty, with the other attributes of grandeur and bulk, without ever displaying the slightest exaggeration or littleness of mind. In these works the hand of the artist is wholly forgotten, and they must have looked like the effort of one grand mind, struck off at one thought. What is also most delightful in contemplating these statues, is that the possibility of a manufactory of such never once enters the mind.

No. 43.

This well known figure, representing one of the Caryatides; we need not affect to criticize, it will be found to bear out all the characteristics of the collection, which however may become more apparent during an examination of the male figure, these being undraped, or nearly so, and the reverse of the female. The other female figures here are mere fragments of the torso and limbs, and do not admit of a careful examination.

No. 13. TRIGLYPHS, FEMALE FIGURE.

Thus has Phidias, solving one of the most difficult problems in sculpture, represented hundreds of figures in every possible attitude, from the calm, motionless Caryatide, to the death struggle of the Centaur and

Lapithæ, without a single distortion, exaggeration or weakness; beauty arranged throughout in gesture and form, nor for one moment has the artist ever forgotten this. The modern artist, to have done all this, would have thought it necessary to have covered the canvass with hideous distorted figures—disproportioned, dwarfish or gigantesque—seemingly in the belief that nature does not present to the mind a sufficient variety in her forms, and fancying that he must seek for that variety in the false images of his distorted imagination.

GENERAL SURVEY OF THE GALLERIES, &c.

Around the walls of the Elgin Room are arranged those noble reliefs representing the battle of the Centaurs and Lapithæ the conversion; transformation of the sailors into dolphins by Bacchus—and other subjects of classical history; it is unnecessary to say how perfectly these figures are carved; we need simply revert, therefore, to the observation already made, that to carve so many figures in the most violent attitudes without exaggeration, without offending taste or departing from the truth of nature, is undoubtedly the great secret of the beauty of these marbles. All artists of all ages probably but the Greeks, would have deemed it necessary, were it only for the sake of antithesis, to represent some of those figures in hideous attitudes and forms; but this the Greek seems never to have done; he knew how to vary without contrast, never forgetful of the beautiful.

In carving the male figure, the artist adopts a certain style indicative generally of a youth, varying from twenty-two to twenty-seven; the limbs are fleshy, beautifully formed and clean; there is no forced display of muscularity anywhere; the impression made by the hoof of the Centaur, shows that the artist had continually before his eyes the love of perfection, that his own reputation was what he chiefly aimed at, and not the popular applause of the moment—in other words, he was inspired by genius and great thoughts, and worked under no other influence. The neck is never represented coarse, the veins may be seen on the right arm, and the attitudes are so natural, that it was an examination of these friezes which first suggested to my mind the object Da Vinci had probably in view in making some of those sketches which are said to exist in his portfolio, and of which a few were engraved by Chamberlayne. The idea I formed was this; Da Vinci saw, or discovered during his dissections, that the violent movements of the body, were, after all, regulated by the articulations, and taking what we call a natural skeleton, which means a skeleton with the ligaments prepared naturally, and left in their places, he kept this moist, setting it up before him in every possible attitude, knowing well that the most violent movements must necessarily be limited by the ligaments or osseous structures. Now apply this rule to these magnificent figures, and you will find that in no single instance has the artist represented a movement incompatible with truth. He marks the veins on the bodies of the Centaur, the large abdominal vein especially; most of the figures might be taken as studies by the artist, or unerring guides for drawing the male figure when in its highest state of perfection; it were almost superfluous to point out anything for his choice. The right thigh in No. 11 may be cited as a specimen contrasted with the left, of inconceivable accuracy of the artist's knowledge of whatever shows itself on the surface. I can see that hands of different power, however, had been at work on some of the figures. Time and rough usage have destroyed much of their beauty. But the fragmentary condition of most of them prevents me attempting any criticism as to their respective merits. The two heads, marked 246, 247, and 119, (in red), seemingly the heads of Centaurs, bearded men, have strongly the character of the Sarmatian race; the form of the mouth, the shortness of head, &c.; the nose in 247 has been mutilated, otherwise I have not the least doubt that the head, when perfect, represented the Muscovite race, with whom the Greeks must have come in contact in Thrace, and towards the mouth of the Danube. Nos. 241, 242, 244, shew flat faces, all like each other, with large eyes, square and misshapen, the largest part of the eye is more on the outside than in the middle of the eye.

No. 109 (in black), 198 (in red), prove that already at the earliest times the Greeks had strictly observed the infantile form, noting how different it was from the juvenile, and still more from the adult.

No. 103 (black), 190 (red), Jewish in features. A figure, presented by Chantrey, against the wall, left hand side of entrance, is not in a style, whether copied or original, to entitle it to be in this gallery. The beauty of the figures, representing the transformation of the sailors into dolphins by Bacchus, is well known, and has been often described. They are marked Dionysius and the Tyrrhenian pirates, being a cast of the Choragic monument of Lysicrates, A. 97; as in the friezes of the Parthenon, you will never find the limbs put in an impossible movement.

CHAPTER II.

SOME REMARKS ON THE REMAINS OF COPTIC SCULPTURE, NOW IN THE BRITISH MUSEUM.

It was Herodotus, the Father of History, who said that the Greeks had borrowed all their ideas from the ancient Copts; but a glance at the remains of Coptic sculpture, architecture and design, now in the Egyptian Gallery of the Museum, may, I think, convince any careful observer that his remark, as regards the Fine Arts, cannot be true.

It was whilst examining the artistic remains of this remarkable race, the Coptic, that I was struck with the close resemblance the features of the modern Jew bears to these Coptic busts. The resemblance amounted, in many cases, to an identity of features, leaving no doubt, in my mind, of the identity of origin of the two races. It was whilst attentively analysing the features of Amenoph, usually called the young Memnon, that accident placed close to me two young Israelites, who might easily have passed for the brother and sister of the Coptic prince. Astounding fact in the history of Man! For nearly forty centuries has the world rolled through space since this inimitable bust was carved; raised on the banks of the Nile, the admiration of the then living generation; now gazed at under the smoky, murky skies of England, by a race ignorant of its history, careless of its origin; whilst around it, in groups or singly, walks the Israelite, the descendant of the Copt, unaltered by clime or time, as unchangeable as the enduring rock from which the busts of his forefathers have been hewn.

It is not, however, all sections of the Jewish family which display the Coptic features; other forms appear amongst them, derivable from other races. Let me now briefly explain what these features are which characterise the Coptic sculpture, and the races, Coptic and Indaïc, distinguishing them from all mankind. The following observations are given here as they were dictated in the Museum, to my friend, Mr. Coleman.

Egyptian Gallery.

COPTIC RACE.

SEE PLATE XXVII.

In the ante-room leading to the Coptic Gallery, there is a cast of the head of the Northern Colossus, or of Rameses II. Being a cast, we shall not describe on it the lineaments of the Coptic race, an attentive consideration of which I here strongly recommend to the artist; the features nevertheless are perfectly well marked. As is usually the case I fear with casts, it shews none of those fine markings which we are warranted in believing will be found in the original bust. The features are Jewish, the profile remarkably so, and the artist has known, whilst retaining the type of the race, viz. the rapid diminution of the chin, the enlargement of the jaws and the diminution of the inter-ocular space, and consequent narrowness of the root of the nose, the elevation of the ears, and their projection from the head; the artist has known how to retain all those great features of the Coptic and Jewish race, yet has touched them with a delicate hand, avoiding the slightest approach to that caricature of which the ancient Copt, and modern Jews, in their figures and forms are so highly susceptible.

RAMESES 2 OR 3, 19; THE YOUNG MEMNON.

It was after contemplating with unusual interest, the bust which used to be called, the head of the young Memnon, but which is now designated as Rameses the Second or Third, of the 18th dynasty, removed to this country from the Memnonum of Thebes, that I first saw clearly that this race was distinct from all others, and not yet extinct; for looking around me at the figures of the Israelites walking in the gallery, I then discovered that a great many of the young persons of this race had the identical features of the Young Memnon. The enquiry was then prosecuted in London and Holland, until the amount of evidence left not a shadow of doubt in my mind.

I shall describe the features of the ancient Copt, comparing them with the modern Jew; I allude of course to those of the purest race, there being among them several varieties and even races. The brow, concealed by the head-dress, displays a mere stripe; eyebrows arched, but not so much as in the Persian; nose narrow at the root, enlarged and protuberant below, nostrils large; upper lip short, lips full and Negrine, chin small, deficient, cheek bone large; eyes, projecting, of great length and peculiar form. These are the features as seen in front.

PROFILE.

Ear elevated about a third above the level of the eye; cheeks large, oval, making one as it were with the nose, or in other words, the nose is not set off clear from the cheek, as in the European. Nose strictly Jewish; the artist had here a difficult part to play; he either had seen the defects of his race, or he had before him a youth, the handsomest of his kind, and accordingly without diminishing in the slightest the characteristics of his race, so as to affect the truth, or yet offend the national pride, he has executed a bust of the greatest beauty, that, under the circumstances, it was possible to execute; we need not describe features further, which any one may see in the streets of London, provided he select the age and the race, taking care that there be no peculiar exaggeration in any feature of the individual Jew-Israelite whom he is looking at. The history of this discovery is more fully explained in my lectures on the Jewish and Coptic races.

What strikes me as so far peculiar in the sculpture of this era, besides a number of other considerations on which we shall touch presently, is, that the artist seldom ventured to give expression to the face by calling the muscles into play. The lips are uniformly closed; now how is this? Simply, I believe, because the artist knew, that in opening the mouth, he must have set the angles of the eyes and mouth too far back, thus distorting the face, enlarging the already disproportioned mouth, depressing the point of the nose, elevating the nostrils and external angle of the eye, giving to the whole features a physiognomy which he must have known could never be pleasing; he has, therefore, preserved the features unmoved, and composed, expressing no passion, lest he should destroy the small amount of beauty which the face admits of, and admits of only in this arrangement of the features.

Let us now examine the other figures in this gallery, and observe whether the artist ever deviated from the type he laid down, which is the type of his race, exhibited in the busts of kings, priests, soldiers, commonalty; of all castes, with an uniformity more resembling wild beasts or trees than human figures, and proving that the blood of the most ancient of the Pharaohs flows in the veins of the modern Jew, no contemptible genealogy for any race of men.

The cast of Rameses the Second, from the fallen colossal statue, 18th dynasty, seems, as far as I can judge, to be a very fine one, and perhaps, in beauty, equal to the young Memnon. The light is exceedingly unfavourable for its examination, but so far as I can decide, it does not differ in any essential point from the bust we have just examined. The nose is straighter, eyes perhaps less elongated, and the malar bones not so prominent. It is to be regretted that figures so valuable and admirable, require to be placed by the British architect in positions so unfavourable to the artist.

The Copt had a certain conventional shape, like the Hindoo, in his drawings and sculptures, from which he never deviated; it was a portion of his non-progressive character, indicating the trammels which certain races of men have voluntarily taken upon themselves; yet it was based in truth, that is, it represented that nature which was always before his eyes; for there can be no doubt, that whether on the banks of the Nile or Ganges, or the Yellow River of *Twank-si-Kang Hoang-Ho*, *Kian-Ku*, the human form presented but few varieties, and the conventionalities of dress formed a part of the nature of the race. Thus the artist, whatever might be his taste or genius, was forced to respect nature and the conventionalities around him; he had no escape in those days; he could not wander from Copenhagen to Rome, and there carve statues for which a purchaser was readily to be found in the cold regions of Scandinavia; but when the Imperial Eagle of Rome had spread over the world, or at least over a portion of it, then the Greek artist, giving license to his mind, sculptured and painted as his great genius directed; finding patrons everywhere; at York or Byzantium; in Spain or Thrace; in Rome or Antioch.

FIGURES, 560, 561.

In the same room or gallery the artist will observe the Figures called Pasht; the human figures of the Coptic Race, when seated, almost always occupying the same conventional forms, no attempt being made to give a life-like form to the hands or feet by action; if one hand be closed or shut, still it is after one fashion; the feet have not the form of our feet, but, I doubt not, approach the form of the ancient Copt; the nail is generally small but elongated. The figures on the tops of the sarcophagi are beautifully carved, but strictly Jewish (Nos. 17 and 18). The finest is No. 17, where the nose deviates most from the Jew, yet the profile is not strictly pleasing. To give greater length to the eye, they occasionally carried out the eye-brow and the external angle of the eye by elevated ridges, extending towards the ears, and even approaching them. This trick of the artist, for to a certain extent it is so, is confined to a mere line in some.

In the figures marked Amenoph 3, who is the Mem. No. 21, with remarkably Jewish features, and the figure of Hapimose (the Nile), of the 22nd dynasty, No. 8, the features are strictly Coptic. The same remark applies to the colossal head found behind the Vocal Memnon, No. 6. In short, examine all the central figures in this gallery, and you will find that they never deviate in the slightest degree from the type of the race. We find at the sides a figure, marked 3, 111, described as a high military officer, bearing the shrine of Osiris; however this may be with the antiquarian, the individual represented here seems to me to have been a woman, and a negress, with a very slight dash of the Coptic blood. The mutilation of the features, and consequent injury of the nose, prevents the fact being seen by every one as I have represented it to be; but there is not a feature here which, if examined closely, will not bear out the remark I have made. We have, for example, the muzzle-shaped mouth, the shorter eye, the fuller chin and throat, the different configuration of the eye-brows; nor has the artist attempted, or ventured to represent, those long lines, extending from the angles of the eyes and eyebrows, which he never fails to mark in the Coptic face. The head-dress is different and the cheek bones also. Seen at a certain distance, the face has that peculiar monkey appearance which is so frequent in the coloured races of men, and which does not shew itself in the comparatively fair races.

Stepping into this gallery, we find a foot so distinctly Greek, that it is a matter of surprize it should be here. On looking below, we find as a reason, that it was found at Alexandria; for the same reason, a Greek Venus found in Canton, might be shown as a specimen of Chinese art.

No. 30. The colossal head of the King is fine; it requires no additional remarks. They had one form for the waist, another for the shoulders, from which they never deviated, and their head-dress resembled what we see upon the modern Jewish female. There is a figure, No. 78, representing a Prince of Ethiopia, but he is no black man for all that, but strictly Coptic. The examination of their frescoes points all to the same facts; a ceremonial and a conventionalism destructive of all taste in the artist, and ultimately of the race; and yet whilst they adhered, and were forced to adhere to a strictly national conventionalism, and to the type of the race, the artist knew how occasionally to take advantage of a slight variety in features, so as to give to his bust or figure an individuality in which the prominent character of the type is still preserved.

Contrast a profile of the Apollo Belvidere, or even of any European, and then will be seen how perfectly distinct the ancient Greek and modern Saxon are from the Coptic and the Jewish; how absolutely opposed they are to these races, morally and physically. The reflexions arising naturally out of these great facts, would be wholly misplaced here. The contrast would have been equally striking, if not more so, had I placed on the engraving, the Coptic or modern Jewish woman's profile, and a drawing of the second daughter of the Niobe of antiquity. It would then have been seen that the Coptic or Jewish face can never be beautiful in the strict sense of the term. It is deficient in the grand elements, the *sine que non* of beauty, namely, proportions and form. In beauty then, the antique Greek female surpassed all other races; she was the only beautiful, because the only perfect human being. This will be more fully explained in the chapter on the Townley Venus.

CHAPTER III.

ON THE MALE FIGURE—THE ANTIQUE STATUES OF GREECE COMPARED WITH THE LIVING MODEL—THE ATHLETE OF ANCIENT AND OF MODERN TIMES.

At the commencement of my researches into "the Beautiful," I early saw that the term beautiful, was wholly inapplicable to the male figure; I mean of course to the fully developed adult. But aware of the difficulties besetting this line of enquiry, the inconceivable prejudices existing in the educated, as well as the uneducated mind; the abuse of terms; the conventionalism of each and of every age, I purposely delayed the thorough investigation of the male figure, and the principles of its construction, until I had completed the enquiry into the theory of Beauty; that is, the investigation of the exterior forms of woman, in whom alone beauty resides, wno is in fact the only perfect and beautiful object m the world. In her alone resides the beautiful, the perfect, the absolute without a fault; when such expressions are applied to any other object, even to man himself, it can only be from the poverty of language; language, which is no doubt the great instrument of philosophy, but has ever been wholly unequal to the expression of the intimate, innate, transcendant feelings of the mind.

The artist then is here presented with the result of my enquiries on these points, in the inverse order of my own thoughts; the theory of the Beautiful will be found in the chapter in which I describe the Townley Venus, and other female figures in the gallery. But this inversion of order in time, will not, I trust, prove disadvantageous to him; for there are many still, I fear, who speak of the ancient statues of Hercules as beautiful! who mistake the true *athlete* for a merely strong, big, lusty fellow; who talk of a beautifully developed muscular arm or leg; who see beauty in the anatomical *écorchée;* who even confound and mingle up the distinctive characters, or beauties as they are pleased to term them, of the sexes in one figure; aiming at the impossible; producing monstrous fictions, which either exist not in nature, or when found, are rejected as heterogeneous by all men of pure taste. The object of this chapter then is to assist the artist and general reader to disabuse his mind of such prejudices, of such misreadings of nature's works, of such misjudgments of nature's intentions; but instead of a systematic analysis of the male figure, which no doubt would have read better, I have, in accordance with the spirit of the preceding work, amalgamated my theoretical views with a practical description of those figures of antiquity to which the artist constantly refers, and to which in one form or another, whether as casts or originals, or drawings from casts or originals, he may and must have access in every part of the civilized world.

Before the age of puberty, the male and female figures *seem* to resemble each other. It is this *seeming* which has misled so many observers, from Winkelman to Haydon; which induced the former to find in *youth* the only beautiful; the theory of Beauty, in fact, he placed in the juvenile form. At a loss where to find an explanation of that beauty, so easily seen when present, so difficult to explain when absent, he was compelled to take refuge at last in an abstraction, admitting of no analysis according to his views, and to declare *youth* to be the essence of Beauty. And so it is; but he understood not the wherefore. He fancied it resided in the juvenile form; now place beside that form the fully developed woman: the Venus, the second daughter of Niobe, the perfect living model, the actual ideal, in fact, from which the ancients drew their inspirations, and you will perceive at once, that the juvenile form does not, *per se*, constitute "the Beautiful" and the *Perfect;* Mr. Haydon, driven from theory to theory, from hypothesis to hypothesis, from assertion to assertion, took refuge at last in a broad generalization, the full import of which he understood not. In despite of all he had written and said on the beauty of the male figure; of the surpassing excellence of the Elgin marbles; of the phrenological dignity of the head of Socrates; of the superiority of the human form compared to the brute or bestial; he sought refuge, at last, in the abstraction, admitting of no analysis, as he viewed it, that beauty resides in the female form alone, and that when seen in the male figure, in the universal animate world, no matter how diverse in shape, the beautiful was only found in forms, more or less resembling woman!

But as the subject of this work is not critical, but practical, I need not dwell longer on a subject, respecting which all thinking minds must have made up their judgments; nor further criticise impracticable and groundless hypotheses, whatever may be the name or the reputation of their proposers. Let us return to nature, to the living model, and to the noble remains of antiquity; in them we shall learn to read the living model aright; the divine genius of the ancient masters penetrated through the mysterious veil which nature had cast over her operations, her intentions; and if successful in discovering "Nature in Art," we may confidently feel assured, that if the truth be not immediately within our grasp, it is not far distant; that the path we trace is the right one; the light we follow, no false meteor, but the sun of *Truth*.

1. British artists have access to certain collections of statues, busts, and paintings, of which some are original, others copies; some ancient, some modern; a few perhaps antique. I shall confine my remarks here almost wholly to statuary, it alone forming High Art, and describe briefly the forms, which being put before the sculptor and painter, serve as his earliest studies, contributing to the formation of his taste and future prospects; furnishing him in fact, with the materials of

all his future labours. Amongst these figures I include the living model, the consideration of which, however, I shall leave to the concluding chapter.

The artist must not listen to those whose standard of taste is low; neither must he exaggerate or run into extravagances; Orientalism was as wildly vicious in ancient times as it is now. Mountains skipping like lambs is as monstrous on canvass as in poetry. Let him remember also that there are individuals, and there even exist whole nations, to whom the perception and love of fine forms has been all but denied; as it is with music, so it is with form. But even though an entire race could become so lowered in taste and feeling, as to prefer a street ballad, or tough sea song of Dibdin origin, to the soft strains of Mario as he warbles "the serenade" in Don Pasquale; or mistake a marble tablet, now suspended in Lloyd's, for anything belonging to the fine arts; or admire a female figure, now occupying the centre of the Exchange of London, in which the essential form of woman has been overlooked by the artist, or not understood; or fancy as he looks from the steps of that building, which shall, for the honour of the country, be nameless here, that in Trafalgar Square, and its dark and filthy funnel-shaped exit in Parliament Street, he sees "the noblest site in Europe;" the artist, I mean the conscientious artist, will not, and ought not to allow these and such follies and degrading prejudices to weigh an instant with him. Those forms which most men call the ideal, but which in truth are the real, ought to be his whole aim. But to see this in its true light, a host of prejudices must be removed. Unquestionably every one is free to consider Art under a less elevated aspect, and to confine his talent or his admiration to some lower point, more suitable to his faculties or his taste; but the true artist ought never to admit as an excuse for the degradation of his art, that in most minds taste is low; good taste abounds in Britain, as in all countries with so mixed a population. All that is required to call it forth, is the formation of free institutions, in accordance with the spirit of the age.

As the male figure, from the absence of beauty and of beautiful proportions, must have presented to the ancient artist the greatest difficulties in his statuary and pictorial labours, I turned from the consideration of that form, the female, in which all beauty resides, to the male figure, curious to know how the Greek, who of all men best saw the truth, had overcome the difficulties I speak of, without trenching on that which the correct eye never permits, a deviation from the eternal truth of Nature. What principles in fact, what theory, for it comes to this, had he adopted; what laws had he laid down in sculpturing the Apollo Belvidere, that of the Vatican, the Laocoon and his sons, the dying Gladiator, the Bacchus, the Mars, the young Athlete or Hercules, the Fawn, the stripling with incomplete development? This was the problem the ancients had solved artistically and practically, and this was the problem I sought to discover theoretically. Let not the artist despise theory, merely because literary men have hitherto failed in enabling him to read aright human forms; art without theory, must be content to rank with the mechanical trades, as it was with surgery, until John Hunter appeared; or rather, for all men have a theory of their own, such as it is; art without a theory equal to the explanation of the antique, that is, without principles, becomes the clumsy grotesque pantomime of nature, addressing the eyes of men, instead of the innate sublime feelings of man's mind.

The figures and busts which the student finds in the Academy are chiefly casts from the antique, and from other sources.

The first impression we receive on looking at those and all other casts is, that they fulfil imperfectly the end for which they were intended. Contrast for example the two figures in the Academy, which I presume are really casts from, and not models of, the Elgin marbles, the originals being in London; yet even here, where no expense is spared or even thought of, and which are unquestionably the finest casts I have ever seen, even here some minute and delicate points of the anatomy of the frame, which are so beautifully brought out in the original, in spite of all its mutilations, seem to me to have disappeared in the cast.

GENERAL REMARKS ON THE MALE FIGURES AS THEY STAND IN THE ACADEMY, THE ORIGINALS OF SOME OF WHICH ARE IN THE MUSEUM.

MELEAGER, (FIGURE WITH DOG ON RIGHT, BOAR'S HEAD ON LEFT).

THE artist has retained all the beauty of youth, but beyond a doubt, the head and neck are those of the young Athlete delicately expressed. Notwithstanding the mildness of character in the face, you can perceive that the individual must have had the true bull-dog courage belonging to that peculiar class of men. In the limbs the artist has retained all the beauty of youth, and carried the roundness of the thigh so far, on its outer side, as to avoid representing the groove separating the vastus externus from the ham-string muscles. He has touched the anatomy with an exceedingly slight chisel all over the body. The frontal sinus is already prominent, and the neck perfectly filled up, and little or no internal anatomy to be seen upon it; the whole is quite Grecian. The antique masters knew practically the theory of Beauty; they knew that when nature aimed at the beautiful in form (and without form, there is, there can be no beauty), she never displayed to the eye the internal anatomy of bone or muscle, sinew or aponeurosis. All these she and they knew the mind of the observer dislikes and abhors.

DISCOBOLUS, (THROWING ONE).

The artist has ventured to bring out a great deal more of anatomy than in those figures where his aim was to represent beauty, but there is nothing coarse or stringy; the great error into which the modern artist is apt to fall, is the giving a stringy, dissecting-room character to the muscles. They take on that appearance, it is true, in worn-out persons; but the artist should, if possible, avoid representing it. It seems to me, that even artists of the school of Teniers and Ostade, usually, but erroneously, called the school of Low Art, that even they avoided it when they could; they were quite sensible instinctively that, wherever exposed, it excites in the mind the idea of dissolution.

DEMOSTHENES, (A DRAPED FIGURE, *Roman*.)

The neck suggests a little of the trick of the modern artist, which ought rather to be avoided than imitated, representing at the side those loose folds of skin or integument, indicating not so much age, as the withering up of the tissues and the approaches of dissolution. For a person may be young and yet not beautiful; and a person may be old and yet not ugly. It depends wholly on the display of the *interior* as *the interior* of forms which nature did not intend should be seen; of the internal anatomy, in fact, which startles the observer wherever seen; destroying all idea of beauty, whatever may be the age of the individual.

PARIS, (CANOVA).

This is one of those figures to which my attention had been originally called by seeing elsewhere a bust of the same figure by the same sculptor. The bust appeared to me one of Minerva, the face, in fact, of a rather pretty woman. But my friend told me it was intended to represent a bust of Paris. I have now before me the whole figure, full of extraordinary faults, and one which might be put before a school, to teach the artist what to avoid. It could be criticised from the top of the head to the sole of the foot, but confining ourselves to one or two remarks, I will point out that the haunches and the thighs have distinctly a female form; the face is that of a woman; the mouth especially so, is too small, too delicate. In man the mouth is full, bulging and firm, even when shewing no anatomy. The frontal sinuses, the distinguishing mark of man, are wanting in this unintelligible figure. The woman's face, head and neck, contrast in the oddest way, with the great breadth of the chest, which, after all, is merely a bad copy of one of the Elgin marbles, with the forms filled in. The outline of the left side is also a copy from one of the Elgin figures, the waist about an inch higher on the right side than it ought to be, producing a figure which may be met with in nature, but which the correct eye always rejects. When forming this figure, Canova unquestionably had failed to observe wherein the peculiar skill of the Greek artist consisted, viz., the never running the sexual forms into each other. Some vague notion of the female form being the only beautiful, which in the main is true, when we speak of positive beauty, had taken possession of his mind, which idea, however, he must latterly have given up, judging from what we see of his works.

THE BOXERS, (OPPOSITE FIGURE).

The same artist thought it necessary to add grimace and distortion, in order to give a determined air to the figures. This may be Italian, but it is not nature.

POLYHYMNIA.

The artist has omitted to give the haunches of a woman to this figure.

CLAPPING FAWN.

The fawns of antiquity, tell us how perfectly the Greek could bring out anatomy when he chose.

I do not recommend the student to draw from the casts of the Muses, the sculptor being under the influence of a conventionalism, the fashion of that day. The waists are almost as bad as in Sir Thomas Lawrence's painting of Mrs. Siddons. The artist must never put woman's waist, nor man's either, where nature has not placed them; and if he will look at the draped female figures in the galleries of the Museum, he will there learn the exquisite art with which the Greek artist, could vary the tying of the girdle and robe, without disfiguring the form.

The torso adjoining the door, is the gift of Mr. Turner ; the artist had probably the figure of the Laocoon before him, which shewing the cephalic vein, he thought it necessary also to represent the superficial epigastric vein; but the ancient sculptor knew better than this, for he knew that in a figure with the thighs so smooth and youthful as the one before us, it was extremely unlikely that these veins would shew themselves; they are not always present even in aged persons, and seldom or ever in the young. The incongruity is in the softness and torosity of the thigh, the absence of muscular development, and the representation of veins.

GERMANICUS.

This figure seems formed upon the best models of the human frame, as scarcely an exception can be taken to the form of the chest or the back, properly so called, although it might be objected that from the position of the left arm, a very careful artist, such as we esteem the Greek to have been, would have chiselled more distinctly the back part of the deltoid. The loins or lumbar region, properly so called, seem to me exceedingly well arranged, narrow and compact, as they always are in man, but from this part the figure falls off, and the lower extremities excite strongly in the mind an idea of slenderness, as if they did not or could not form a part of the figure above, or as anatomists say, the sub-diaphragmatic half of the body does not correspond to the supra-diaphragmatic half.

The Farnese Hercules does not shew anything like this. The left leg is too slender, and the knee wants breadth. Although the loins are narrow in man, yet the erector muscles are not absolutely weak, they have not great breadth, it is true, but still they are sufficiently massive and rounded; now this has scarcely been done justice to in this figure, and the result is that the back of the thorax projects unpleasingly towards the lower part, exciting in the mind the idea that the longissimus dorsi and sacro-lumbalis stop there, which is not the case; they go on quite to the lower part of the neck. In addition to the slenderness of the limbs, the back of the thigh wants the muscular attributes of a strong man, and the right hip is surely too low, by about half an inch, making every allowance for the attitude of the figure.

Having commenced with giving great delicacy of limbs to the figure, the artist could not venture to strengthen any part of them; he fortunately kept this in view, otherwise he might have added a strong calf to the leg, with a slender thigh, one of the most frightful and outrageously ridiculous proportions which can be given to the human figure. Nevertheless, the figure is an excellent one, but seems to me to contain those radical defects. It is well to remark here, that it is not always the strength or size of the superficial muscles which give to the limbs and trunk its fulness, and beauty, and strength, according as each point is considered; it is, on the contrary, often the second layer of muscles which effects this, sometimes even the third. The beauty, for example, of the haunches of woman, does not depend altogether on the breadth and size of the gluteus maximus, nor of the fatty cellular cushion placed over it, but is to a great extent owing to the size of the gluteus medius, or that muscle which lies just below the crest of the ilium, and chiefly above the anterior and superior margin of the gluteus maximus.

In the arm, for example, it is not the strength of the biceps, which gives to the arm of the Athlete its power and beauty; the second layer, or brachialis flexor, must be full, else the arm will never be perfectly handsome. If the peroneal muscles are naturally deficient in fleshy fibres *inferiorly*, this gives to the shin bones an unpleasing appearance, as if they were too thin, too osseous, not equal to the support of the body. The fulness on the back of the foot must always depend, to a certain extent, on the extensor brevis, which is not a superficial muscle, and the neck can never be made to look handsome, full and round, by merely enlarging the sterno-mastoid, or trapezii muscles; the deep layers must be developed, the sterno-thyroid in front, and the splenii and complexii on the back. If the lesser pectoral muscles be small, we can scarcely expect the breast to be full and handsome, and it is to the strength of the soleus, and not of the gastrocnemii muscles, that we must look for the beauty and fine proportions of that portion of the limb, extending from the lower edge of the fleshy belly of the gastrocnemii to a space within an inch and a half of the malleoli or ankle. To return to the figure before us, there is a disproportion between the two limbs, the right being larger than the left, whereas the left is in action, and if there be any difference, should be the larger. The right hip being so much larger, extends lower down than it ought. The right preparatory male organ has been brought lower by the same action, which the artist thought requisite in consequence of the hip being lower; but this also is an error. The neck is not set on exactly like a man's, being too narrow.

MERCURY OF THE VATICAN.

The artist has only to contrast the two figures together, to see that these remarks are not hypothetical; in this case the leg being bent so much more, yet the hip is not so low down by an inch.

Of the anatomical figure by Roubillac, now in the Academy, I shall say nothing here; the consideration of such belonging rather to the chapter on the living anatomy.

HEAD OF MENELAUS;

(Sometimes called Ajax, the one with the helmet, the face looking upwards).

The trick of modern artists to represent folds of loose skin, hanging down from the neck, when the head is turned round a little, the ancients seem to have avoided, always knowing that when the neck is full and fleshy, and that when age has not touched it, no loose skin hangs about any part of the body, no matter how the head or torso turns round. Many full grown figures, even of considerable age, never display anything of this kind, and which in fact is not true of a fine person, no matter what the age may be.

1. EXTERIOR FORMS OF THE ORDINARY MALE FIGURE.

With the exception of the natural curves in the spinal column, which can never be too carefully studied, the osseous and ligamentous spine itself does not and cannot give the slightest idea to the observer of the basis on which the muscles in this region of the body are laid.

The back of the head in man is simply rounded, and the upper part of the neck well filled in, to support it; by causing the head to project a little backwards, by hollowing out the neck between the occipital bone and seventh vertebra of neck, the artist gives to it immediately a feminine character, which the ancients never ventured to imitate, not even in the Antinous. I have seen men so formed, and they showed an appearance of weakness, unpleasing, because not natural to the male character, from which the deep pervading character of strength and resolution must never be entirely absent, whatever be the beauties of form with which the artist is desirous of clothing the male figure. Of the spine generally, it may be said that the three curves must on no account be departed from, but on the contrary, studied deeply, since on their outline, in a great measure, depends the beauty of the torso, whether male or female. In the infant the spine is straight, and when a person grows up with this form, as many do, it presents the oddest sight in the world. I saw a Dutchman, about six feet high, with the spine as straight as a rod; he had grown up with the infantile form of spine; he attracted the universal attention of the camp, shewing that men who can neither read nor write, may yet be perfectly able to judge of the human form.

Nothing of the ligamentous or osseous structure ought to be shewn by the artist when drawing the back covered with muscles, except a slight elevation corresponding to the seventh cervical vertebra. There are structures which being present in the male figure, explain why the male back, at no age, is ever so fine as the female; for there is first, disproportion between the chest and the pelvis in man; and secondly, there is the bulging out of the posterior portion of the lower ribs, giving to the male chest, elevations towards the lower part, which are wanting in women. These are readily seen, even in the young male; they are also distinct in the Antinous; they do not depend altogether on the size of the erector muscles of the spine, whose greatest strength lies, in fact, below this. The bulging of the ribs here argues great capacity of the chest in man, whereas in woman there is a flatness, particularly towards the back part of the ribs, as well as at the sides; thus the male thorax differs as distinctly from the female in the back, in the young male as well as in the grown up; in the Antinous as distinctly as in the young Hercules, in whom the bulging of the ribs being carried to the extreme point, constitutes the distinction not only between man and woman, but forms also a leading feature in the Athlete.

I have sufficiently explained the object the ancient sculptor had in view in softening the external forms in the male figure; retaining, it is true, the male proportions and general forms, from which he of course never ventured to deviate; but retaining also, when beauty or a share of it at least was his object, the cellulose-adipose tissue enveloping the entire muscular, osseous and aponeurotic textures approaching the exterior, thus concealing in as far as the male figure admits of, the dreaded interior, abhorrent to all sights.

2. OF THE ATHLETE.

But in his representations of the male figure, he varied also his forms in accordance with nature. The athlete he had carefully studied. He knew well that a heavy, burly, strong man, does not constitute the athlete, properly so called; this truth struck me forcibly when looking attentively at the forms of the great prize-fighters of Britain, I saw that they formed a class apart; morally and physically distinct from all others. The Laocoon represents a strong and muscular man, but not an athlete. These facts are best seen in the antique Hercules, the type of all prizefighters of ancient and modern times. Let me in the mean time complete my remarks on the male figure by a few observations, dictated as the preceding ones, in the galleries of the Museum. In this way the student of art, to whom these apartments are open, can readily compare the descriptions with the figures, and at a glance comprehend the distinction I have laid down between the true athlete and the merely strong man.

The figure marked No. 2, and called an Apollo, is objectionable in many respects; and it is singular to observe the absence of any good male figure in these galleries of art. The figure before us wants unity of composition, and the artist must have been trammelled by some conventional ideas. The head no doubt is balanced on the neck as the male head ought to be, that is, with the larger portion in front of the ear; the muscles of the neck filling up, but not so completely as in the athlete, the part of the neck which is hollow in woman. Observe in the grand antique male figures, how careful the sculptor has been in fashioning the neck; how it is hollowed out posteriorly in woman's beauteous proportions; how it is tolerably well filled up in man generally, and how in the true athlete it rises up like a column, rounded and full, on which the head, of comparatively diminutive size, is, as it were, stuck or fixed; the occipital region never projects beyond the line of the neck itself; the ligamentum nuchæ never shewn, not even in the male figure; the trapezii thin above, as they really are; the deep muscles of vast strength in the athlete: all these arrangements flow from a close observance of nature, from which the Greek never departed.

In the neck of the finely formed man, the ancient sculptor trusted merely to a general enlargement and breadth of all the muscles; but he stamped it with no remarkable muscular characters. He elevated the head of man, but not the brow, which he limited, as it must always be in the finely formed head, to the length of the nose. The upper part of the expanded brow of man, he concealed with ringlets, so as to expose no more than was consistent with those proportions on which all beauty depends.

Although in every part of the frame, the athlete shew characteristic differences, in none is this more remarkable than in the head and neck. The back of the neck is entirely filled up; it is of great strength, and seems also of unusual length; it is set on the shoulders fiercely, and the slope of the shoulders is much finer than in the ordinary male figure. The brow is small, compressed; the features in the young Hercules are handsome, the torso and the arms remarkably so; in the young athlete, when perfect, the bosom and the arms are as finely formed as in woman. The deep muscles are equally developed with the superficial. In woman the complete athletic form is never seen, but I have occasionally seen, even in woman, the neck and head of an athletic cast. The athlete is rare in the Celtic race; common enough in the Saxon. Of the dark races, one individual athlete appeared in England; this was Molyneux, who in the head, torso and arms, was the finest of all the athletæ I have ever seen.

In conclusion, a careful examination of the male figures in the galleries of the Museum, will convince the artist that the ancient Greek sculptor avoided as much as possible all unnecessary display of the anatomy of the interior, even in the male figure. The statues of the two young Satyrs prove this; the ancients knew also much better than the modern, the form of the male chest, and its marked differences from that of the female.

In his movement the true athlete is as rapid as thought when roused; this I have seen repeatedly in the living prize-fighter. I consider their activity as a more remarkable quality than their great strength. On their brow sits defiance, and it is evident that they know not fear. Homer describes him perfectly; his form was as well known to the divine bard, as was the essential nature of beauty, the true theory of which he has touched with a masterly hand.

CHAPTER IV.

AN ANALYSIS OF THE BEAUTIFUL IN FORM.

THE practical nature of this work forbids me entering upon any extended analysis of "the Beautiful," the most important of all enquiries as regards the artist; the most interesting perhaps of all enquiries as regards man himself; for the Beautiful must include "the Perfect." It cannot, I think, be a matter of surprize that literary and scientific men of all ages have met on this, as it were, common and debateable ground; the metaphysician and the *physicien;* Kant and Leibnitz; Cicero and Goethe; Pliny and De Quincy; Polycletus and Canova. To discover the canon of the ancient Greek sculptors, according to which they chiselled those altogether inimitable works of art which have left posterity so far behind; to discover *truth in art*, that is in their art; nature in art, as it has been termed, that is, in the antique; this in fact includes the whole question. The absolutely Beautiful must be perfect; the essentially Beautiful must be in nature, it cannot be beyond it, above it, nor below it; the merely ideal in form can have no real existence in the mind of man, so long as his mind acts through the instrumentality of brain and nerves.

The poverty of language in expressing the great and noble feelings of the soul, has led to the indiscriminate use and abuse of the terms "beauty and taste." There is an *abstract beauty* no doubt; these terms I employ, to express the group of feelings resulting from a contemplation of the emblems of youth; not of the young, but of youth's emblems. But even this abstraction must be combined with *form*, without which there is, there can be, no real beauty; absolute beauty, which resides alone in the fully developed form of woman, as represented by the antique sculptors, clothed with all the perfection which nature could bestow, and whose object in this grand work, their divine genius correctly penetrated.

There is no *ideal* in the strict sense of the term; there cannot be with mortal man. What the pictorial anatomist has written and said about this, admits of no analysis; the principles first laid down by Voltaire in his celebrated critique on Beauty and Taste, principles which were afterwards adopted by the Rev. Mr. Alison, are fundamentally wrong, as I shall afterwards endeavour to shew; the anatomical views, they can scarcely be called theories, of some modern anatomists and artists are clearly in a wrong direction; artists are, I believe, almost universally in this belief, although they have not as yet openly and fully expressed themselves; the artist of good taste and judgment will reject the ready-made physiognomies, based on " a theory of expression," which after all is no theory; and he will look for beauty in nature, but not in the *écorchée*, the lay figure, nor the dissecting room.

Before I venture to submit to the reader an abstract of the views I have adopted in respect of the matter I now discuss, it will be perhaps of utility to the artist, to trace with him the characters of a few of the works of art within his reach; these are chiefly to be found in the galleries of the Museum. By comparing the following observations with these figures, he will easily see the scope and spirit of the theory which is to follow, enabling me thus to avoid entering on any elaborate exposition or defence of a theory, which he may readily test for himself in the Museum. The following details then, and the doctrinal portion may be read separately or conjoined; what is defective in either, the other will, I trust, compensate for.

The galleries of the Museum present but few works of High Art; and still fewer calculated to enable me correctly to describe the form of woman. I have been, as it were, forced then to select a partially draped Venus, marked No. 8, and which I shall call the Townley Venus. Its position in the gallery is such, that I could not examine the back, the sculpture of which will, no doubt, be found to equal the front in excellence. The figure has few faults; it would be difficult I believe to point them out; inferior, no doubt, to the real antique, and perhaps merely an oft-repeated copy of some celebrated figure, it is, notwithstanding, unexceptionable as a model, and one, therefore, which the artist may draw without any dread of misdirection of his ideas.

No. 8. THE TOWNLEY VENUS.

HEIGHT ABOVE NATURE. ATTITUDE, REPOSE. HALF-DRAPED.

HEAD.

The balance of the skull-cap and brain upon the column or neck, is in this figure quite perfect. The hair is beautifully arranged and rolled up behind, so as to favour the balance of the head upon the neck, and so take away any preponderance in the size of the face, and fore-part of the brain, as compared with the back part of the head and upper portion of the neck.

PROFILE.

The ear, of which about a half is shewn, is small and beautifully finished; the cheek is large and full, without a trace of anatomy to be seen in any part. The external angular process of the frontal bone forms merely a continuous ridge with the eye-brow, not terminating suddenly, but descending towards the cheek. The crest of the frontal bone, lying before the region of the temples, is barely marked in outline, but sufficiently distinct to characterize the full-grown woman from the girl. The nose and other features are set off quite clear from the jaw or cheek, as in all Greek figures of every age. Hence the difficulty of marking the pretended period when the Coptic and Greek eras slid into each other. The intermediate stage seems wanting. The profile view of this beautiful figure shews a longer nose, and a chin less full than in the classic age of Greece, but the eyes are deep set, and the profile strictly Grecian, without exaggeration.

FRONT VIEW.

The proportions from the summit of the head to the lower part of the chin are carefully observed. The brow small, sufficiently broad at the base. In the right super-orbiter ridge, the artist has marked the supra-orbitar notch, thus giving a charming individuality, an appearance of life in fact to the figure. It is not so marked on the left side, a variety common enough in nature.

FACE. FRONT VIEW.

Nostrils small and oval. The anatomy of the cartilages concealed, but sufficiently marked to shew that firm structures lie beneath the skin. The fold of integument running from the upper edge of the cartilage across the cheek diagonally, is sufficiently well marked, so also is that between the chin and lower lip. In the meantime, not a trace of anatomy, of muscle, tendon, or vein, is to be seen in this charming face. The anatomy of the exterior is perfectly well drawn; the interior wholly concealed. Upon this theory the ancient sculptors wrought; this was their canon; wrapping up the hideous interior in that glorious envelope with which nature has clothed it. In sculpture and painting, observe those proportions which the eye for forms rigorously demands; add the expression indicating grandeur of soul, which flows indeed from these very proportions; clothe all with the bloom of eternal, ever-returning youth; conceal from the eye of the observer all suspicion of what lies beneath that exterior he now admires; let him not suspect even for an instant, the horrible existence of bones and muscles, tendons and cartilages, that hideous machinery, which nature intended should never be seen, never suspected to exist; keep in view these points, as the ancient sculptors did, and you have as a result "the beautiful," a "theory of beauty;" the canon I believe of Zeuxis.

The second daughter of Niobe seems to represent the type of such faces, being absolutely faultless. The eyes are in form and in expression, deep set. A peculiar arrangement of the upper lip, which is slightly raised on the left side, corresponds to a greater activity on the left side of the face. The chin is slightly dimpled, and the brow not quite so smooth and rounded as that of a very young person. The brow slightly hollowed in the centre, marking the increasing strength of the laminæ of the frontal bone in the grown woman, as compared with the upper portion of the same bone.

NECK.

In addition to the beauty of proportion and outline in the neck of this figure, the artist has carefully avoided displaying the anatomy of any part; he knew how to flatten the front of the throat without making it unpleasing: the face being turned towards the left side, he has displayed a fullness in the line of the left sterno-mastoid muscle, without bringing it into forcible action. The artist has but lightly touched the prominence of the larynx, yet without giving to it that hollowness implying a want of development in that organ, and an imperfection.

TRUNK.

As respects the bosom, nothing can be more careful than the way in which the artist has avoided shewing the distinction between gland and muscle; the elevation of the deltoid on the left side, is displayed rather by flattening the upper part of the bosom of the same side, than by any display of muscular action. The outline of the trunk on the left side slopes very gently inwards as far as a line corresponding to one and a half or two inches above the navel, marking the smallest part of the female waist, but he has taken care not to display the form of the waist on the left side, knowing that it could not be seen in a figure so placed. On the right side, the waist is displayed with two or three folds of integument, but there are no muscular or tendinous traces. The position of the recti-muscles are simply shewn by a fulness or roundness of the surface, with a corresponding depression in the mesial line, continuous with that between the breast.

The line called by anatomists linea semilunaris, is marked in the very slightest way, while the anatomist alone can discover in the slight transverse depression below the bosom, the position of the first tendinous intersection of the rectus; the remaining tendinous intersection of the recti he does not notice. They are not seen in a fine woman, and this fact the artist knew well. The hypogastric prominence below the navel is full, rounded, uniform, characteristic of the female form; flatten it ever so little, and you give to woman a masculine character. Carry the mesial depression down through its centre, and you do the same. This abdominal elevation, so characteristic of woman, is limited below by a depression, extending nearly across the body, and separating it from the pubic regions; this is a purely cutaneous or superficial depression or groove, and strictly feminine. Turn from this figure, to the male figures around, and you will be convinced of the accuracy of this view.

LOWER HALF OF THE BODY.

The balancing of the figure upon the feet is so fine, that it seems impossible to suggest the slightest improvement upon it. The right limb carries the body without fatigue, the left balancing it; the right knee being in that position, which carries the body with the smallest muscular effort, the knee being bent back as much as possible. The robe hangs quite loose from the haunch to the foot, so that no part of the limb is seen, excepting the toes. The right arm, which carries a fold of the mantle, shews a little transverse ridge towards the lower part of the biceps, which is all that is seen in the fine arm in action. The right hand appears to me exceedingly good, and the thumb also. It is to be remarked with regard to the trunk, that a mere fulness denotes the edge of the pectoral muscle, the latissimus dorsi is not seen at all. The position of the serratus cannot be made out as the figure stands with its back to the wall, but that back we have no doubt is equally well formed. The face, looked at in all directions shews the same beauty. In no way can you put the figure out of proportion, out of drawing. The attitude of the figure is assumed, and yet perfectly untheatrical, and the unity of the work, in spite of evident restorations, is such as to leave upon the eye, the impression that the artist knew perfectly what to represent, that is, the perfection of the female form without trick, without any thing meretricious or conventional. The toe-nails are beautiful, and the position of the toes all that could be desired. Notwithstanding the weight being carried by the right foot, the artist has carefully avoided spreading the toes out; as the robe covers the greater part of the foot, he leaves the spectator to conjecture that this may be caused by the sandal, but in whatever way it is effected, the impression on the mind is the same, viz., the presence of a being having a perfect form, requiring no effort to display the grace, which nature had bestowed upon her.

It is obvious that the anatomy of the interior has never once occurred to the artist during the sculpturing of this figure; and secondly, that his whole mind must have been perfectly full of the female form, as distinguished from the male. It is the figure of a full-grown woman of twenty-two or twenty-three years of age, retaining a perfect form, with as much of the beauty of youth as the artist dared, consistently with truth, bestow on that age.

No. 22. VENUS.

This small figure, shewing how the Greek knew to vary the dress, so as to conceal without appearing to conceal the figure, convinces me, by the fulness of the ball of the thumb, that the casts of the hands of the ancient figures we have, cannot be correct. The left limb of this figure is seen, as indeed all the left side, undraped; the shin-bone displays no weakness, nor the calf any strength. The last phalanx of the thumb has great beauty of proportion, without much breadth—a characteristic always unpleasing in a woman. A prominence marks the head of the fibula, another points to the tension of the flexor muscles of the ham-string; but neither here, nor in any other fine statue, can we observe the tensor fasciæ in action, nor the strong cord displayed, which binds it to the outer condyle and fibula.

No. 5. THALIA.

Antique drapery displays how much of the anatomy of the exterior form the artist knew. The robe is fitted to what we might call a short waist; that is, the enclosing band or girdle embraces the figure just below the bosom, or, in other words, where the waist of woman commences. This dress which, improperly adjusted, gave to the female figure a few years ago so frightful a form, and to Sir Thomas Lawrence's painting of Mrs. Siddons, a ludicrous shape, which can only be looked at with pity, and which he knew not how to correct, has in the statue before us been perfectly handled, and with consummate art by the sculptor. From the point where the binding girdle is placed, he has adjusted the robe carefully to the trunk for a space of four inches lower down, at which point it starts again, elevated by the haunches; thus he has preserved the real waist of woman in this beautiful figure, notwithstanding the high position of the girdle, that is, he has shown, though covered in a robe, the actual length of woman's waist (about four inches), on which the robe lies in graceful folds; this dress, which in other hands might have been made to disfigure a most graceful figure, has been so managed, as not only not to injure the shape, but rather to display the natural beauties of the frame, proving that the sculptors of Greece were such masters of their art as to be able to overcome even the caprices of fashion.

HALICARNASSIAN MARBLES.

On these rude but boldly sculptured marbles, much defaced by time, we may make this one remark in regard to the female form; neither in form nor attitudes has the sculptor represented woman in ungraceful, masculine, or indecent postures, or postures which in her would be deemed indecent. They are large, full bodied, and handsome women, never shewing masculine features or masculine forms.

TORSO OF A VENUS.

Corner of the Phigaleian Saloon.

It has the usual concealment of the interior; the folds of the pectoral muscle, the left arm being brought close to the body, the position of the deltoides, and the depression between it and the bosom, seem to me perfect.

No. 40. ARIADNE.

A figure below the average height, but having the antique character: it is fully draped. The face and neck being alone exposed, the artist was not called upon to shew any more anatomy than the drapery permitted him to do; now this he has done perfectly. The robe has no girdle, the upper tunic hanging loose from the trunk, yet he has contrived to display the waist—by which I do not mean the most contracted part of the body; and this he has effected in the most admirable manner. The figure reposes upon the left limb, and the robe is drawn up with a ribbon under the left bosom, and over the right shoulder. Nothing required to be displayed on that side; but on the right, where the difficulty occurred, he has drawn the robe under the right bosom so as to represent the commencement of the waist, and by a fold of the robe artfully laid on, and yet most naturally, he has displayed the first and second portions, and even the third, or most contracted part of the waist, as carefully as if the robe were adjusted to the body by means of corsets. The taste of the Greek was so correct as to render him incapable of offending the most fastidious mind in his sculpture, provided that mind was also chaste and correct; hence the contrivances and mock-modesty arrangements in so many modern figures, never entered into his imagination, for he had nothing to conceal. His pure and elevated mind raised him above all chance of offending the pure. "Unto the pure all things are pure, but unto them that are defiled and unbelieving is nothing pure; but even their mind and conscience is defiled." (Titus, ch. i. v. 15).

A cast of a small female figure unnamed, second on the left of the entrance door to the Elgin saloon, brings out the same facts in regard to the drapery; the attitude is spirited.

No. 13. ISIS.

The opposite figure to Ariadne does not seem finished with the same care and accuracy. The form of the torso under the breast is not shewn. The drapery is too square and angular, particularly on the back.

The frightful Hindoo sculpture placed in this gallery, is quite out of place; it characterizes the unhappy lot of a non-progressive race.

No. 8. BACCHUS AND AMPELUS.

This is a group in a florid style, and although possessing many good points, yet has an error on a point into which the ancient sculptor never fell. He has given to the trunk of the Bacchus a female waist and form, idealizing in a wrong direction. The idea has often been repeated in modern times, but must always fail as being contrary to nature. It is in fact an attempt to embody the erotic mania of the Greeks, which nature always rejected and the great law of the human kind stamps as impossible. I shall not criticize further the errors of this statue, this essential one destroys all its beauties.

I have moreover some doubts of its being a representation of Bacchus; the hand is essentially female and very beautiful; the fingers exceedingly taper and perfectly conical, smooth without knots, the last phalanx turning up. The whole seems the work of an artist, who like too many others, sacrificed truth to the fashion of the day. The position and form of the waist and supra-pubic line, the want of the characteristic lines denoting the male abdomen, mark the incredible extent to which the artist had ventured to proceed in the wrong direction. The waist in man, scarcely meriting the name of waist, is always lower by two inches than in woman; in woman, the ribs from the fifth to the eighth are flattened, elongated; whereas in man they are circular and rounded, arched, in fact; man's ribs are a large segment of a small arch, and woman's ribs are a small segment of a very large arch or oblate speroid.

If the Greek mind, left free and untrammelled for ages, produced those great works which all mankind admire, occasionally the force of circumstances compelled the artist to walk within limits; the nature of those circumstances every one may comprehend easily on reflection. For example, the early Italian artists were left very much to themselves; nevertheless, patronage had its influence, and it could scarcely be said, that the great minds of Raffaelle and Michael Angelo were permitted to expand; these remarks are brought out by a terminal bust of Bacchus, No. 19, and another, No. 27, which shew that the Greek accepted of a formula, provided that formula did not absolutely contradict his great taste. He has in these busts, cut the beard and features in determinate or fixed lines, in obedience to the feelings of his day. Thus, what the despotism of a caste effected in Egypt—effected by a peremptory order—the despotism of opinion exercised by the mass gave rise to in Greece. The patrons of the art, are mankind generally, or a portion of them; what they wish for, they must have, and the artist must yield. This is beautifully illustrated in Cicero's letters, in those explaining his negociations with a friend in Greece for the purchase of figures, not of a high character in point of execution or feeling, but suited to the porticos of his Tusculum Villa, in which he intended placing them. Cicero himself had no taste for the beautiful in art; he admired merely the suitable and the magnificent. He expressly says so in a letter to Atticus.

No. 28. FEMALE FIGURE.

Right hand corner—recumbent.

I would venture to recommend to artists to study the outline of this pretty figure, in which the artist has with an uncommon attention to accuracy in carving the right foot, caused the space between the first and second toe to disappear. The hollow of the foot is beautifully formed, and although it has no pretensions to great beauty, yet shews a perfect knowledge of the living form; the peculiar shape of the little toe, the smallness of the nail, and the bulging of the joint above, with its close proximity to the four toes, will explain to the artist, that some of the forms of the feet which the physiologist has been in the habit of ascribing to the chaussure, are perfectly natural, and have nothing to do with the wearing of sandals and shoes. I have examined frequently the feet of those who had never worn a shoe, and will take it upon me to say, that they differ in no respect from others in their essential form; and that all that has been said by surgeons and anatomists on the artificial deformation of the feet and toes, legs and waist, head and hands, by dress or labour, is absolutely devoid of any foundation in fact.

No. 1. MINERVA.

Upon this bust, one of those ideal busts, in the sense which I have explained above, the artist has simply repeated the forms of the Juno, but with a different cast of expression. The chin not so large, a trifle not so full; the brow smooth as a woman's should be, leaving no doubt of the sex, the neck shorter than what is required by the standard of beauty; not a trace of muscle or tendon is to be seen anywhere, yet the mouth is full of expression; the face has great grandeur. The artist represented her as the Minerva whom Homer drew; not as a masculine coarse woman, with male features, but a divine form leading the Greeks to battle —perhaps the Homeric Ballad, and these busts were coeval. Around the poet perhaps sat those noble figures whom Homer drew, and aided by whose descriptions the artist represented in marble.

MINERVA, (*in the middle corner*).

A bust of extraordinary beauty. The artist, quitting the trammels of his mythology, has elongated the neck slightly, indicating the right sterno mastoid—deepened the groove which traverses the neck about the middle; on the face he has preserved more of the ideal, diminishing the strength of the nose however, thus removing it from the cast of the features of Juno; in a word, the bust is classical and pure, no matter what the era be. The era has its influence on inferior men only — Phidias, Napoleon, Alexander, Shakespeare, were men of no era.

No. 16.

This is a Minerva of another era, and by another hand; it is also ideal in the sense I speak of. The artist has known how to throw life into the face by the expression of the mouth and the slight elevation of the upper lip on the left side. The nearer we look into these figures, the more beauties appear. To me it seems a great mistake, to suppose that the Greek artist finished roughly, or that he fancied that a few bold lines could bring out effect; this is also perfectly refuted by the Elgin marbles, which though placed at a great distance from the spectator, were found to be most highly finished. The lips of this Minerva are apart; the second vertical lines of the angle of the mouth correspond rigidly with the position of the lips. The lips are separated from each other, and the mouth, partly open, an appearance of teeth may be seen in the interior; the natural depressions and grooves of the face are chiselled with inimitable accuracy. The hollow between the upper lip and cartilages, or wings of the nose, is most beautifully marked, which appears almost incredible, did we not know that an anatomist may see the truth through many layers of tissues. The sculptor of this ideal head has so individualized the form as to mark the action of the depressor alæ nasi, a muscle which he not only never could have seen, but which has not been probably carefully examined by half a dozen anatomists in Europe.

No. 48. ROMAN OF LATE DATE.

The Venus, resembling that of the Capitol, is no doubt a handsome figure, which the artist may copy with perfect safety. The sculptor intended to represent the full-grown woman, retaining all the marks of beauty. He has taken care in the construction of the lower limbs, to retain for the thigh its perfect roundness and fulness, marking prominently no muscles or tendons, yet carrying the thigh bone a little forward over the tibia, indicative of an age approaching to full maturity; the position of the statue prevents a more careful examination, and this remark applies to most in the gallery.

Upon the whole, the Greeks seem never to have imagined that there was variety in the beautiful, or that the beautiful admitted of variety; fine feet can have only one form, and so it must be with fine hands and limbs. They sculptured no knotted fingers, no square phalanges, no disproportioned palms, no outrageously large or small hands; with them the small hand was not the beautiful, it was a proportioned hand; so of the foot. They exaggerated nothing; they have no tricks, or devices, *ad captandum*. The coarse, the conventional, the vulgar, they perfectly understood, and as carefully avoided; even to the Hercules, the Athlete, the personification of brutality, they contrived to give a share of beauty. The young Hercules abounds with fine forms, as it is in nature; no arms are so fine, so handsome, so beautiful, excepting always woman's, as the young Athlete.

No. 10. DIONE,

Appears to me an ideal head in the sense I use the word; the artist has, perhaps unknowingly, carved it for effect, so that the beauty of the profile does not equal that of the front face; nevertheless it is a grand bust, and worthy of a careful study; all the features are strictly classical.

CENTRE; FOURTH FIGURE, SIDE NEXT THE VENUS.

A figure playing on the lyre. Unable to examine it carefully, owing to its position, I would yet venture to suggest to the artist the beauty of the attitude, the solidity with which the whole figure reposes on the pedestal, and the grace with which the body leans to the left in order to reach the harp. I have no doubt, that the figure would bear a very careful scrutiny; nothing can be juster than the position.

A small female figure at the side appears equally graceful.

If the artist has carefully weighed the preceding remarks, he will no doubt have discovered by this time, that I place "the Beautiful" in the happy, natural, and life-like concealment of the interior structures of the human frame: the canon of the Greek is the discovery of this fact; the absolutely beautiful I place in the full-grown woman only, in that figure whose fully developed proportions satisfy the most fastidious taste for form; whose expression no language can describe, but is yet understood by all; in whom the emblems of ever-blooming youth; that youth, so cherished, so loved, so adored, still remain, thus combining all possible attractions. These exterior forms resemble in no way the internal; they are the very antithesis of them. What resemblance is there in the skeleton of the foot, or even in the dissected foot, to the most beautiful foot of woman? Wherein consists the resemblance of the perfect female hand to the osseous and muscular framework supporting the exterior? Can you discover the "anatomy of expression," or any other anatomy, strictly so called, upon the face of the Niobe, of the Venus?

Now all these beauteous and perfect external forms; this decorated exterior which nature intended man to see, concealing from him the machinery lying beneath the surface, owes its beauty to many circumstances, which I need not here further refer to; but chiefly, as a *sine qua non*, to the cellulo-adipose elastic layer, interposed between the integument and the aponeurotic sheaths and muscles.

It is this, together with the strength of the integument which conceals the osseous and muscular interior, masking from external view those forms which, when ever so slightly seen, are sure to displease; when prominent, excite dislike and dismay. Such feelings must have a deeper origin, no doubt, than the mere love of the beautiful; they must be instinctive, and have a reference to two qualities of the mind; a love of the beautiful, the perfect, the young, or rather the emblems of youth, combined with those just and grand proportions a taste for form demands; and secondly, that innate feeling which teaches us to dread dissolution, and to see in the display of the interior forms of man and animals, even though seen through the integuments, as in the infirm, the feeble, the exhausted by disease, the aged, those emblems of dissolution from which the mind involuntarily shrinks.

Whether or not the human proportions, when fine and beautiful, delight the eye in consequence of their relation to certain harmonic numbers, I leave to others to determine. There may, or there may not be, a deep geometry, which the correct mind searches for, and discovers alike in the proportions of the human frame and in the architecture of the Parthenon. This was the opinion of the ancients, followers of the School of Pythagoras. A deeper enquiry in this direction would be wholly misplaced in an elementary work of this kind. An eye for form, like an ear for music, is bestowed in its highest degree only on certain persons; but this alone will not enable its possessor to judge of beauty on the one hand, or of noble compositions in either; there must be more than this; there must be a love of the perfect; of unity of thought, of grandeur of soul, as seen in the composer and in the artist.

In one sense, beauty admits of no variety; what is perfect cannot be made more so. Variety and contrasts (which no doubt exist abundantly in nature) are merely the manifestations of that great law, the law of variety, the law of deformation, as constant and regular as the law of perfect formation. The latter leads to unity in the individual; to the highest specialization, to the perfect and to the beautiful, as contemplated by man in mankind; the former leads from this towards universal unity, another phrase for ever-recurring variety; these great laws were discovered and elucidated by the anatomists of southern Germany; not by Germans, but by Sclavonians. Before their discovery the philosophy of organic bodies had no existence; no theory of the perfect or the beautiful was possible; it could have no basis; and accordingly conjecture and conceits, hypothesis and fancy, took the place of a profound physiological analysis.

But this perfection and beauty, discovered by the ancients, was not invented by them; they merely discovered it in nature; no geometrical theory, no doctrine of harmonic numbers or proportions, ever benefitted any artist or gave him a single idea of art. Art preceded all theory; "the Beautiful" was discovered and chiselled by those who knew nothing of geometry, nothing of the doctrine of harmonic proportions, nothing of anatomy, descriptive or philosophic, technical or transcendental. What led to this discovery? Could man imagine and carve a form of nobler and grandeur proportions than nature ever *made or contemplated?* Impossible. The story of Zeuxis is a mere fable, in every sense; the ideal is a theory which cannot be maintained. All forms that man can understand, and understanding, represent, he must first have seen in nature; genius accomplished the rest, leading on, as if by inspiration, the mind of the sculptor from the observation and representation of the fact, to the comprehension of the plan, to the scheme of nature herself. This it is which distinguishes genius from common-place; the inventor from the imitator.

There is then nothing absolutely beautiful in the world but the human form—that is woman's form; it alone combines all the requisites the mind and feelings demand. Place under the noblest dome that was ever raised by the architect the statue that enchants the world, or her living type, and be assured that the building sinks into insignificance before her; all eyes will be rivetted on her alone.

The problem I have thus attempted to solve is one of unquestionable difficulty; none perhaps more difficult. It is a theory of High Art, in fact, which I venture to offer to the artist. If he be a man of taste and education he must be aware that art without a theory must ever be incomplete. The waving line theory of Hogarth has been rejected; the anatomical theories of Haydon do not merit the name; the "Anatomy of Expression" admits of no analysis. I have ventured to offer him a theory based on transcendental anatomy, and on an analysis of human feelings and instincts; apply it to the living model, and test its truth; apply it to modern sculpture, above all, to the antique, from a profound study of whose sculptured form I first drew the materials of this work.

The style throughout I have purposely made simple and unpretending; this is a practical work, with which fine writing, well turned unmeaning sentences, and attempts at elevated flights of fancy, expressed in lofty sonorous phrases, have nothing to do. To analyze "the Beautiful" is, after all, the great object of this work; "the Beautiful" in form may surely be best described in simple language.

CHAPTER V.

THE HISTORY OF ARTISTIC ANATOMY AND ITS UTILITY TO THE ARTIST.

The misdirection of the studies of the artist, dates at least from the time of Michael Angelo; it was then that the anatomy of the schools, I mean the medical schools, took the place of the living anatomy—the only instruction of real utility to the artist. But the artist ought also to be acquainted with the anatomy of the dead, at least to a certain extent; how to combine these with each other, how to avail himself of all legitimate resources of his art, how to eschew the errors of those who tell him, or who have told him, that on the one hand he may have ready-made physiognomies suited to all occasions, and on the other, that from the lifeless and dissected carcase he may sketch with safety; copy dead forms for living ones; forms which nature never intended should be seen; forms which she has in the high tide of beauty and youth most carefully concealed from human sight. To enable the artist, in fact, to escape from a misdirection which is sure deeply and fatally to influence all his future aims and works, is the object of the present and subsequent, concluding chapter of this work.

Prior to the appearance of Mr. Fau's work, the anatomy of the external forms of man had never been correctly written; it may with truth be said, had not even been attempted. Much valuable information, no doubt, lay scattered through the writings of John and Charles Bell, of Mr. Haydon and others, of use to those already acquainted with anatomy and with the principles of art; but no treatise on artistic anatomy, meriting the name, had appeared prior to the publication of Dr. Fau's excellent Manual.

Ever since I taught anatomy, my attention was strongly directed to this deficiency, which I had resolved should with time be filled up. Unprovided with a descriptive manual of external forms, based on artistic views, artists and amateurs were of necessity forced to have recourse to sources of information of a highly questionable character. This state of things has been forcibly depicted in Dr. Fau's preface; it could not well escape the notice of all students of art. As the object of this work is instruction, and not criticism, it will be sufficient for me to point out, that of the sources of information referred to, some were altogether defective or erroneous; others vague and unsatisfactory. I need not particularize them further, but simply apply to most of them the complaint made of the litterati of Germany, Cornelius and his illustrious colleagues in art; namely, that neither the literature nor the philosophic writings of Germany had ever benefitted art or artists in the slightest degree; nor furnished to the artist, a single practical view; a theory of art deserving the name! So much for Germany and its transcendentalism in art.

But in this sweeping, and no doubt, just condemnation of the philosophic literature of Germany, and by inference, of Europe, it cannot I imagine be meant to include the able volume of M. Quatremère de Quincy, from a perusal of which the artist may derive much benefit. But the object of that work is wholly different from the present; De Quincy's work is theoretical; Dr. Fau's work, with the additional memoirs and remarks I have appended to it, is entirely practical.

An objection equally strong, though differing in its character, may be made to most anatomical works hitherto published; I speak of them with a reference to the artist. For, first, a hardness and flatness wholly unartistic, and as unlike life as possible, are the prevailing characteristics of the iconographical works. How could they indeed be life-like, since they are drawn from the dead and dissected body! or secondly, we have descriptions of these unartistic drawings by persons whose views are entirely adverse to art; and whose reputations, if any, must have suffered, had they been even suspected of teaching anatomy with artistic views; elementary lectures and dissections, in fact, addressed to the strictly anatomical student. I need not say how entirely antagonistic to art such lectures, and such dissections, and such writings must of necessity

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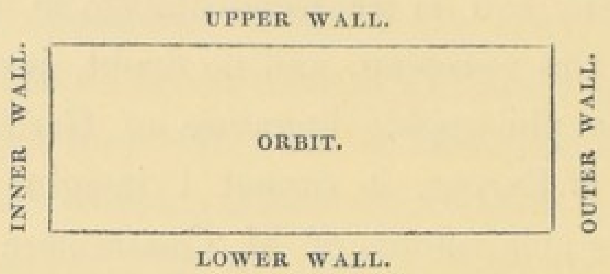
be. Of late years anatomical teaching has suffered still lower degradation even than this, for I have seen works in which the human osseous orbit was represented of this form:



the compiler being ignorant of, or setting at defiance, the very principles of sound education.

On these points few have enjoyed a larger field of experience than myself, or can better know the wants of the anatomical student, of the artist, or of the amateur; and the allusion to it here is simply to caution the artist, as well as the scientific student, of educational errors so deep and dangerous, that a life-time may be passed in vain efforts to eradicate the false impressions thus received in early youth.

The objection I now make with M. Fau to such a course of study and to such sources of information, was long ago made by Camper to Albinus; its practical illustration was given by Mr. John Bell. Camper combined the rare and often contradictory qualifications of a correct anatomical eye with a fine artistic taste, great ability, and some originality; his love of form, by which I mean, of course, external form, was instinctive and profound, his taste correct, his ability unquestioned. It was natural for a person so gifted, to object to the hard anatomical drawings and engravings of the celebrated De Witt (Albinus), who in love of truth, equalled no doubt, Camper himself, but who viewed the human structure simply as an anatomist; drew it rigidly correct as a piece of machinery, strictly mechanical, dead; one, in short, whose views were wholly directed towards the *interior*, and who considered the external envelopes, not as elements of form, but as anatomical materials, concealing from the anatomist, that interior, which with him is all important. Bones, deprived of all their coverings, as drawn by Albinus, present *forms* which, under no circumstances, ever appear, or are meant to appear to mankind. It is the same with the muscles and their tendons, the ligaments and the aponeurosis. When dissected, as Albinus and other correct descriptive anatomists dissect and describe them, and as I myself dissected and described them for twenty years, teaching nearly five thousand medical students to adopt the same views, they display forms never intended to be revealed to the general view of mankind. They disclose the interior in all its naked deformity. In that condition they become an object of deep interest to those exercising the arts of physic and surgery, and to the philosopher enquiring into the unknown, that is, the hidden secrets of nature. But to the artist, who must ever aim only at the representation of the external forms; who must draw only what he sees; and to mankind, who *feel* that form is the highest condition in which beauty appears, is in fact "the Beautiful," and that the form so sought for, so prized, so valued, resides exclusively in the exterior, and not at all in the *interior*, that interior must always be frightful and appalling; without intelligible form, without beauty of colouring; antagonistic to all the sympathies of our nature; to the natural feelings of mankind. In a word, in all his anatomical studies of the dead, the artist must never forget that they are made merely to enable him to comprehend the *living anatomy*, and that they never can become a substitute for it.

A deep knowledge of the interior, cannot then benefit the artist as an artist; studied too nicely, it might even affect his love for external forms, and his ability correctly to pourtray them. Let me not be mistaken; I do not dissuade the student from a deep study of anatomy, I merely caution him as to the mode of pursuing that noble art, which has done so much for the emancipation of the human mind from degrading and most appalling superstitions, unworthy the human character.

These truths, Camper, the anatomist and artist, *felt* as an artist, although he did not express himself in this way. His objections to the drawings of Albinus, and to all similar ones, were well founded in one sense; yet the reply of Albinus was worthy the anatomist and the philosopher: "I have composed these works and published these engravings, not for artists and amateurs, but for anatomists, surgeons and physicians." This was his reply.

Mr. John Bell, to whom I have already alluded, was unquestionably the greatest surgeon Britain ever produced. Nature had showered on him every gift; as a man of the highest taste, he naturally entertained the same views as those expressed by Camper. In accordance with them, he published a small quarto volume, on the anatomy of the bones, muscles, and joints, in which his artistic taste prevailed over the anatomical; he forgot that he was writing for anatomists, and not for artists; the work in consequence was never held in any estimation by medical men, for the reasons I have explained; but artists knew its value, and with them, though full of deficiencies, and useless as a manual, it is still much esteemed.

Influenced by authority to which most men naturally submit, I long repeated to numerous classes of students the maxims taught me by my masters, that a knowledge of anatomy was essential to the artist. And so it is, no doubt, but not the anatomy of the schools. The misdirection of this is so great, that I should esteem it more likely to injure than to improve the taste of the artist. The authorities which I followed, in despite of my own feelings, and natural taste and judgment were Charles Bell, and the imperfect and incorrect statements made by him and others respecting the anatomical studies of Da Vinci, Michael Angelo, Raffael, and the great masters.

The result of this misdirection of his studies by distinguished men, has unquestionably been injurious to the British artist. The higher natural taste of the French, Italian, and South German races, has enabled them generally to overcome it. A more frequent drawing also from the living model, may, on the continent, have contributed to a correction of the hard anatomical style engendered by a too frequent drawing of the skeleton, and of the dissected muscles of the dissecting room.* Hence also I think must have arisen many of the unseemly disputes amongst artists, respecting the utility or non-utility of a knowledge of anatomy to the artist; neither party defining correctly what they meant by anatomy. Had this been done, no such disputes could have continued as they do, even now, to the present day.

The exterior alone interests the artist and mankind; all beauty of form resides in the exterior. That the interior has a deep relation to the exterior, is true; to explain those relations is a part of the object of this work.

The proportions and direction of the skeleton, influence of course the exterior form; but this relation is deep, unseen by the world, and must never be coarsely exhibited on the surface. It is the same with the muscles, tendons, and aponeuroses. What the anatomist is most desirous to display, the artist, if his ideas be sound, does his best to conceal. A hard projecting angular piece of bone, as seen in the skeleton,

* The following circumstance deeply merits the attention of the student. In 1809, the leading geniuses of Germany were expelled the Academy of Vienna for studying from nature, or "working from the life," contrary to the precepts of their masters. Cornelius was expelled from Dusseldorf for the same reason.

becomes in life, a soft, delicately traced cavity, with beauteous shadows. What the anatomist calls a *beautiful* muscle, is, or ought to be, to the artist an object most scrupulously to be avoided. In a word, in an artistic view, the whole aim of the anatomist is vicious. It is with me a firm belief, that no artist should draw from the dissected muscles and tendons as seen in the dissecting room and on the table of the anatomical teacher.

Such lectures and such materials for design, are sure to misdirect his views. Let him dissect the muscles, tendons, and aponeuroses by all means, but draw them, when fully dissected, by himself, and merely for his own information, with a view to the furnishing of his mind with the recollection of *facts*, not of *forms*. I leave this matter to the judgment of the artist himself. Drawings, from bad drawings, must be still worse.

To render the work at once practical, and I hope useful to various classes of readers, I have introduced many references to paintings and sculptures, to which the general public in Britain, as well as artists, have access.

To the Elgin marbles I have given especial attention, describing them anatomically, but with artistic views, in as far as their mutilated condition admits of. Thus the Manual will be found valuable, I trust, to those who visit the Museums, not as " illiterate loungers," but with a desire to improve their taste ; to distinguish the true from the false, the really beautiful from the conventionally so. Modern artists will not, I trust, be offended at the remarks I have made.

The surgeon and the physician may find useful information in this little volume. The difficulty of correctly appreciating the position of the interior organs, as seen through the medium of the exterior, must be well known to them. To speak of the errors I have seen committed on this point, would be revealing the secrets of a profession, which with difficulty holds its ground in public estimation.

In a medical point of view then, this Manual, it is hoped, may also be useful by inducing the anatomical student to compare the *interior*, as displayed by him in the dissecting room, with the *living exterior* as seen in the exercise of the surgical and medical arts.

To render the English edition of M. Fau's work, still more useful, and, it is hoped, valuable to the English artist, I have added to the original work, distinct memoirs on the Elgin marbles; the anatomy of the ancient athlete as compared with the modern; an analysis of form, comprising a new theory of "the Beautiful;" and a brief description of "the living anatomy of the male form," intended as the complement to M. Fau's sketch of the anatomy of the Laocoon; these memoirs and observations required for their illustration several additional lithographic engravings by a superior artist; to which outlay, Mr. Baillière, as publisher, cheerfully assented. Neither labour on my part, nor expense on his, have been regarded in carrying through the work; but it is to the public spirit of Mr. Baillière that the British artist is mainly indebted for a Manual, to be ultimately approved of, I hope, by all true lovers of art.

CHAPTER VI.

OBSERVATIONS ON THE ÉCORCHÉE OR PLASTIC ANATOMICAL FIGURES OF THE SCHOOLS — ON THE DEAD AND LIVING ANATOMY.

When M. Fau compiled the work of which a translation is here presented to the public, he engaged an artist to model a statuette *écorchée* of the Laocoon, for the use of artists. The statuette has also been for some time before the public, and has to a certain extent been approved of by British artists. Like all the anatomical figures modelled for the use of artists, though excellent, as was to be anticipated, it is open to many objections, amongst which stands prominent, the impossibility of giving to the plaster those precise characters which the nature of the model demands. For, 1. The model does not pretend to be a guide to the *external forms of man*, these forms being destroyed in the process of removing the integuments, and dissecting the muscles and tendons. Nay, even the aponeurotic coverings of the muscular system of the limbs, requires to be removed; its sheaths opened and cut away; the subcutaneous cellular envelope everywhere interposed between the integuments and that internal machinery nature was so desirous to conceal, on which, above all, the beauty of external forms really depends, is also supposed to be removed by the modeller, and with it the integumentary covering. 2. The anatomical figure, then, of the Academy and of the Schools, and to this the statuette neither is, nor can be, an exception, represents, or endeavours to represent, the *interior structure* in so far as that structure influences the external forms, or in other words, in so far as these internal forms interest the artist. Now this object it fulfils most imperfectly, for reasons so obvious that I need not dwell on them. Still the *écorchée* figure will always perhaps be of necessity referred to by the artist, forming a portion of those elements from which he must draw his knowledge. The correctly drawn figure; the anatomical model; the lifeless body, entire or dissected; the living model; the antique marbles, last and greatest; these are the materials on which the artist must base his knowledge of the human figure. By working on these in a right spirit, he will at least avoid falling into grievous error; if genius be also present, his compositions must stand apart from the common-place of the day. I have thought it useful, then, to make a few concluding remarks on these figures; on the anatomy of the living model, and of the *écorchée;* but nothing systematic has been attempted here, for this has been already done in the body of the work, to which the reader is consequently referred.

In the study of forms, as I have endeavoured to explain in the chapter containing the analysis of " the Beautiful," the artist must ever bear in mind, that as regards " composition" of organic and inorganic forms, there is a beauty in the absolute truth of nature; a perfection which no mere imaginings on his part; no fancied ideal, can ever approach. To be convinced of the truth of this remark, he has only to compare the works of Teniers and the Flemish School, I mean the great masters of that school, with nature on the one hand, and with their modern imitators on the other.

As regards the *perfect* in the human figure, let him bear in mind the two-fold meaning of the term. The skittle players of Teniers is *a perfect work;* so is the Venus de Medici; to the idea of perfection which instantly fills the mind on looking at these two works, that of " the perfectly beautiful" is superadded in the marble.

To attain the perfect, the artist has only to look at nature with an unprejudiced eye; to attain the idea of " the Beautiful," essential to him as a sculptor or painter of high rank, he must look through the living model before him, with all its imperfections, that is, its deformations in obedience to the great law of unity of organic forms, keeping in view the perfectly beautiful, which fills his mind. The antique furnishes him with all he requires; rightly studied, it will enable him at all times to avoid, or at least to modify the endless varieties of form occurring in mankind, all tending more or less towards deformity; it will enable him to harmonize even the portrait, to make it life-like and pleasing, to soften down natural exaggerations; in a word, by adopting the canon of the Greek, he interprets everywhere *nature's intentions*, nature's great scheme of form; that is, the perfect form, which she constantly aims at, but so seldom attains; in this ideal, as I interpret it, he will find that real which all men look for; and he finds everywhere that model, which Cicero, following Plautus, thought "was nowhere, and yet was found." But Plautus' remark had a reference to poetry, which, with great deference to De Quincy, I do not consider as one of the fine arts. The model which the artist seeks is everywhere, if he knows how to look for it. The *theory of a choice of forms*, which still prevails in the schools, is wholly at fault; of this there cannot, I think, be the smallest doubt; idealized, that is, imaginary forms are the result; forms, which the human eye never saw, and which human sense and feeling alike reject; the deep instinctive feelings of mankind harmonizing only with the absolutely real; with nature as she now exists; with her manifestations through external forms; and with nothing above or below, beyond or within. The *internal model*, as it has been called, means then, if correctly viewed, nothing more than a competency in the mind of the artist to interpret in the right sense the models placed before him by nature; the *creations* of man's pure *reasoning* are generally frightful, often ludicrous, always unnatural; they have most frequently no relation to the external world, and are consequently rejected by the *instinctive*, that is, the universal *feeling* of mankind.

THE SKELETON, &c.

In as far as I have been able to judge, Da Vinci and the great masters drew the skeleton as artists, and not as anatomists; they were quite sensible that skeleton forms are never seen as such in living bodies. The dissected muscles, they drew as dead masses, perfectly aware that these give an idea of the external forms, only when but little disturbed from their natural position. Dissection disarranges of necessity all muscular forms; the student ought to be made aware of this, and hold it constantly in view. The *écorchée* model is an imaginary figure, representing muscles in action in a dead person; dried preparations of joints and other parts, as seen in anatomical Museums, are calculated not merely to mislead the artist, but also the surgeon. Anatomical drawings generally, and more especially those of Manuals, are beneath the notice of the artist, and equally so of the rightly educated medical student.

The finely formed female skeleton differs essentially from the male skeleton; they are formed as it were on different plans; they lead to proportions and forms essentially distinct. That all female skeletons are not so, is quite true; but this has nothing to do with the question. We speak of what should be, and not what is. The perfect and the beautiful admit of no variety, in the usual sense of the term; let him who doubts this, place together the face of the lively smirking brunette and grisette, and the plaster mask of the second daughter of the Niobe, attentively comparing the features of each; or contrast the modern half-dressed French female figure, called by some "the Academy figure," with a model of the Venus! I need say no more to those of correct minds; to others it is needless to offer any remarks.

The artist ought not to draw the skeleton frequently, I mean with anatomical views; it will destroy his taste. Scarcely any thing can be so unlike the beautiful foot of woman, as the skeleton of her foot. Let him draw the bones as often as he pleases, but with artistic views, looking to their proportions, outlines, forms, direction, and mode of articulation.

What human face shews least of anatomical forms? The antique. What most? The negro. Look at the beauteous arms of women and children, and shew me any skeleton or muscular forms; examine the arm of the young athlete, and you will find it just the same. What is it which renders the aged Negress, Gipsy and Jewess occasionally so unpleasing? It is this: the proportions of the organs of the face were never good, but in youth were partially compensated for by the subcutaneous cellular tissue; the expression of the eyes and mouth, and the comparative smallness of the features. These aid in the compensation. With age the adipose cushion disappears; the nose and mouth, obeying the sympathies of deeper organs, enlarge, deep wrinkles shew themselves; but, above all, skeleton forms appear, the interior structures, emblems of dissolution. In such a face, the observer sees only a dark withered parchment-like skin, drawn tightly or loosely, as the case may be, over a skeleton head and face! A living skeleton walking abroad in open day.

Hence the importance of dress to man, of costume, in fact; apt to become conventional and ludicrous, no doubt, in a mechanical race, without high taste, and ignorant of fine forms; but always of essential importance to civilized man.

THE ANATOMICAL FIGURE.

Of the various plaster figures in use by artists, I shall first offer a few remarks on that by Houdon, commencing with the back.

This figure, which is in a sufficiently graceful attitude, and is no doubt, anatomically correct in most of its details, fails in giving to the artist good ideas of the human figure, beyond a mere outline. Nevertheless the outline is good, artistic; but when you look to the detail, the artist must not hope, any more than the anatomist, to gather from this figure a sufficient acquaintance with the superficial and second layer of muscles, to enable him to take an independent part in drawing from memory, or in sketching the living figure; in a word, it would require him to have dissected many years, and to have handled the muscles themselves, and to have studied the physiological action of the whole locomotive system, which includes all muscles, to do away with the faulty impression, which must arise from a constant study of such figures. No happy touch of the pencil, or of the chisel, could ever be expected to flow from an artist as a consequence of the study merely of figures of this kind. The elements of structure and of action of the muscular system and its appendages are few, no doubt; nevertheless they are so difficult of comprehension, that we find anatomists, physiologists and medical men, of the best education, at times unable to comprehend them. The same remarks will apply to the front view of these figures. The anatomy is essentially correct; it is not, therefore, to this that the objections lie; it is to the want of that delicacy of detail, which one would think it so easy to give in so simple a system as the muscular, but which has not been given here, and without which, all drawing and sculpture must, I think, assume a stiff and plastery character, as following the model of a figure which has no real existence. In a word, such productions must of necessity have a *manufactured* look; now this is wholly unnatural. Nature never manufactures; it is man who does so. In her endless repetitions, she for ever individualizes.

It would be safer for the student of the fine arts, to commence his studies with a dissection of the superficial muscles by his own hand, sketched by himself as dissected, and their physiological action afterwards carefully studied in the living figure and in the fine remains of antiquity, rather than copy plaster figures; of drawing from the lay figure I need not say one word.

FIGURES BY M. ANGELO, (ANATOMICAL).

In these figures we have the whole character of Michael Angelo's mind, expressive of that exaggerated form of muscular action to which he adhered for so long a period. It is scarcely worth while looking into the anatomical detail, which, generally speaking, will be accurate enough, for under no circumstances could one recommend the artist to study from such figures, which besides their original intrinsic misdirection, will generally have the accumulated errors of a hundred copies. The new figure which I have seen in London, but which has not yet been offered for sale, is an imitation of Roubiliac's, with the right arm in repose, and the left arm more elevated than the left in Roubiliac's. The anatomy is good, but I think somewhat coarse and undefined, the margins of the muscles being sharpened by over dissection, and by being set free from the surrounding attachments. The neck seems too long for the male figure, and if we look at the masseter and other muscles, we shall see the same fault complained of as in the first, viz., a total want of finish and pretension to the finer parts of anatomy, which, after all, gives the charm of life and individuality to the ancient figures. Upon the whole, I feel disposed to say, that the finishing of the figure is not so good as that by Houdon, and in fact, to express it in a word, the whole figure appears to me more plastery.

There is also used in the Schools, an anatomical bust of the head and neck, apparently a plaster cast, taken from the dead; the ear is flattened by pressure, and the form of the human face simply disfigured by a dissection, which removing the exterior covering, yet misrepresents the interior. I mention such figures only to advise the artist to avoid them.

Of detached portions of the body, I find, of the natural size, a cast of the foot in use, to which no objection can be made on the ground of accuracy and anatomical detail; at the same time, nothing can be coarser than the outline of the calcaneum, or heel bone, which in man, being a portion of the foot not much covered, requires of the artist great care in depicting.

There is a cast of an arm, of the size of life. An attempt has been made to give as much of the reality as possible to this cast; and, by leaving some connecting points of cellular structure and aponeuroses, to preserve the muscles in their place; the aponeurotic slip, for example, binding down the tendon of the biceps to the surface of the pronator teres, has been preserved; also the palmaris longus, and the palmaris brevis; still the dissection or the cast has not been a good one. The anatomy of the biceps, for example, presents that confused and undefinable appearance, unlike anything that ever was in nature, dead or living. It is, in fact, the cast of a muscle which, having no life in it, could not contract, and which the artist yet wishes you to regard as if contracted under the influence of life.

CAST OF THE LEG FROM NATURE, A LITTLE ABOVE THE KNEE.

If this limb had been executed with more delicacy, it might have proved extremely useful to the artist, enabling him to understand the anatomy of the knee joint, with the limb extended *as an unbroken lever*. The shifting position of the condyles of the femur, as regards the patella and tibia, can only be understood by a reference to a cast of this kind, or to the living model; but nothing can exceed the coarseness with which the whole has been executed, and hence arises a great objection to its use.

In conclusion, from a hasty examination of these figures, I may be permitted to observe, that it were well for those interested in such matters, to offer every encouragement for the improvement of casts of the human figure, giving a preference to the finest, and admitting none else into schools of design; thus would youth early acquire a taste for fine forms, from an habitual contemplation of unexceptionable models.

A profound study of the living human form and its various expressions, *when unobserved*, is essential to the artist; without it, he never can hope to come up to nature. He must learn to draw rapidly, so as to catch the ever-shifting expressions, which do not long remain on the face. Attitudes, too, must be studied when the parties are off their guard; thus he may reach the real *poetry* of his art; and what he draws and paints, never can be classed with low art, even were it a Flemish kitchen and cook-maid. The usually received ideas about low and high art are altogether erroneous, as I have already observed.

A deep study, then, of the animated form is essential to the artist. To this unquestionably Raphael owed much of his excellence. His genius supplied the rest; his ability to execute, completed the work. It was not, then, to a knowledge of the anatomy of the dead that the great masters owed their vast superiority; but to a combination of a certain amount of knowledge, sufficient to regulate their judgment, combined with the most careful observation of living forms; their own "eye for form" being perfect, just, and judicious.

First, no doubt, there is to be considered simply the form, then the movements, and, lastly, the expression. The forms are less influenced by the deeper organs than might be supposed; it is the layers above, and those which fill up the interstices of the muscles, which actually give the form in fine figures. When these are thinned by age, disease, or accident, we then discover the internal forms, always hideous, which the skeleton, the prominent strips of aponeuroses, and the starting, prominent tendons and muscular masses display. In ordinary movements, the muscles even of strong men do not display themselves so forcibly on the surface as when energetic actions are called for. Let the artist never forget, that in muscular action, the fleshy part alone of the muscle swells and shortens itself; the tendon remains passive. Hence, depressions and elevations appear during action, which are not seen at other times. These must be carefully noted from the permanent ones.

Certain deep muscles exert the highest influence over external forms; artists are not quite aware of this. I may mention here the influence of the supra spinatus muscle, whilst in strong action, to recal the fact to the recollection of the artist; on the strength of the brachialis flexor depends the beauty of the arm; and on the strength of the great flexors and extensors of the fingers, equally developed below as well as above, depends much of the beauty of the fore-arm. This remark will be found to apply to many other parts of the frame.

It were superfluous to point out to the artist the necessity for an exceedingly careful study of the various attitudes and movements of the body under all circumstances. But to succeed in this difficult study, he must avoid drawing from the jointed lay figure; in the stilted postures and theatrical strut of most modern actors, I see merely living lay figures. Looking carefully at the engravings by Chamberlayne, of some of the so-called anatomical drawings of Da Vinci, it has often occurred to me, that the great number of naturally articulated skeletons he represents in action, connected with mechanical engines, was the mode he adopted of carefully studying, and finally becoming master of every possible movement of the human body. Properly speaking, the engravings I allude to are not anatomical drawings at all, but studies after the naturally articulated skeleton, with a view to the discovery of the truth, or actual extent of movement in each and every joint.

By a neglect of the truth in movement, or what amounts to the same thing, the actual range of the functions of the joints of man and other animals, artists have occasionally committed some ludicrous mistakes. I have myself seen, I think in Paris, an engraving of a lion attacking an enormous serpent. The latter has been drawn in an attitude which no serpent that ever lived could have assumed, without breaking the spinal column in fifty places, and yet the artist represents the serpent as quite bold and fierce, at a time when the most ordinary observer would have predicted its instant death. In a word, he has given to the serpent a style of motion the reverse of truth.

The defective formations of the human figure depend often on this; that the person grows up to the adult state without undergoing those changes of form essentially required to constitute the perfect and the beautiful; this is a result of the great law of unity of the organization; in such cases the law of unity prevails over the laws of specialization and individuality.

You will find many adult persons with the spine more or less of a straight columnar or perpendicular form, those fine curves which give to the back its human character being either wholly wanting or but little marked. This is an infantile or a fœtal form, and like all such forms, displeasing to the eye. Many illustrations might here be given if necessary, of this great law of deformation. Examine the external ear, for example. In some it is rounded, and without a lobule, like the ears of an ape; in others frightfully elongated; in some the antehelix is spread out as in the lower animal, &c.; all these are deviations from the perfect and beautiful form of the antique, and of the finely formed living ear; they are infantile and brute forms, to which nature returns, or which she preserves when circumstances prevent the full development of the adult human form.

The coarse anatomy of the dissecting room, and the still coarser anatomy of chalk sketches and plaster *écorchées*, will not enable the artist to take his place amongst the masters of his art. If not gifted with the rare quality of observing nature face to face, without any interposing veil, he must be taught to do so by theory, that is, he must be taught to know how to observe; what forms to draw, what forms to avoid. But this he can only do by being able to interpret nature in her manifestations.

This great law, based on the unity of the organization in all living things throughout all time, was wholly misunderstood, and, indeed, noteven imagined, until discovered by the anatomists of South Germany, that is, of the Sclavonian race of men. Let the artist bear in mind in the delineation of the human figure; that there are no *lusus naturæ* now; such notions belong to a bygone age. The laws of deformation are as regular as the laws of formation; their consideration cannot be separated; a knowledge of the one implies that of the other. It is not proposed to him to study the laws of Transcendental Anatomy; but it is important that he be made aware of their existence, of their universal application to every living animal, and more especially to man; he will then feel less surprise at the difficulties he may encounter in correctly representing that form, in which his fellow-men look for perfection, for the beautiful, for the mortal and fleeting emblems of a divine mind, and of an ever-returning, ever-youthful, everlasting youth; that Form, which is, or ought to be, the antithesis of age, decay and dissolution; the antithesis of all other organic existences. Linked to them by the great law of unity, Man yet stands apart by the laws of specialization, the right interpreting of which constitutes at once the difficulty and the perfection of art.

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