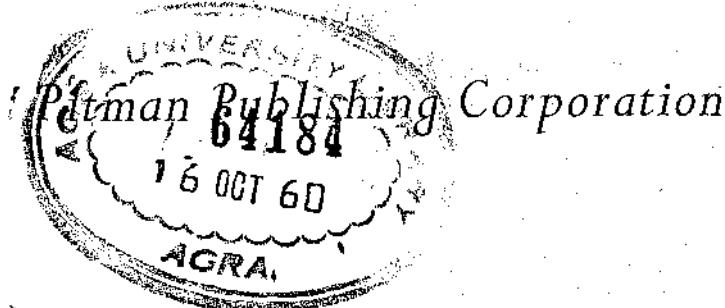


ANATOMY *and* DRAWING

by VICTOR PERARD

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Dedicated to my wife
Ernestine Perard

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C O N T E N T S

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NOTES ON PROPORTION

PROPORTION AND DRAWING

THE SKELETON

THE HEAD AND NECK

THE TORSO

THE ARM

THE HAND

THE LEG

THE FOOT

THE ECORCHE AND MUSCLES OF THE BODY



PREFACE TO THE FOURTH EDITION

It has long been known that the study of anatomy leads to the appreciation of form and beauty in art. The human figure is particularly rewarding for study. It has simplicity and beauty of form. It is so balanced and proportioned that it can do much with little effort.

For these reasons, human anatomy is taught in schools of fine arts throughout the world.

The student who buys a book on drawing anatomy needs to have this important subject explained to him as simply as possible.

This *Fourth Edition* of ANATOMY AND DRAWING, including new material on the muscles, has been prepared from this point of view. The human figure is presented in a series of simple diagrams from which all but the necessary naming of parts and

Anatomy and Drawing

actions has been stripped. The wording is printed in clear juxtaposition to the identified body parts. Skeleton figures or quick body sketches demonstrate actions.

Throughout the book, I have kept the text to the essential minimum and have adhered to the wisdom of the saying, "One picture is worth a thousand words."

SEPTEMBER 1955

VICTOR PERARD

PREFACE TO THE THIRD EDITION

The purpose of this book is to present in a simple and direct manner the subject of anatomy as it is applied to Art. As little text as possible has been used, and much dependence has been placed on pictorial representations because the latter are a more direct means of impressing the artist with construction and form. For this reason this work has been copiously illustrated, often showing various views of the same structures and actions.

To the beginner the study of anatomy is too often dull, prosaic and difficult and this is due, in large part, to the fact that many text books on the subject contain insufficient descriptive drawings. Even though the student plows through many pages of text, he often fails to visualize the subject properly. Therefore it has been endeavored to substitute illustrations for descriptive text whenever practical. The drawings have been arranged in groups for the purpose of comparison, and in this way the eye becomes accustomed to observe much which otherwise might escape attention.

Preface

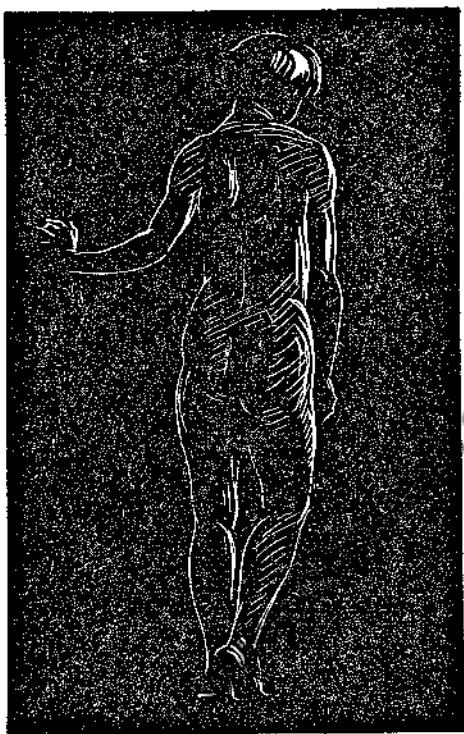
To express outward form correctly requires a knowledge of the internal structure, that is, of the bones which compose the framework and define its proportions and of the muscles and tendons which direct its action.

Every figure artist finds sooner or later, as he advances in his artistic career, that his work needs strengthening through a well grounded knowledge of anatomy. The great masters of the past realized this and their grasp on the fundamentals of anatomy is reflected not only in their finished works, but in such of their preliminary sketches as are still preserved.

The ability to construct figures correctly from the imagination rather than to depend entirely on models is a distinct aid to the draftsman and to the sculptor. The student of anatomy should therefore test his skill by making memory drawings and by applying his knowledge to compositions of his own fancy.

When working from living models, the artist will find that his knowledge of anatomy will enable him to analyze and interpret the forms before him in a more understanding way than he could without such information. It will develop in him greater powers of observation. An understanding of anatomy is an instrument in the mechanics of Art: a means to be employed to assist but never allowed to dominate. The artist must learn properly to evaluate his anatomical information and to know the part it is to play in the development of his art. The studies he makes will then be done more intelligently and with better draftsmanship as an inevitable result.

VICTOR PERARD



NOTES ON PROPORTION

Since proportion is the comparative relation of one thing to another, some standard or unit of measure must arbitrarily be established. In Art, this unit is known as the "head" which is the distance from the top of the skull to the tip of the chin. The illustrations in this book are based on the proportion of seven and a half "heads" to the height of an erect figure. The use of this standard will obviate much descriptive text. It is well, however, to bear in mind that this standard of proportion is modified by such elements as race, sex,

Anatomy and Drawing

age and physical differences peculiar to the individual. For this reason the following notes on proportion are grouped under the heads: Male, Female, Children and General Observations.

Proportions of the Male. The greatest width of the male figure is at the deltoids, a little below the shoulders and the width here is about two heads.

The width between the hips should equal one and one half heads, and the width between the nipples one head.

The height of the figure, seven and one-half heads, should approximate one "head" for the head, two and three-quarter heads for the neck and trunk, and three and three-quarter heads for the lower extremities.

From the finger tips to the elbow should measure two heads.

Proportions of the Female. The bones of the female are shorter and have less rough surfaces than those of the male. The sternum or breast bone is shorter and more curved and the pelvis is broader and shallower which gives a greater width to the hips. The sacrum is wider and projects at an angle backward.

The posterior superior iliac spines and the anterior iliac spines are further apart than those of the male. The distance from the rib cage to the pelvis is greater due to the shallower and broader pelvis.

There is less distance from the crest of the iliacs to the great trochanters of the hips, because the anterior iliac spines are spread out and lower, and further apart. In the female figure the Poupart's ligaments and the furrow of the groin are more horizontal.

The shoulders are narrower and the collar bones (clavicles) straighter and shorter thus giving a more graceful and longer neck and more sloping shoulders in comparison with the square shoulders of the male.

Notes on Proportion

The arms are shorter in proportion to the trunk which is due to the shorter humerus bone of the female, and because the humerus bone is shorter, the elbow is higher.

Variations in the length of the female leg are more frequent than those of the trunk and so it is more difficult to judge the height of the female figure when seated. But the length of the torso is proportionately longer than in the other sex. The legs are shorter and the skull smaller.

The center of the female figure is above the pubic bone while in the male, the center is about at the pubic bone. The width of the female hips is about the width of the chest wall plus that of one arm and is greater than that of the male of the same height. The fact that the female sacrum is at a greater angle than that of the male and that there is more fat on the buttocks gives these a greater diameter.

The female abdomen, is more rounded and the thighs are thicker from the back to the front than in the other sex.

Proportions of Children. The child of three is about one half the height of the adult, and at ten, about three-quarters the height of the adult. As the child grows older the relative sizes of the head and the trunk change. At twenty-five the figure is full grown.

At birth the center of the figure is a little above the navel, at two years at the navel and at three years the center is level with the iliac bone.

With advancing age this point gradually lowers depending to a great extent on the length of the legs.

General Observations. The clavicle bone continues to grow for a considerable period after the other bones of the body have attained

Anatomy and Drawing

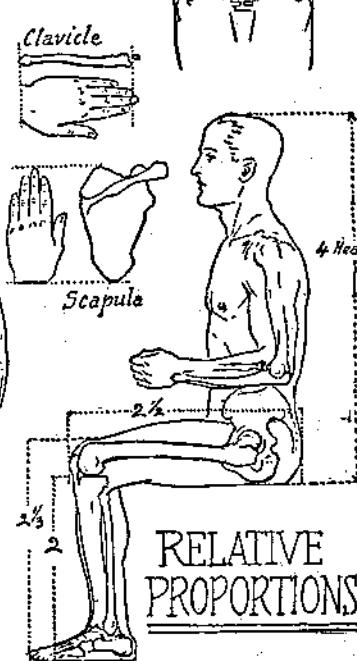
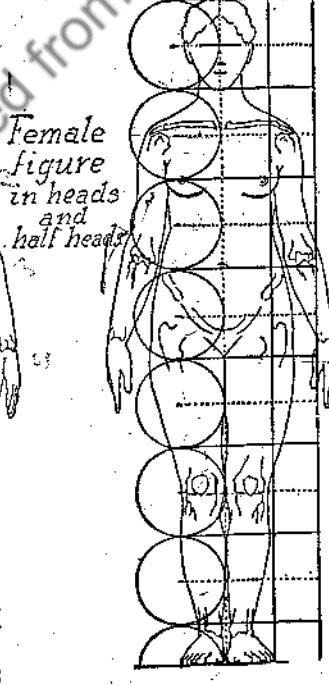
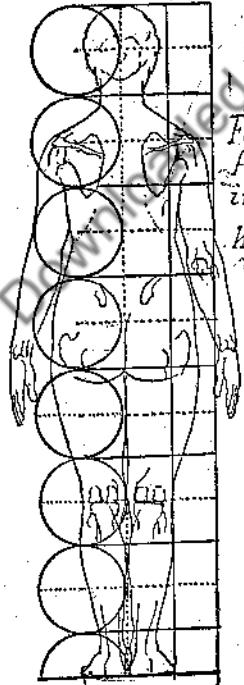
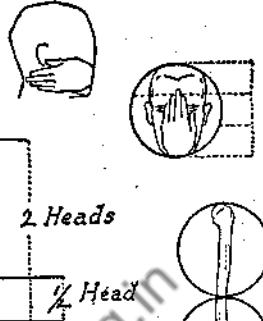
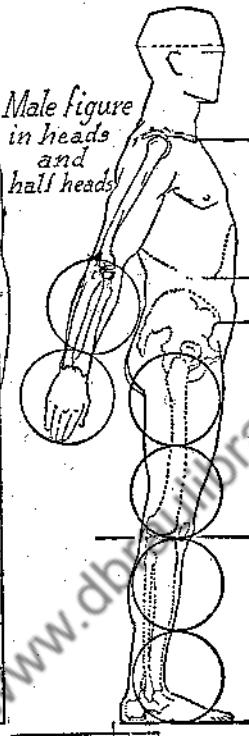
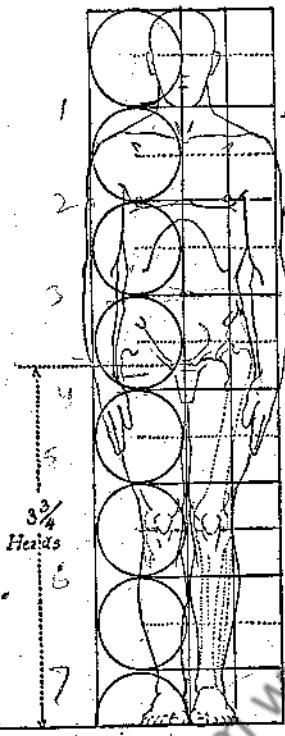
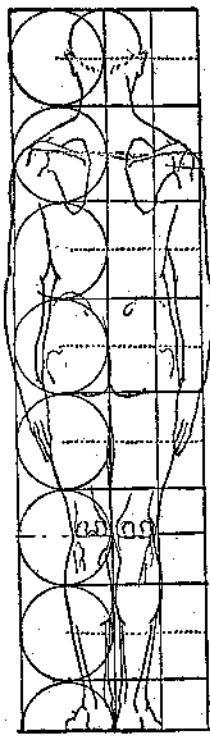
their full development and therefore the shoulders are said to broaden.

Only very tall people have a height of eight heads. Short people are seven heads or less. The muscles of the adult account for about one half the weight of the body.

The skeleton always provides the proportions of the figure with slight allowances for the padding between the joints, between each vertebra, and under the heel and foot. In old age the figure shortens due to the hardening and shrinking of the cartilages between the bones.

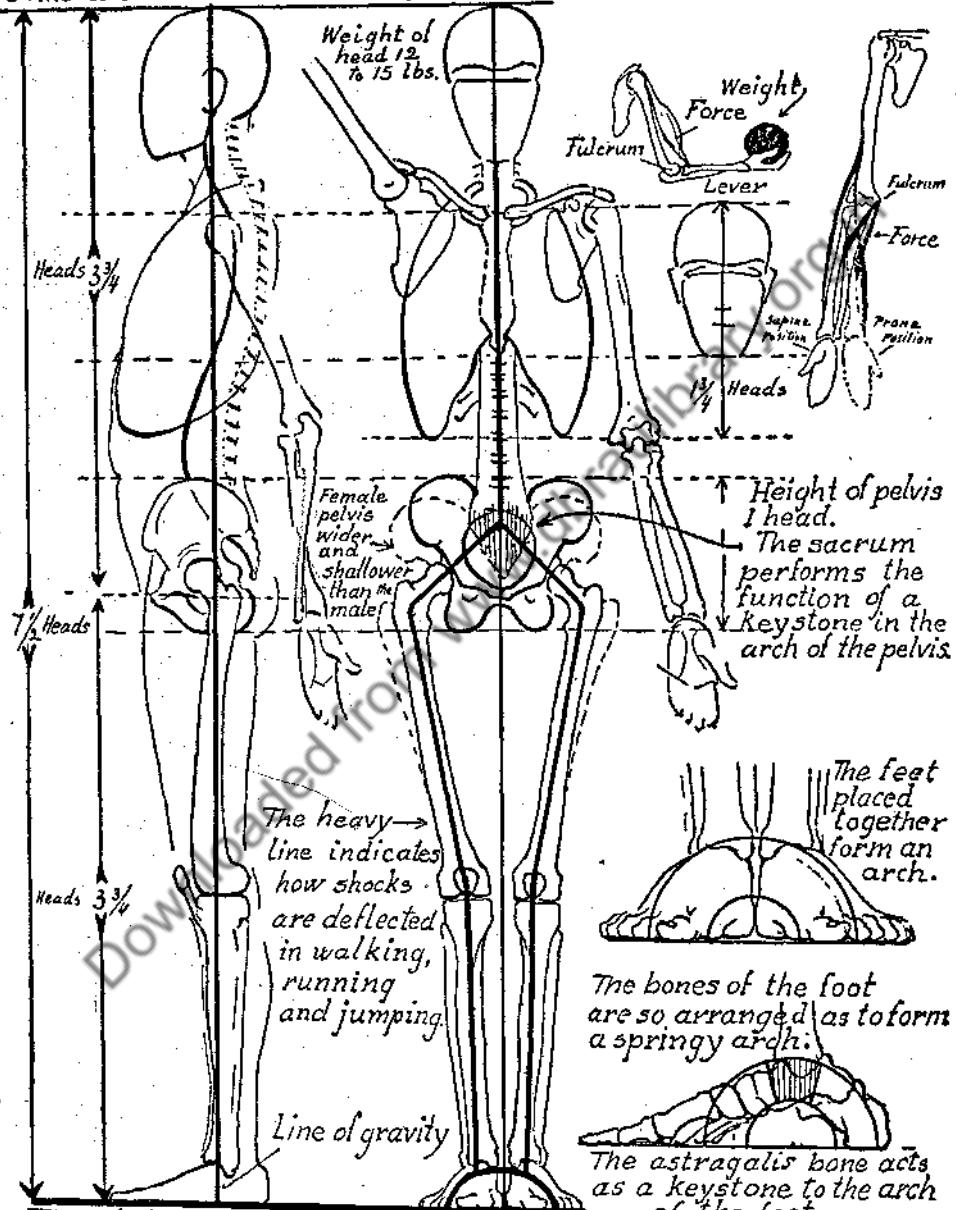


PART ONE
PROPORTION and DRAWING



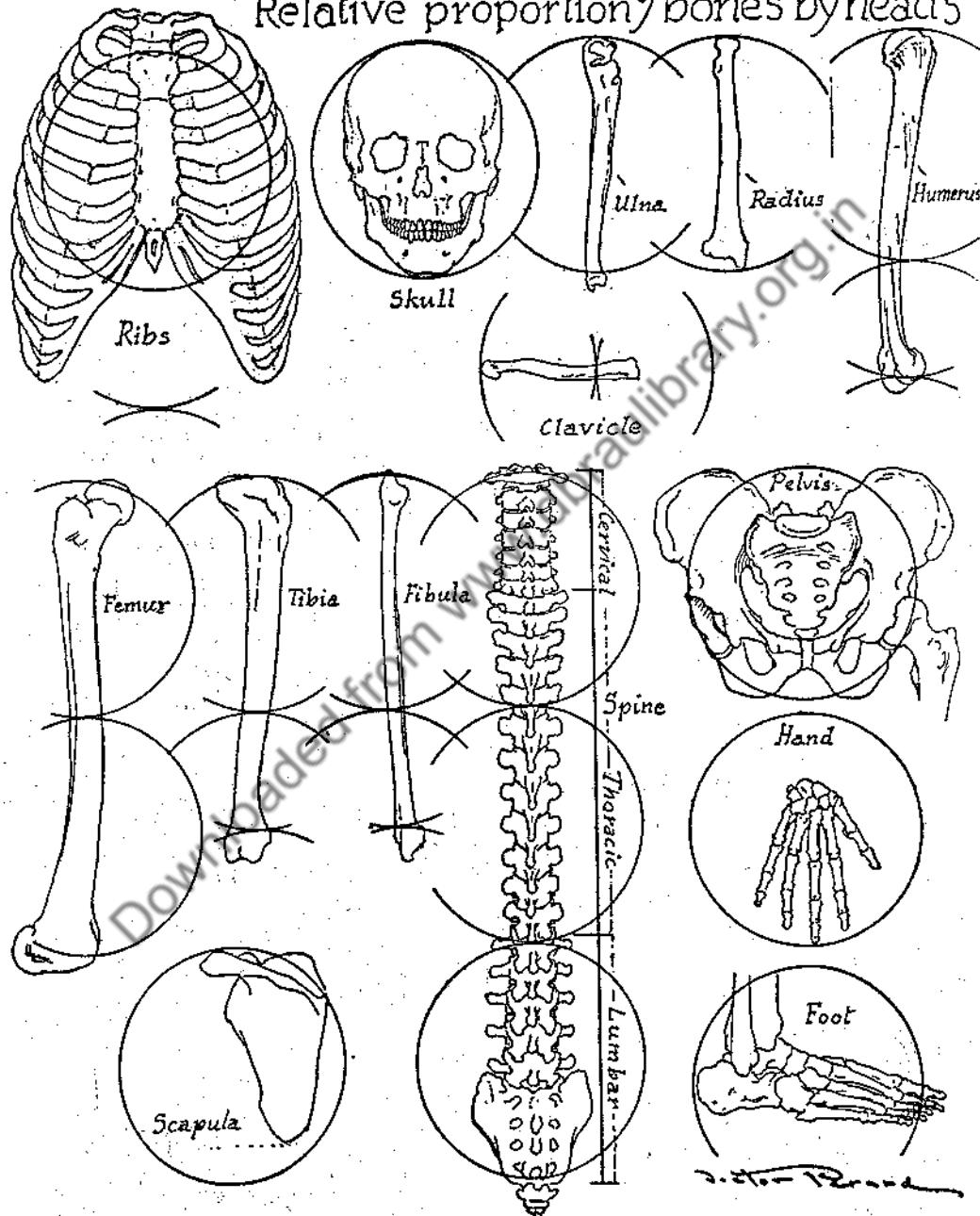
RELATIVE PROPORTIONS

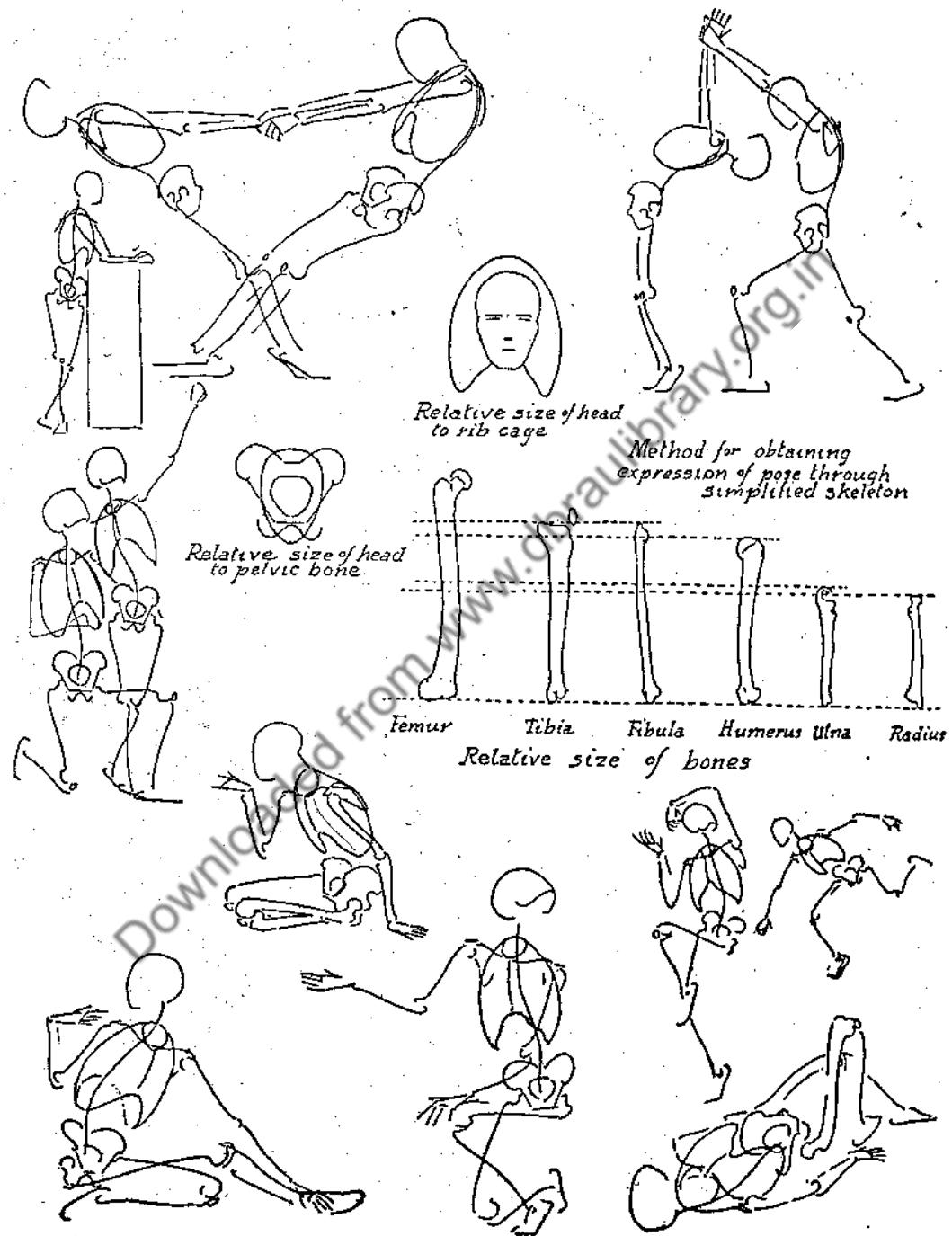
Some of the mechanical principles of the human frame.

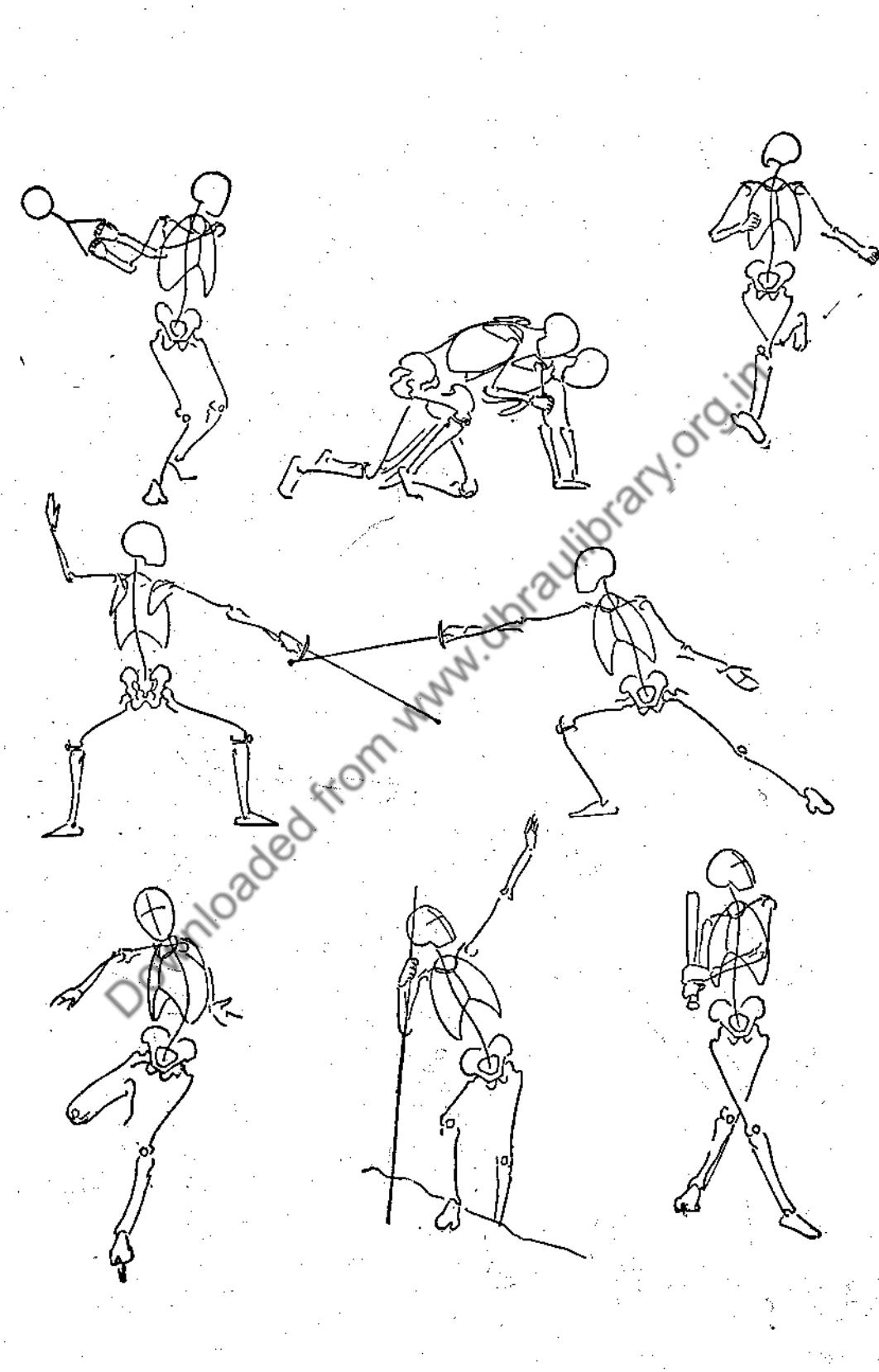


The skeleton in simplified form to illustrate curves which deflect shocks and give springiness to the frame.

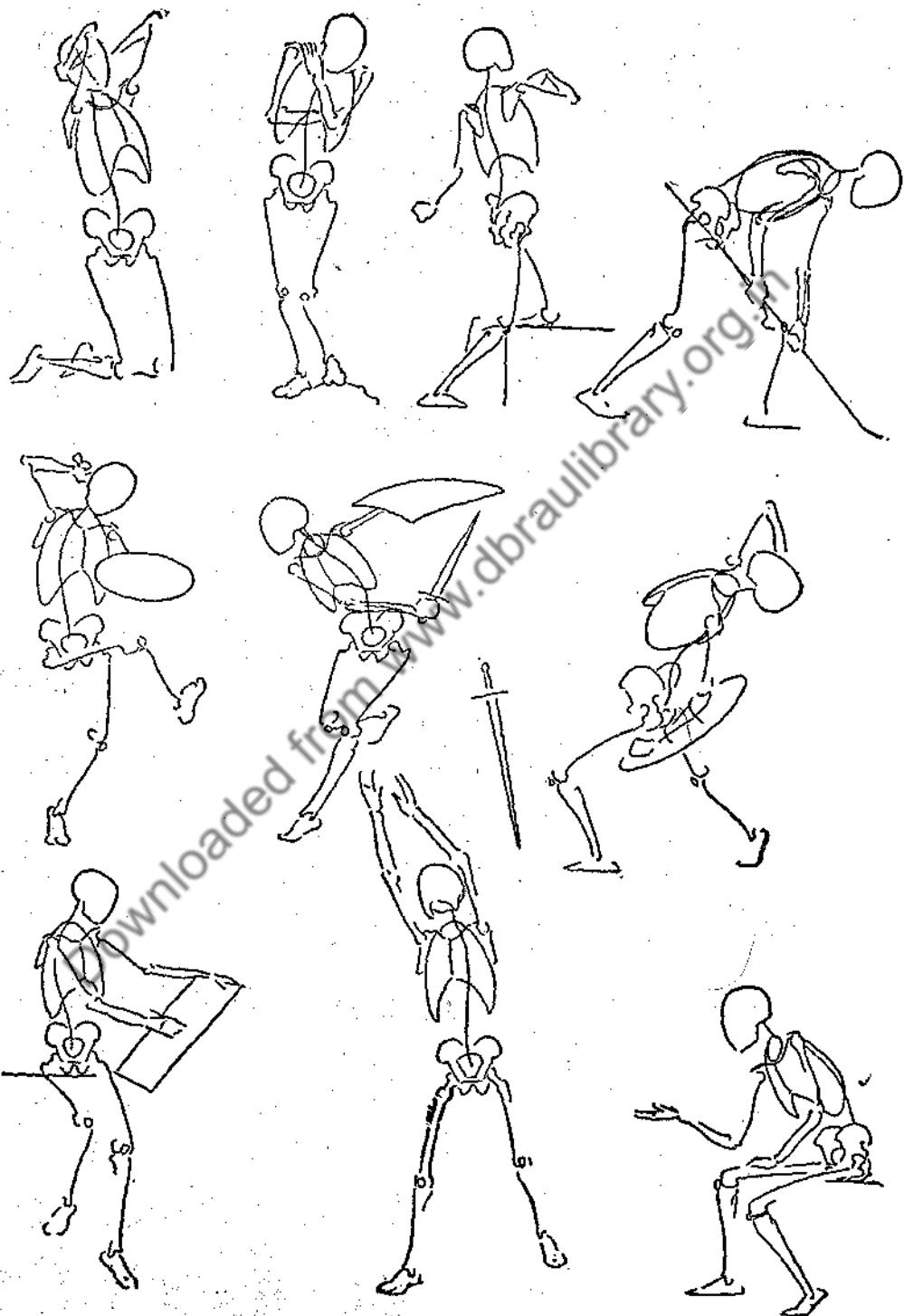
Relative proportion of bones by heads

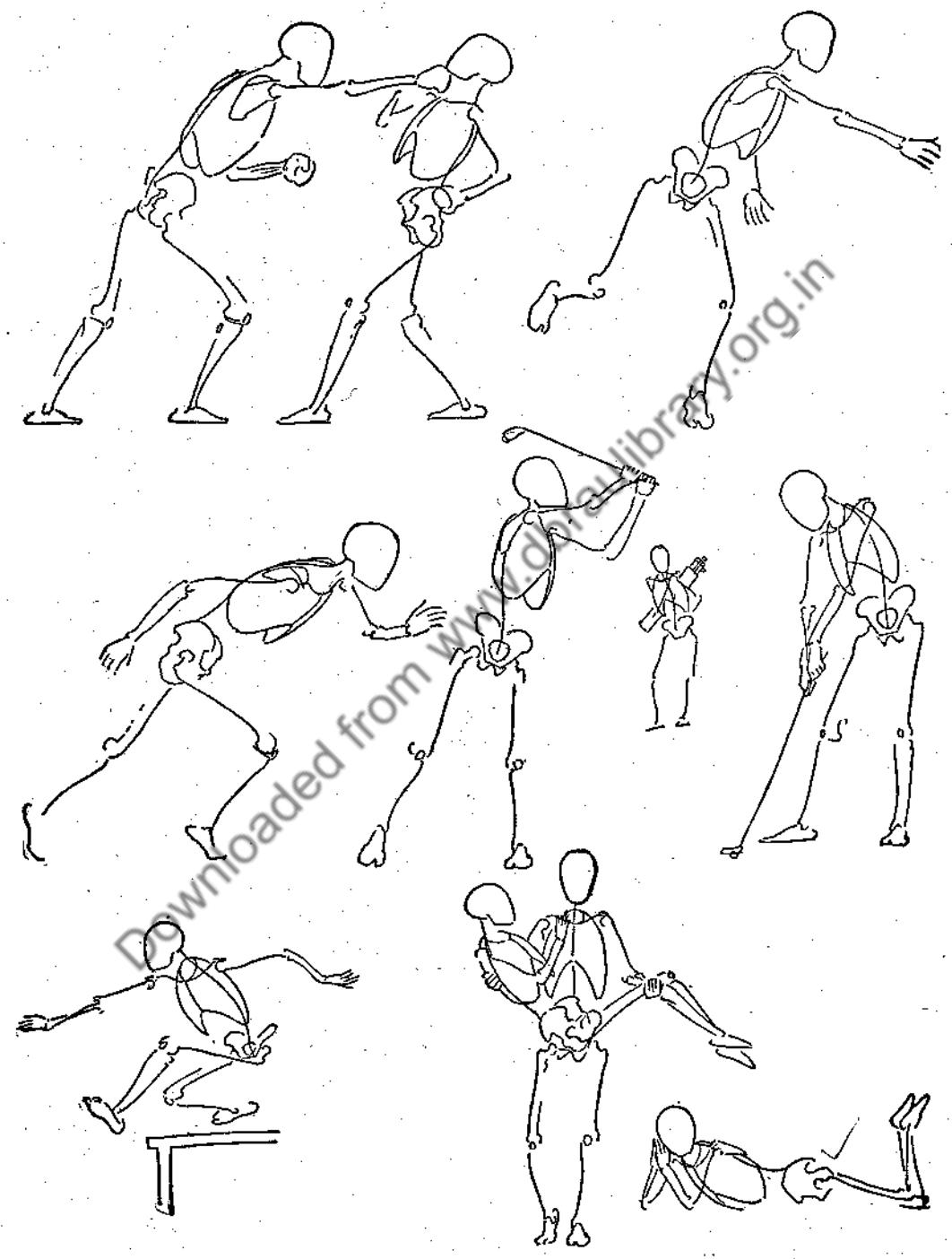




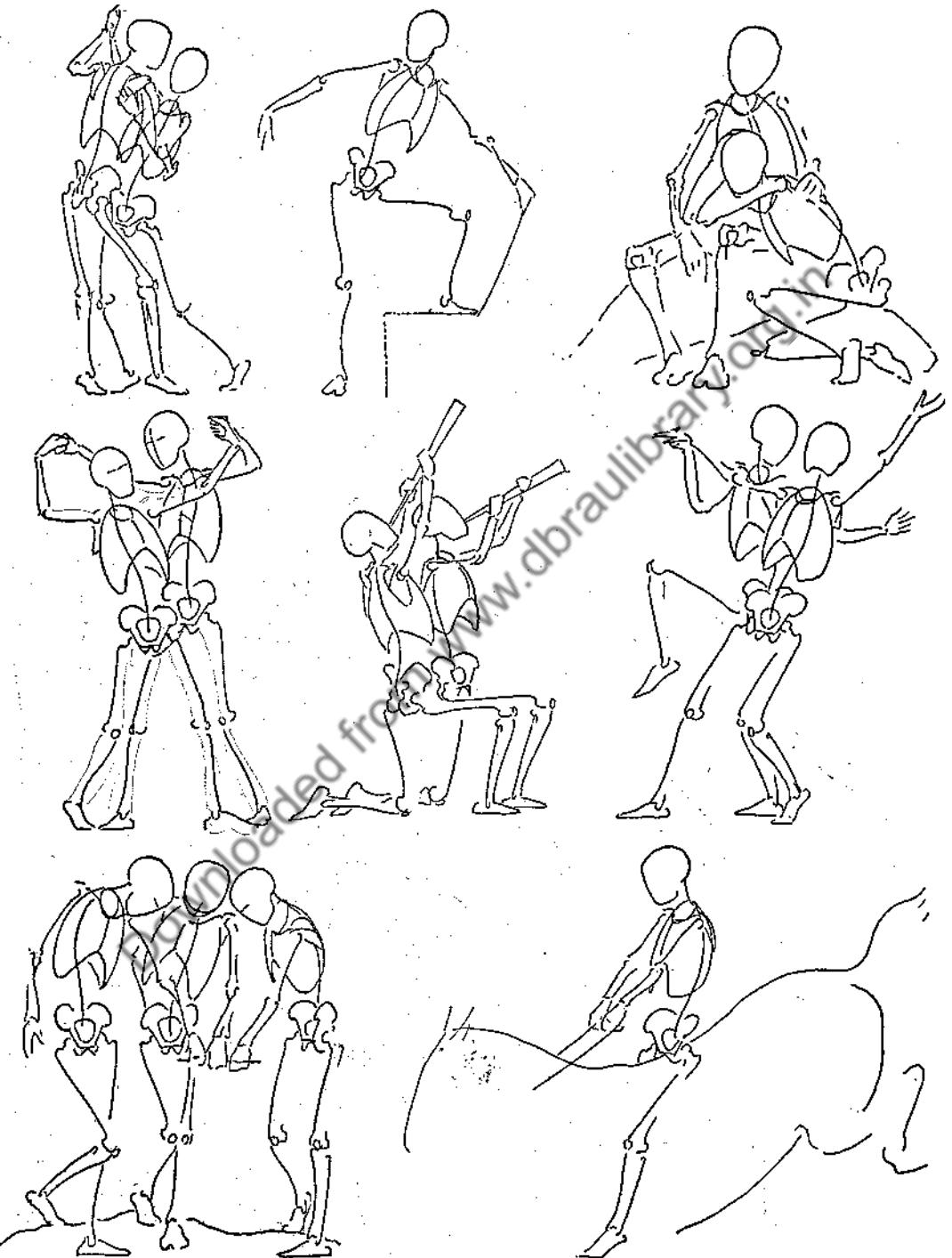


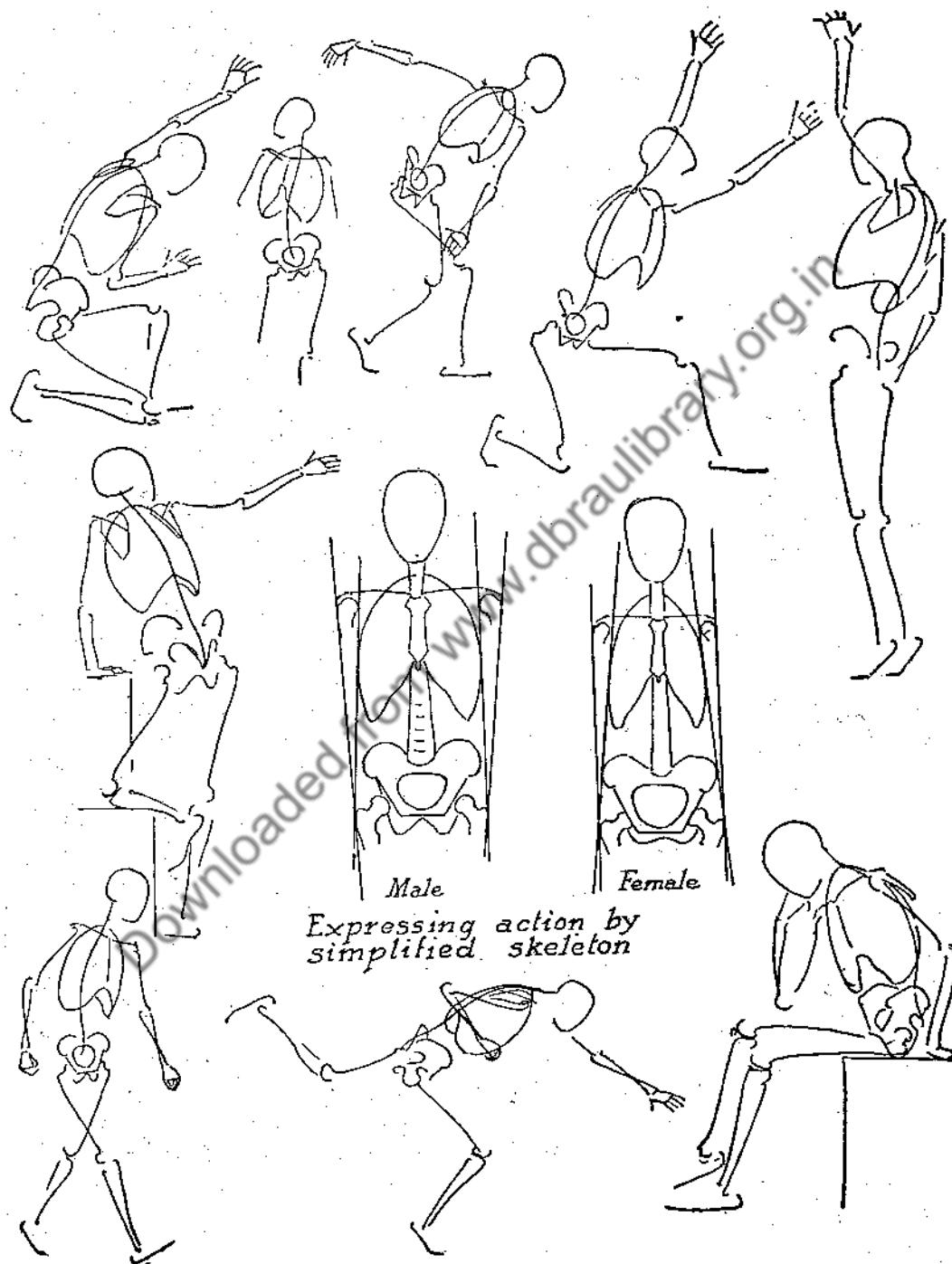
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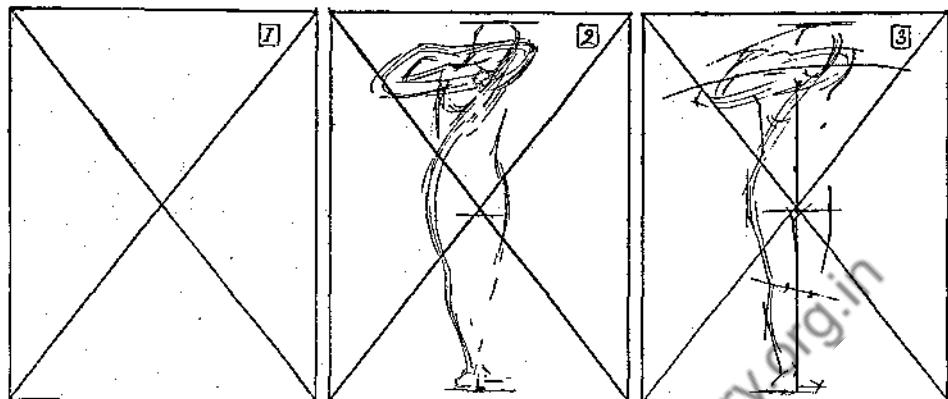




METHOD OF DRAWING

From Life or from the Cast

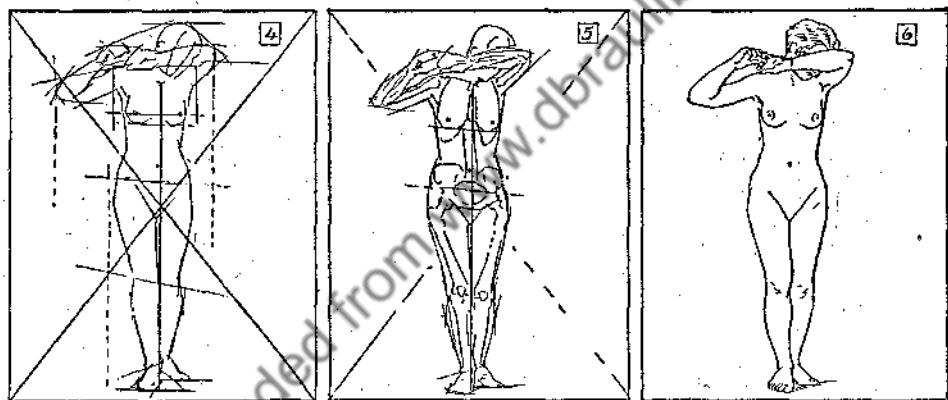
1. Find the center of the paper by drawing lines from corner to corner. This is done to help center the study.
2. Measure with the eye or pencil to find the center of the subject and make a line at that point as related to the center of the paper. Draw a line at the head and another at the feet. With free lines search for the rhythm of the pose, to help visualize the figure and to place it on the paper the size intended. Draw lightly so that the mental impression of the figure is not obliterated by a heavy drawing, and corrections can be easily made.
3. Decide where the pit of the neck should be placed and draw a perpendicular line from this point (if a front view) to the feet. If a back view, draw the perpendicular line from the seventh cervical vertebra to the feet. Find the line of the shoulders, giving the angle of their positions. If a standing figure, first draw the leg on which there is most weight, to obtain the proper balance of the figure.
4. Give the line showing the angle of the position of the pelvis. Indicate a line through the knee-caps. Draw the torso, indicating its bulk, marking the width of shoulders, hips, neck and head. Block with straight lines going beyond the intersections to obtain a better idea of the direction of line and to avoid a cramped feeling.
5. Sketch within the lines a simplified skeleton, to check up on position of joints and bulk of chest. (Refer to pages on proportion.) See that the pit of the neck, the pubic bone, the navel, the pelvis, the knee-caps and the inner ankles are in proper relation to each other. Compare relative sizes of head to bulk of torso, hands to face, feet to hands, arms to legs, and thickness of the neck to that of the head, leg and arm.
6. Go over the outline, perfecting it, searching for character and for grace of line.
7. Indicate the outline of the planes and of the principal shadows.
8. Fill in the planes in large surfaces, and connect the shadows as much as possible.
9. Without losing their mass, model the planes keeping well in mind the direction of light.
In drawing the head, decide on the bulk and draw in the planes of the face (see Part III), then the eyes, the mouth and the nose last. It is easier to fit a head on a figure, than to fit a figure to a head.



1

2

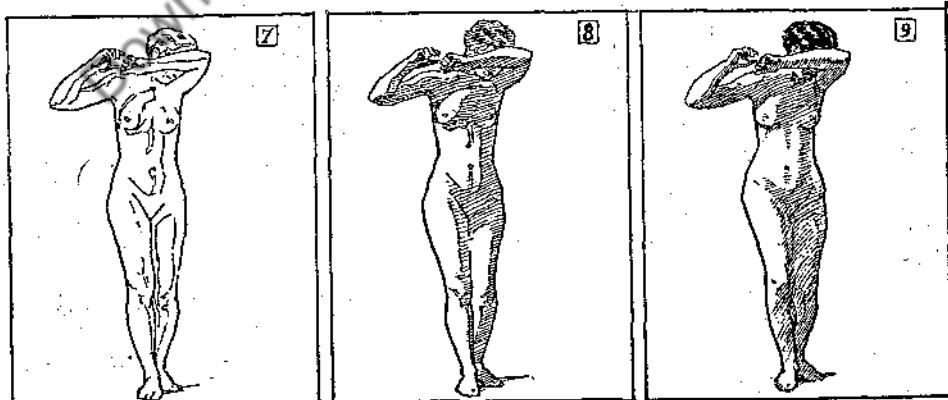
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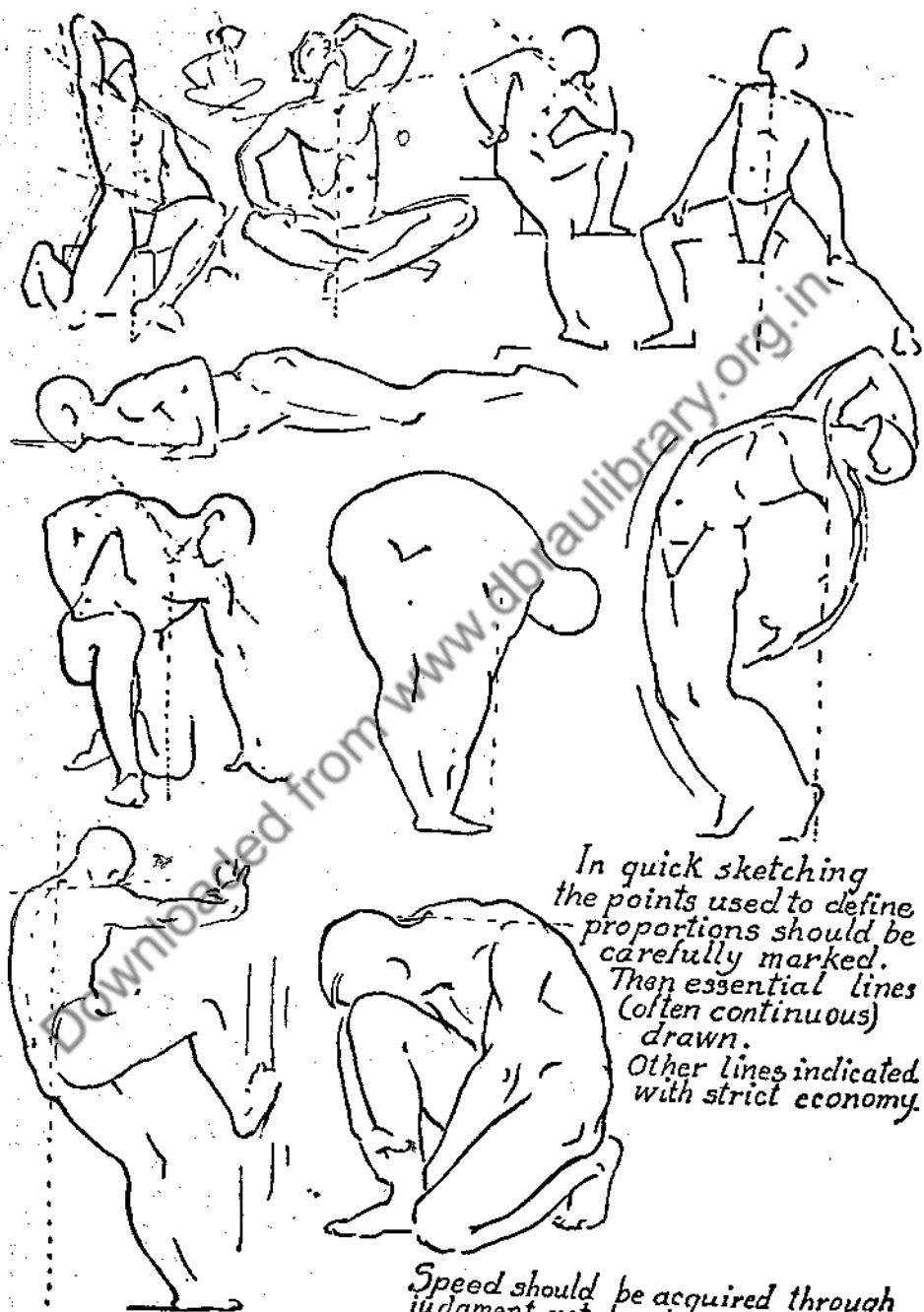
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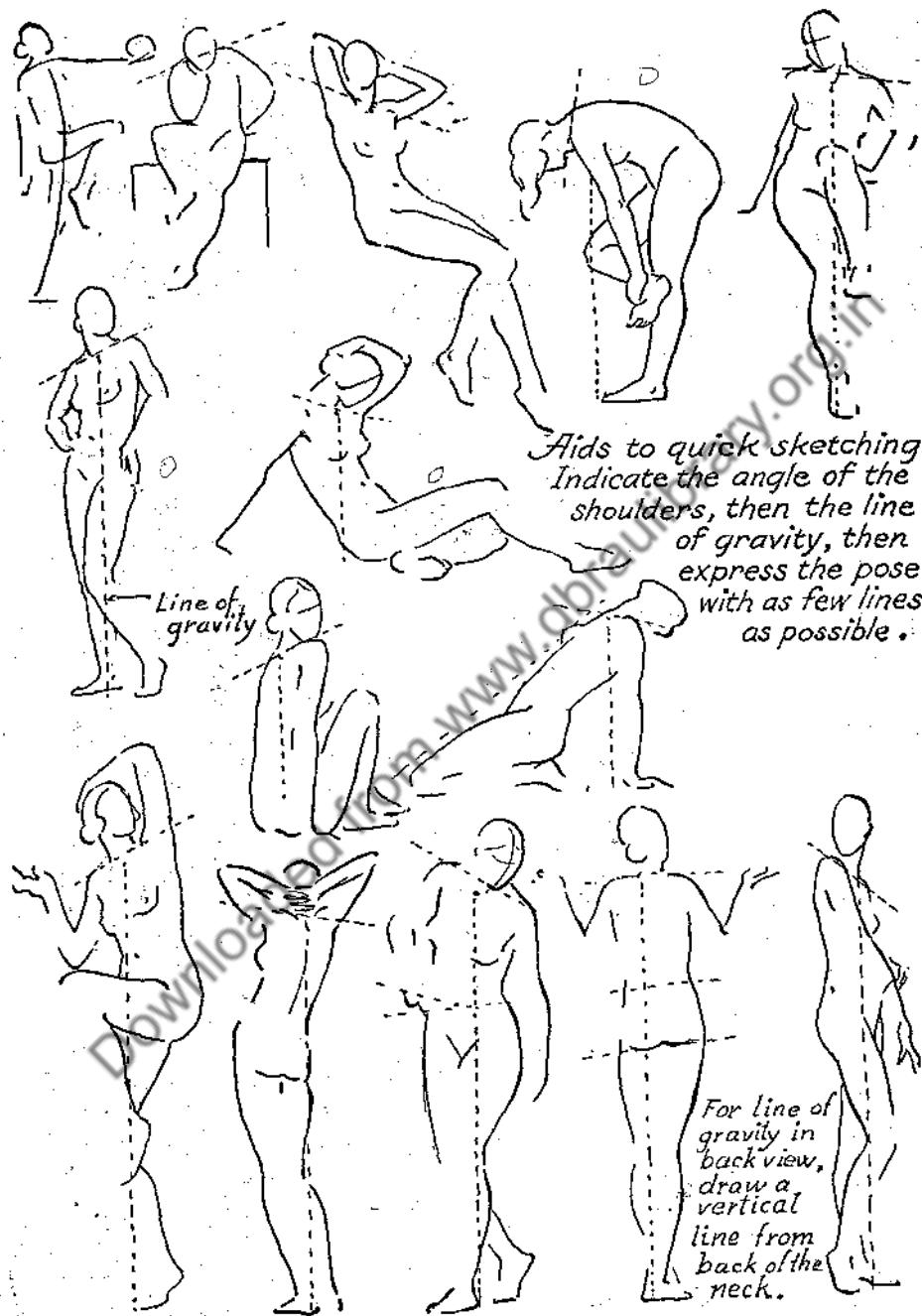
8

9



In quick sketching
the points used to define
proportions should be
carefully marked.
Then essential lines
(often continuous)
drawn.
Other lines indicated
with strict economy.

Speed should be acquired through
judgment, not haste.

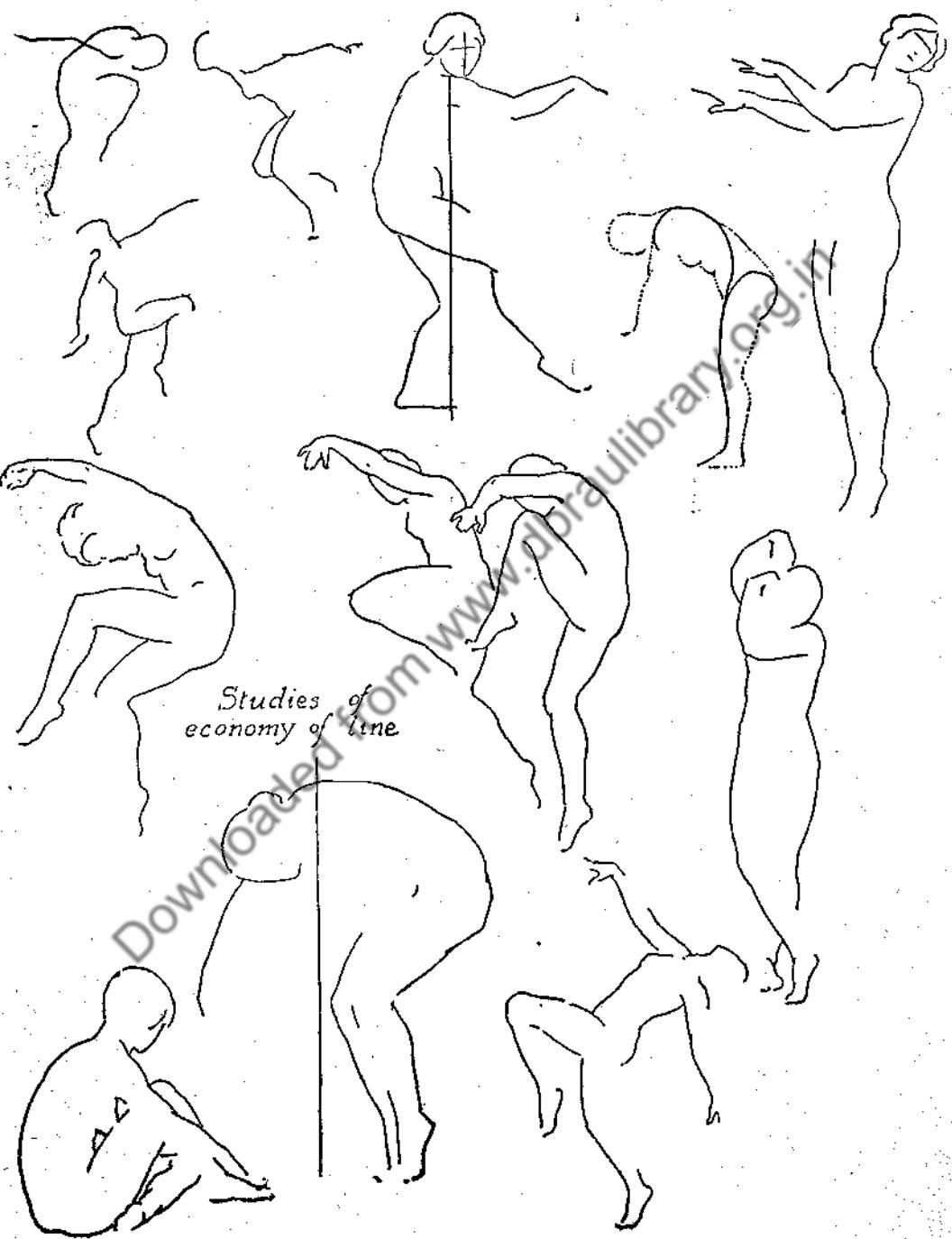


Aids to quick sketching.
Indicate the angle of the
shoulders, then the line
of gravity, then
express the pose
with as few lines
as possible.

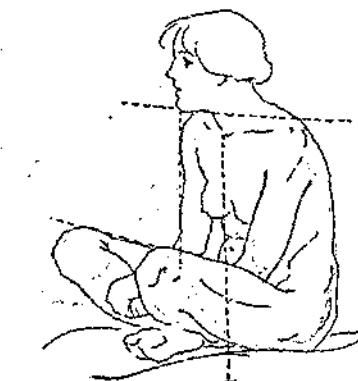
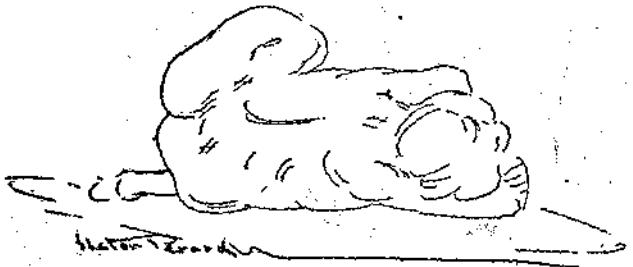
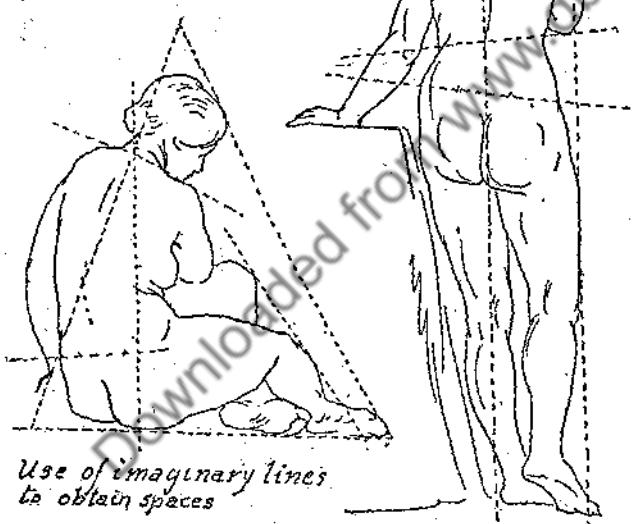
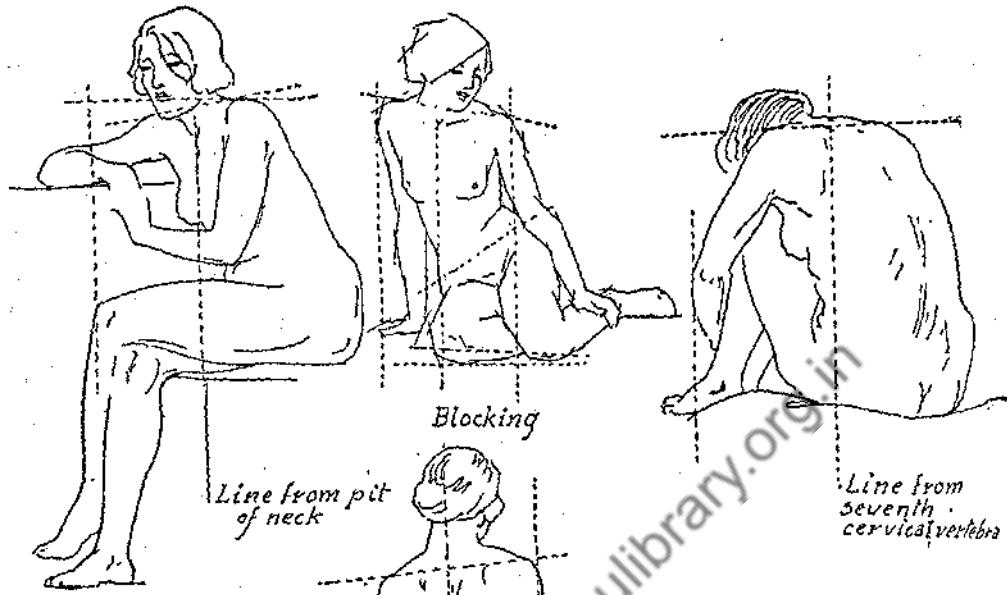
For line of
gravity in
back view,
draw a
vertical
line from
back of the
neck.

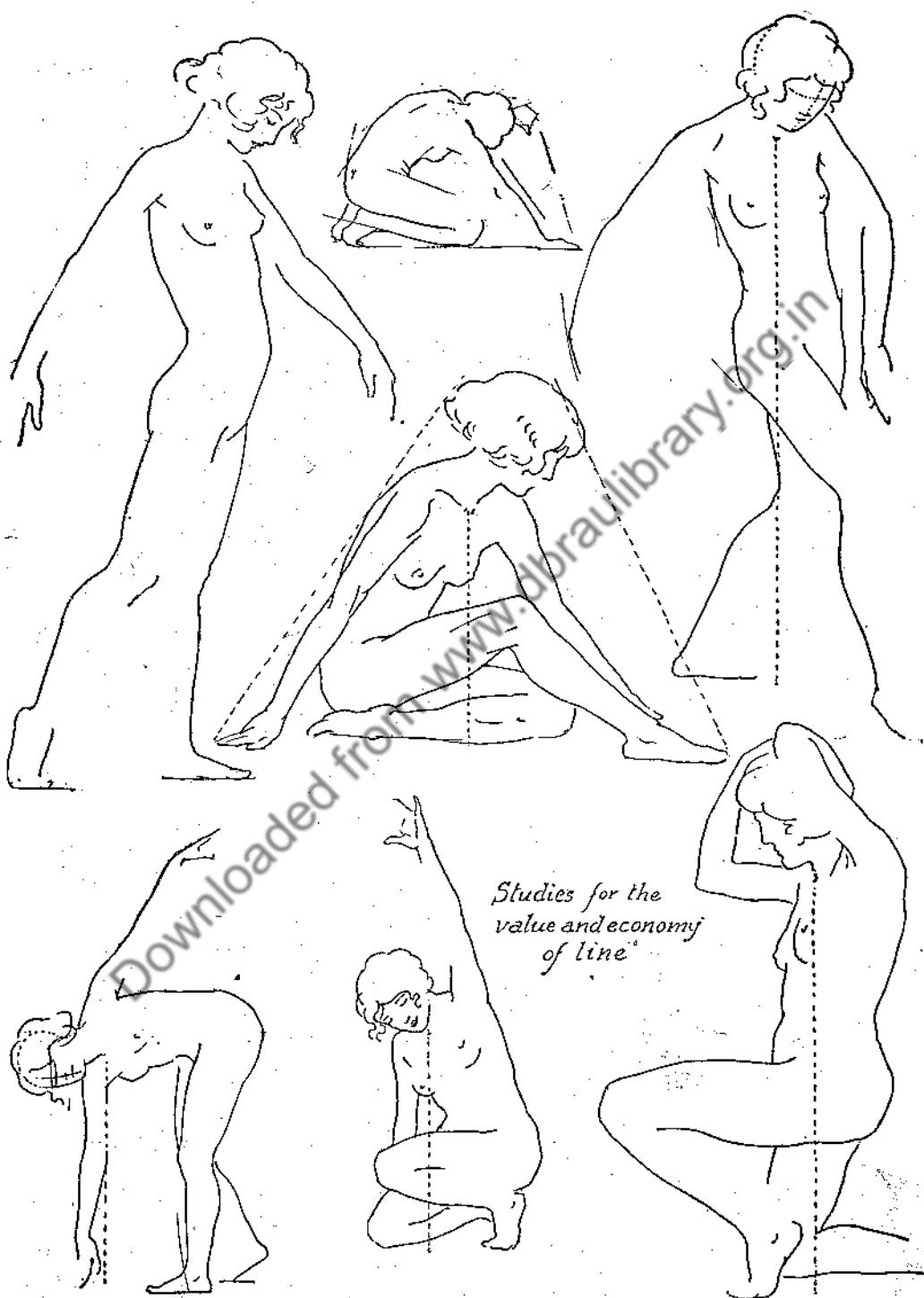


Five minute sketches for
quick decision of action and
proportions

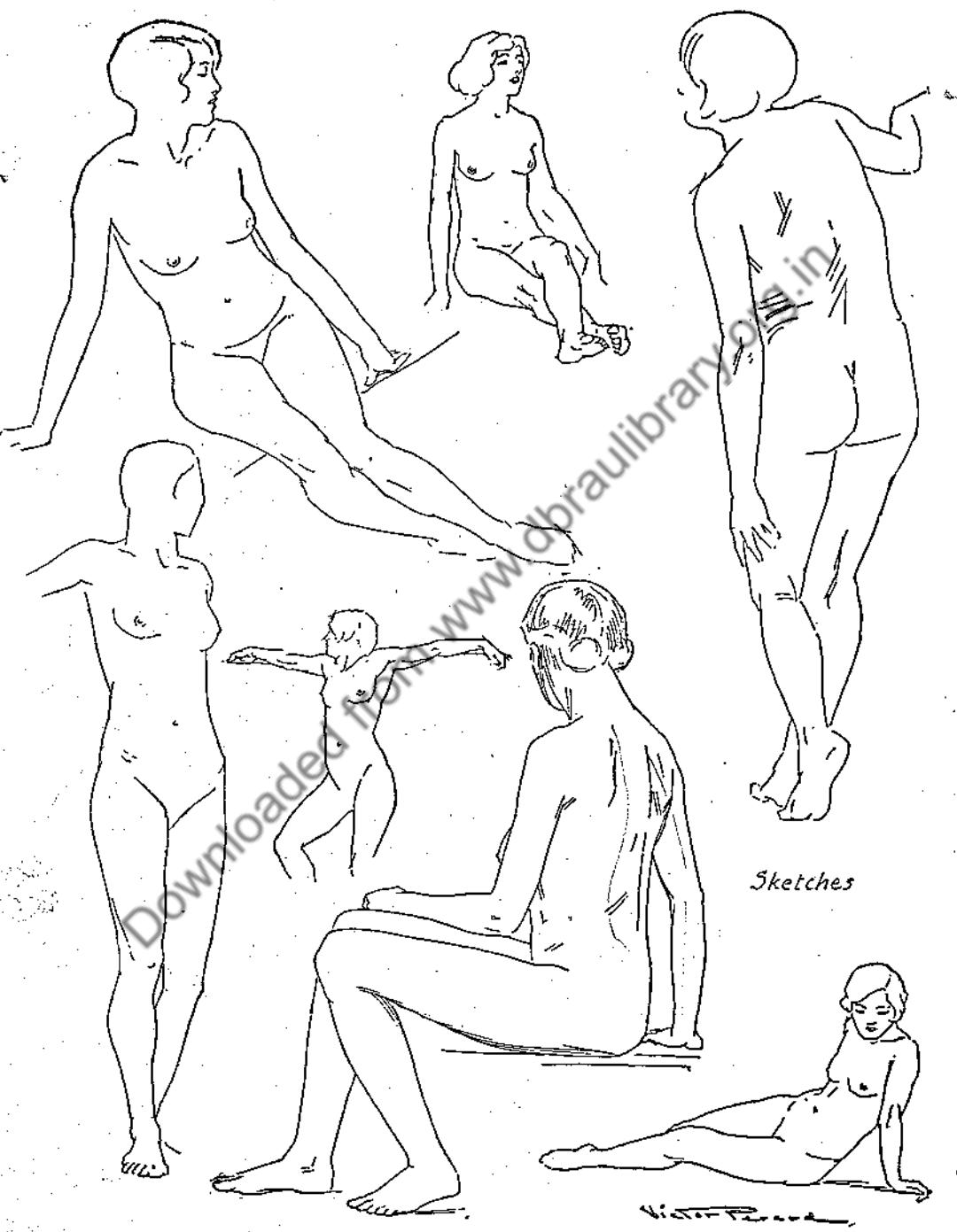


*Studies
economy of line*

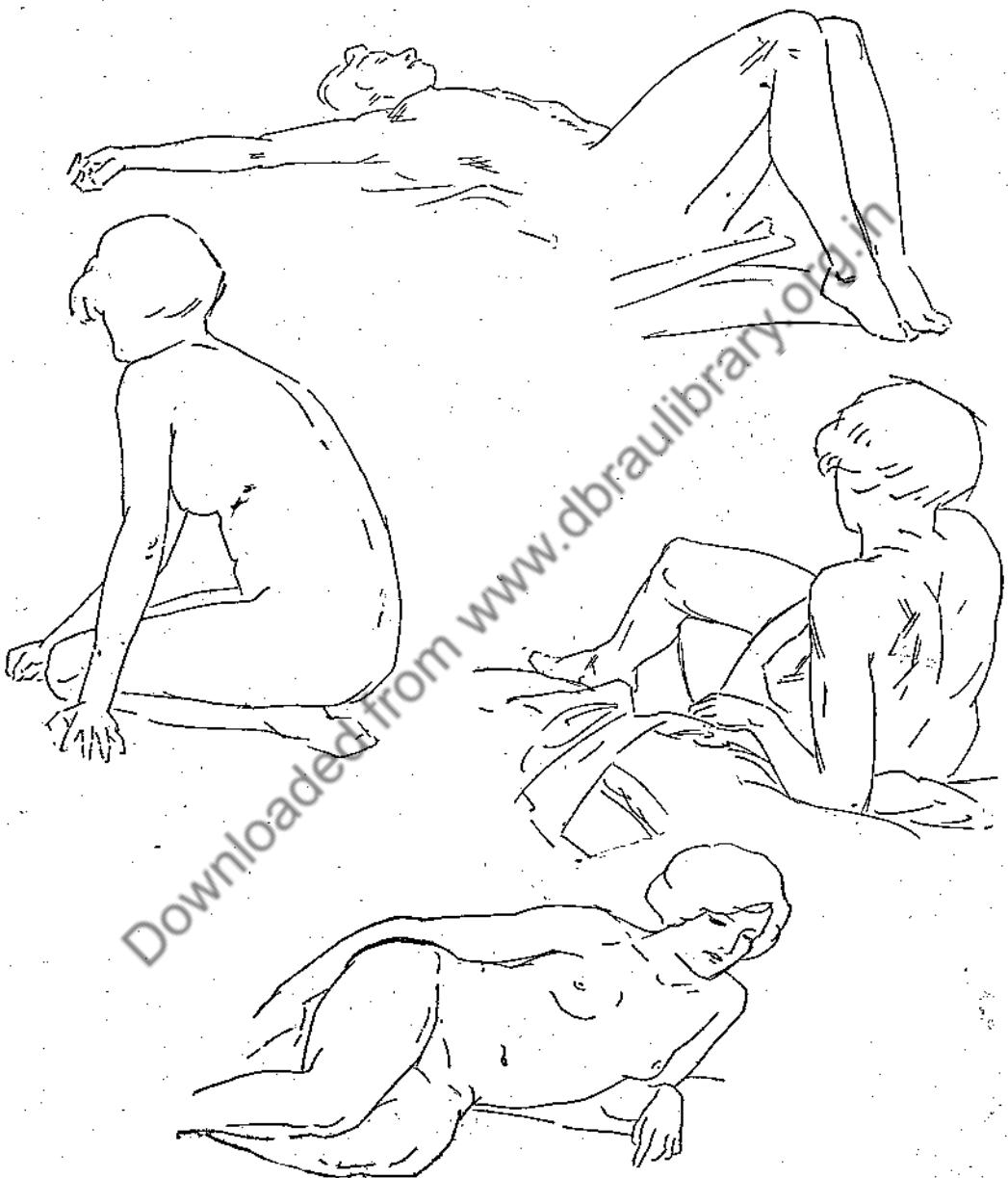


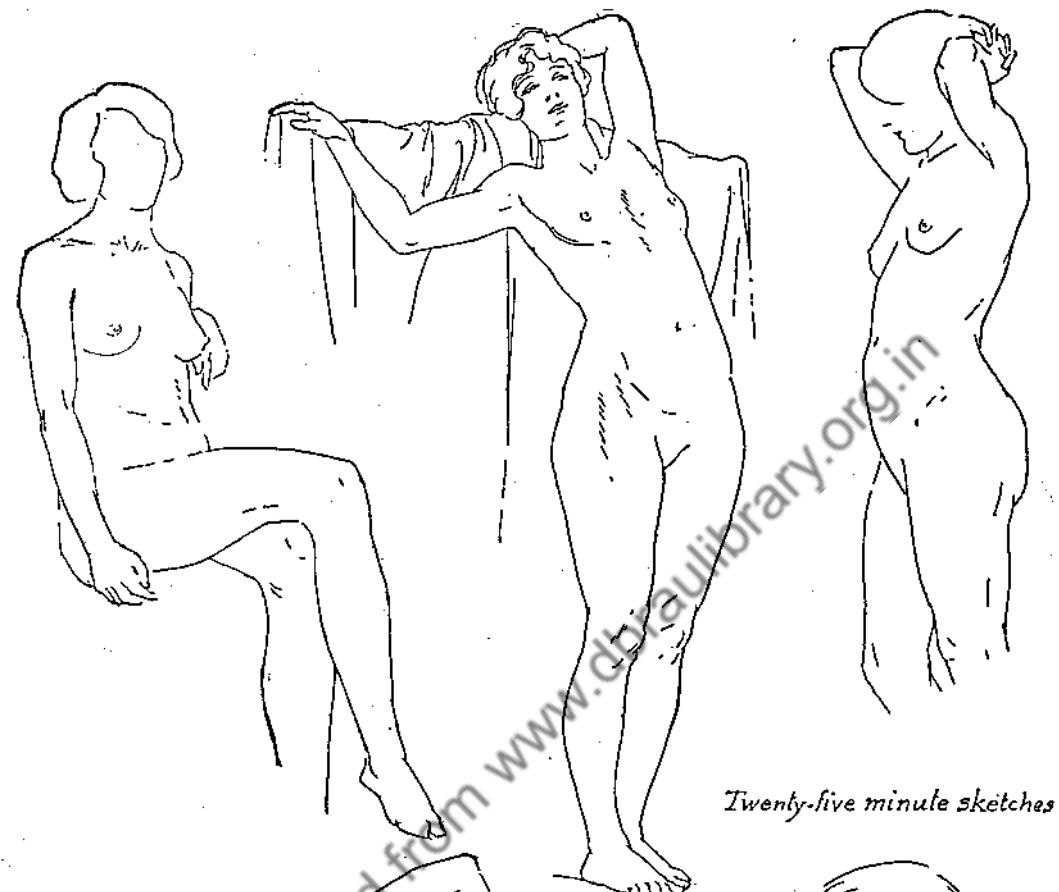


*Studies for the
value and economy
of line*

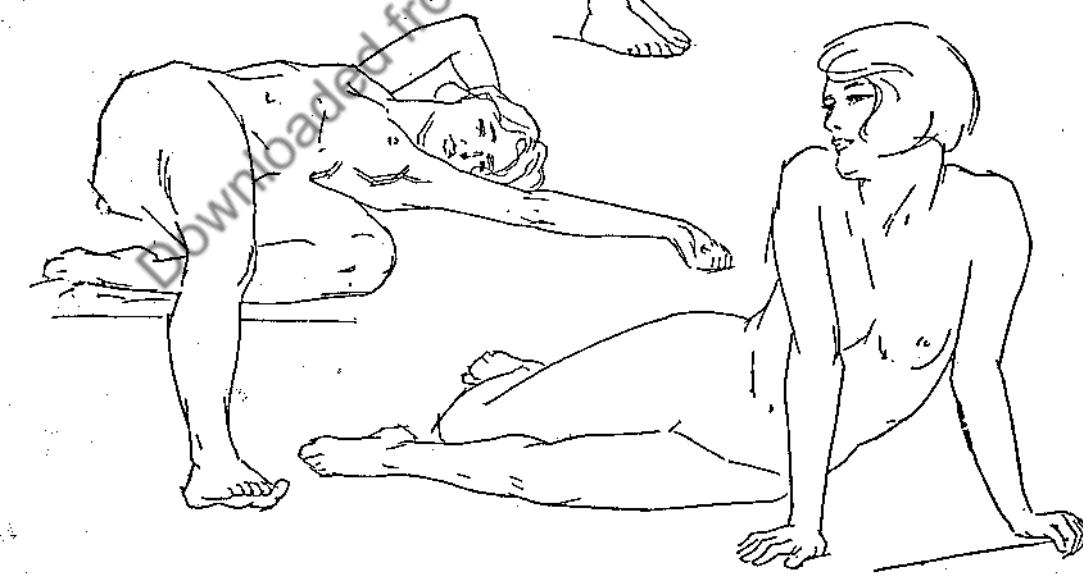


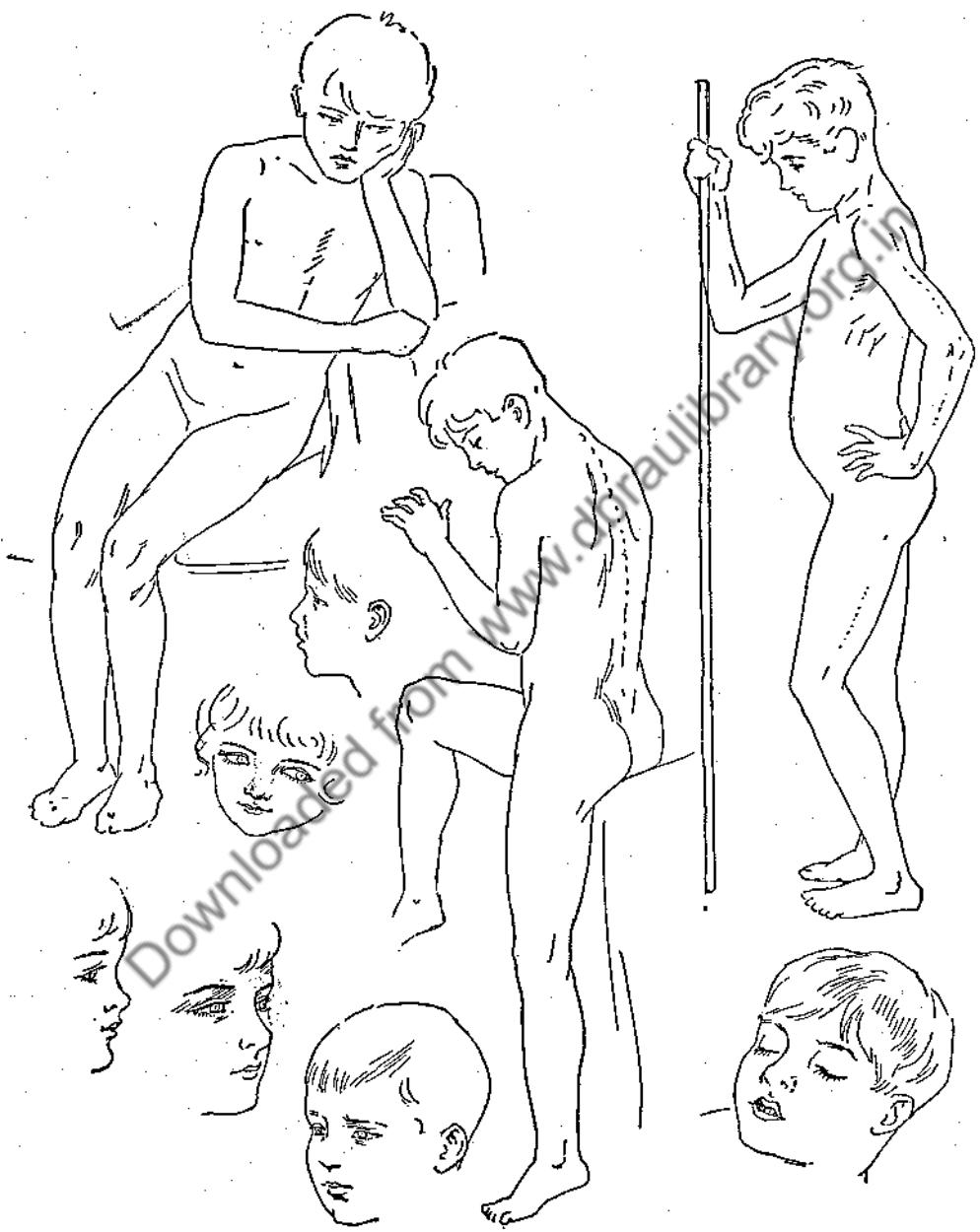
Vishwanath



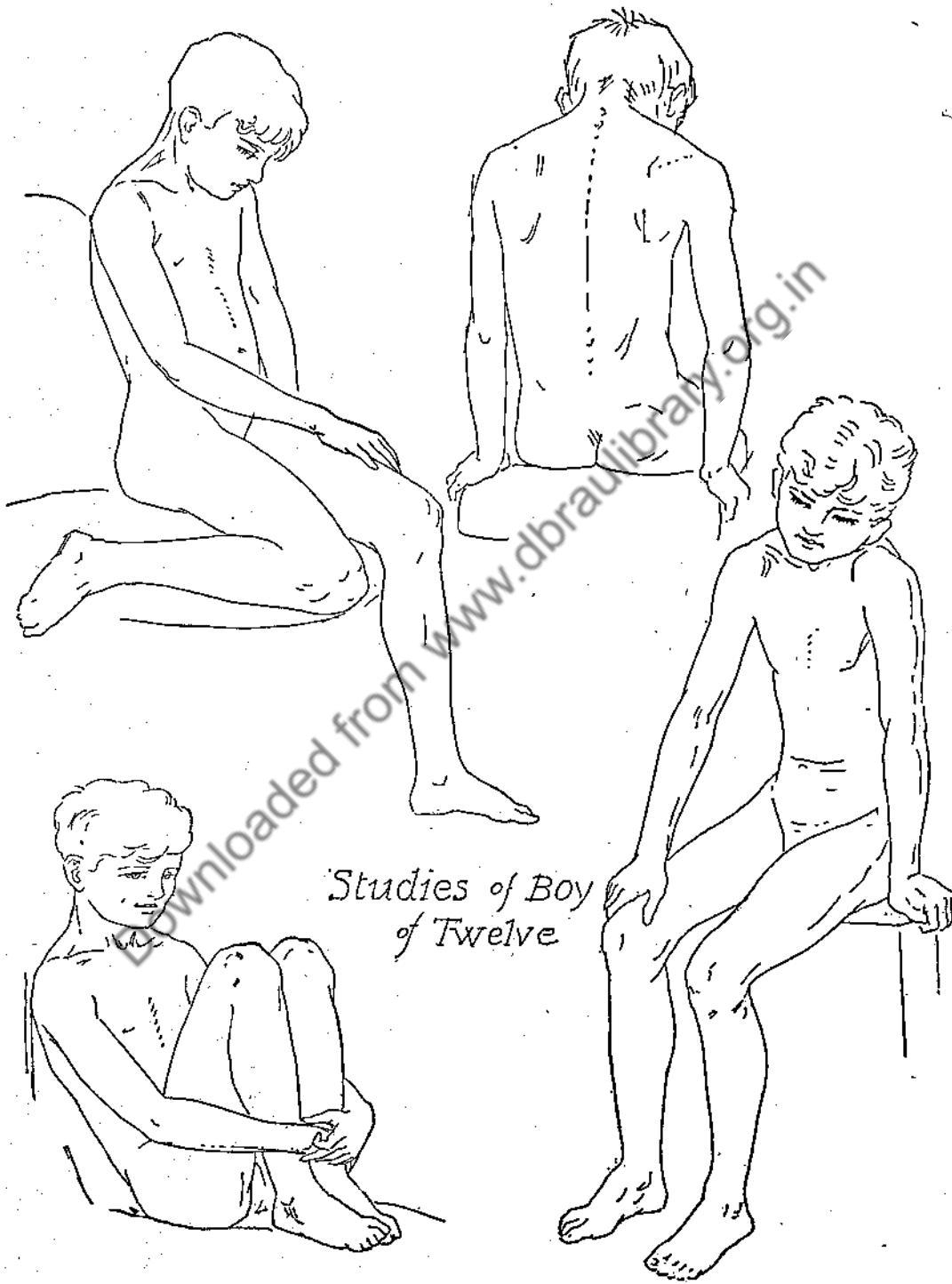


Twenty-five minute sketches



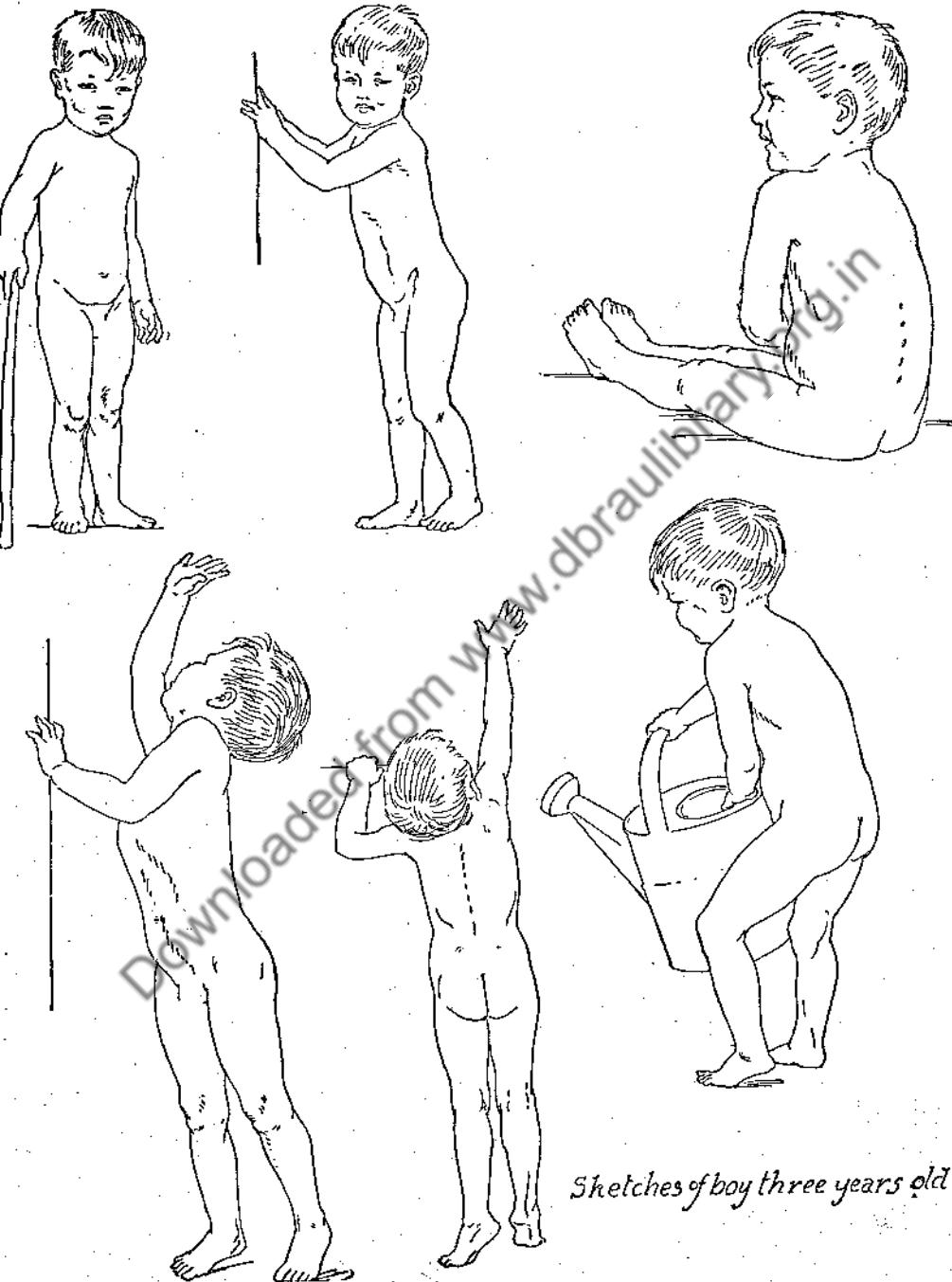


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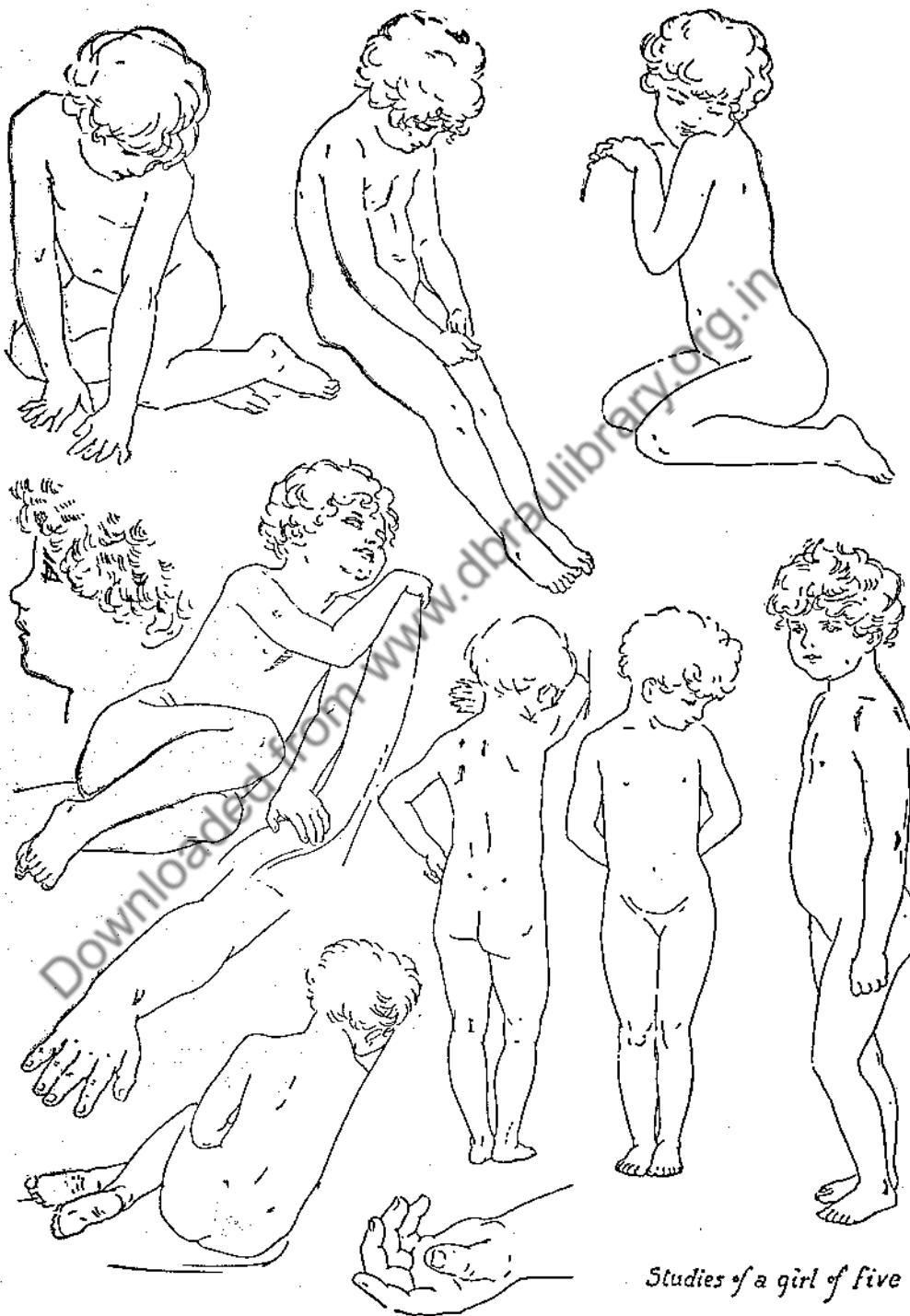


*Studies of Boy
of Twelve*

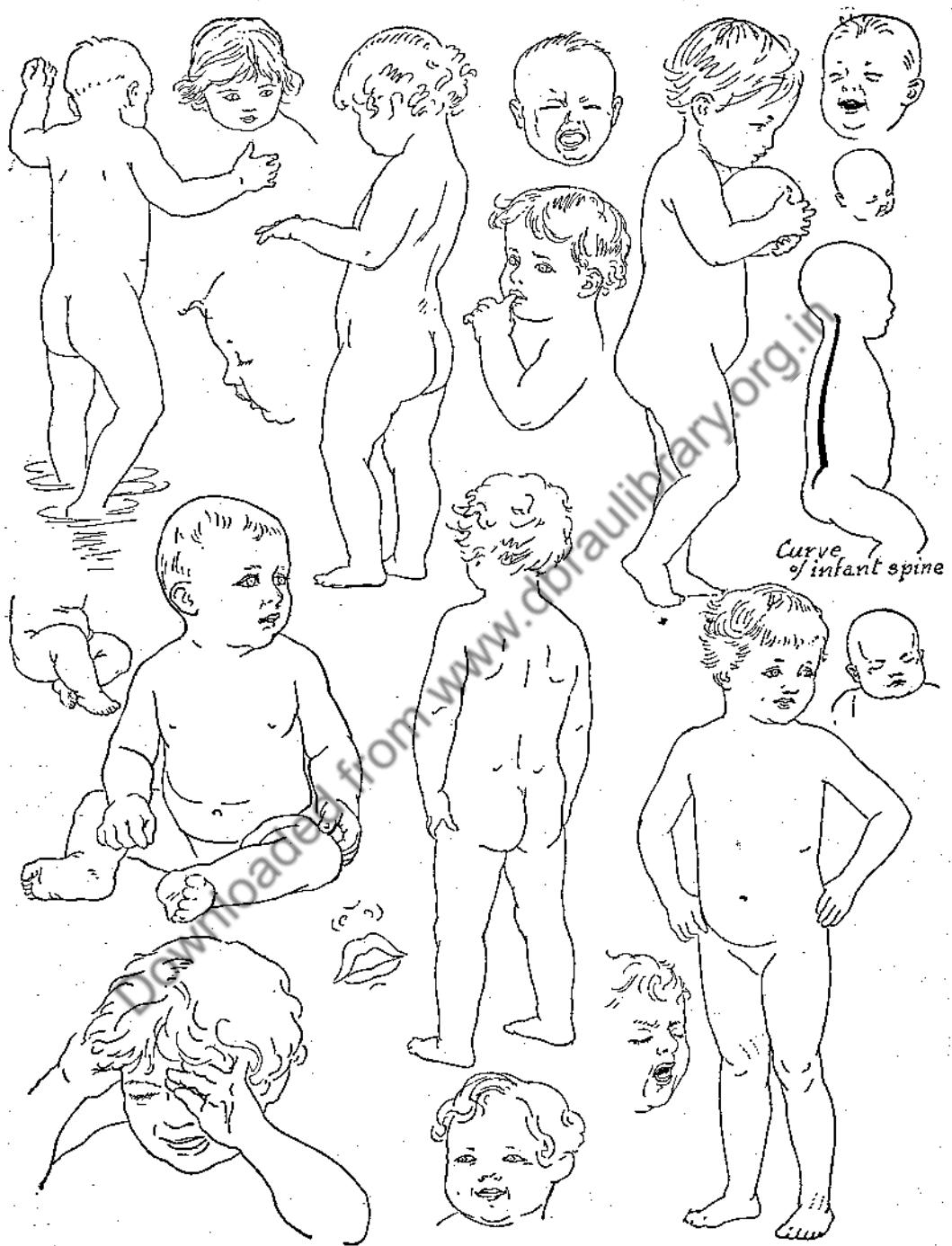
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Sketches of boy three years old



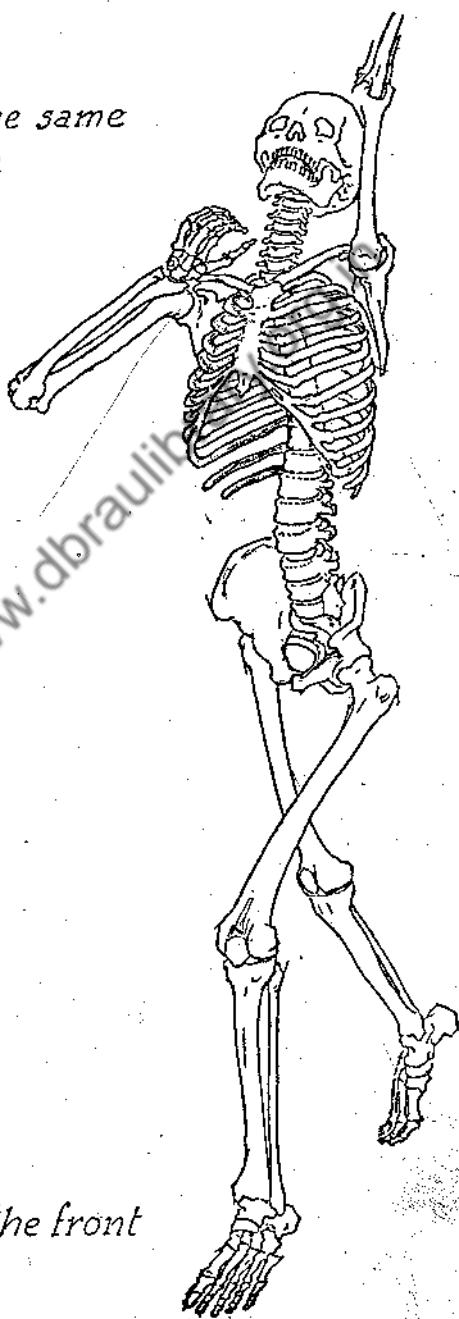
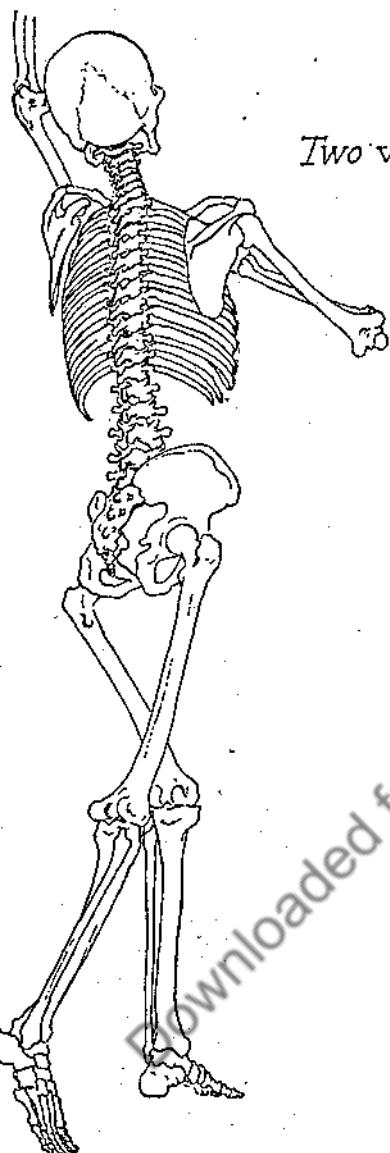
Studies of a girl of five



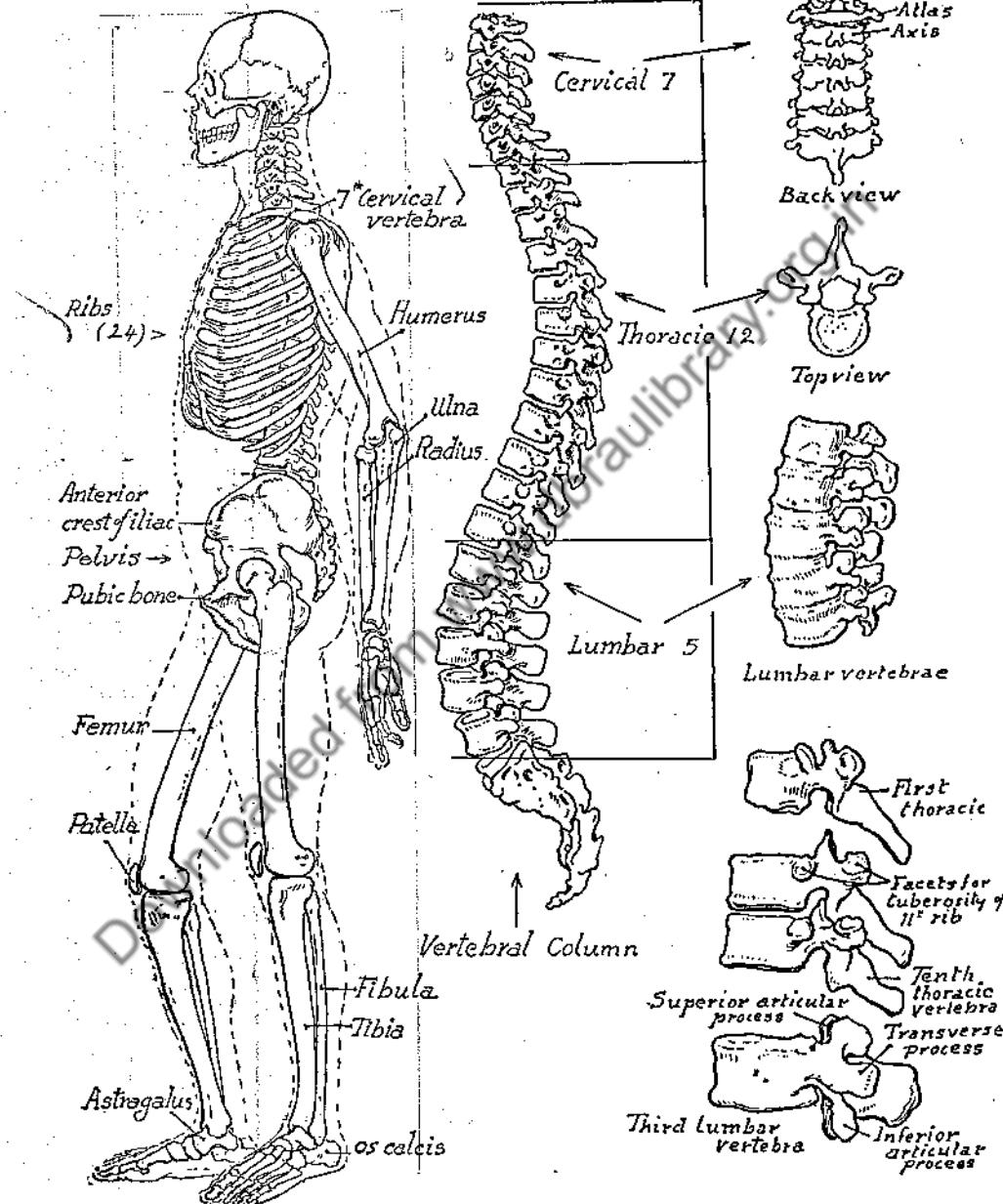


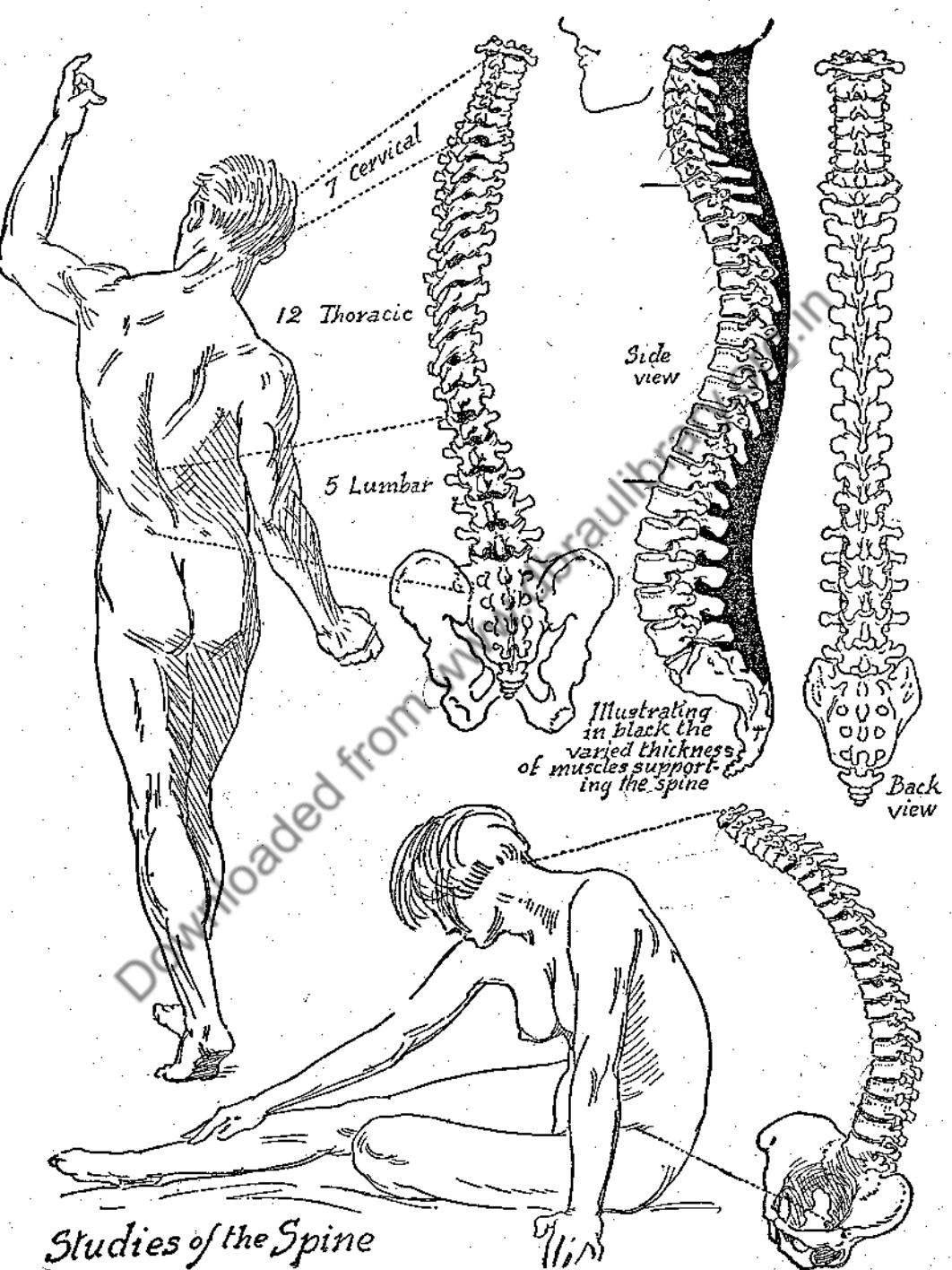
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PART TWO
THE SKELETON

*Two views of the same
skeleton*

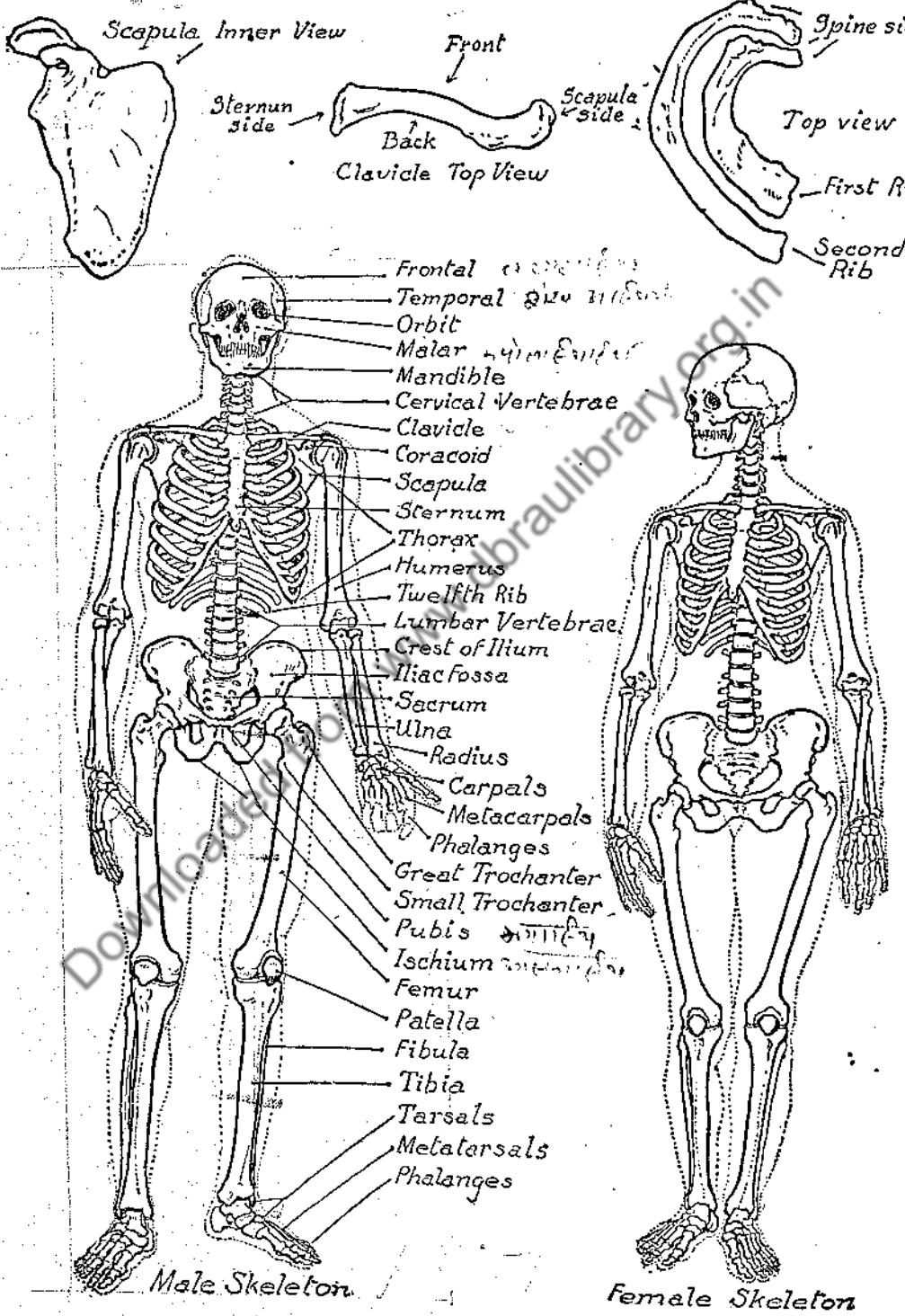


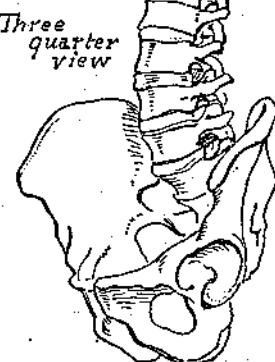
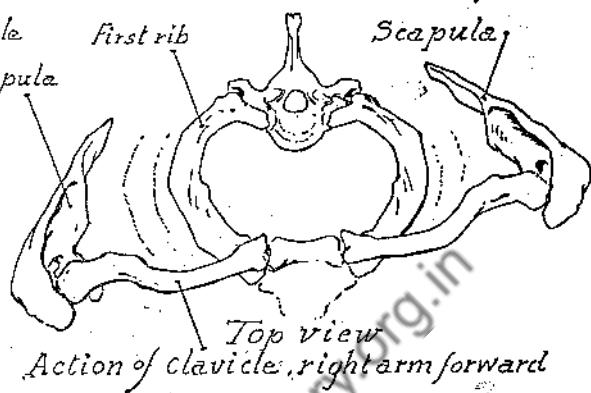
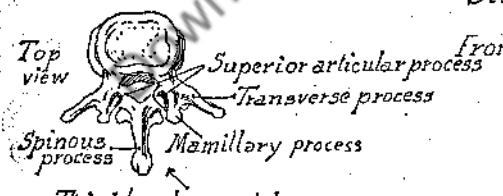
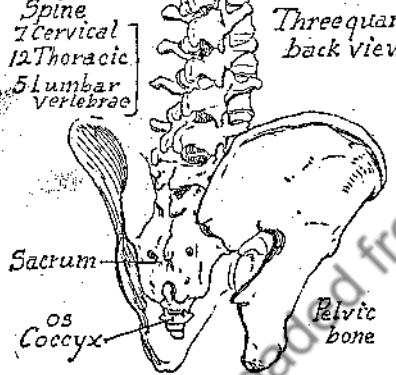
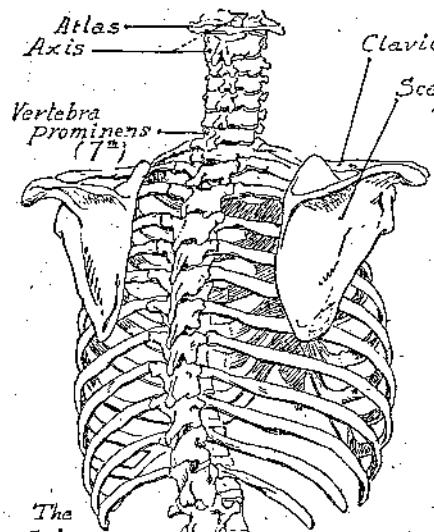
The spine from the front

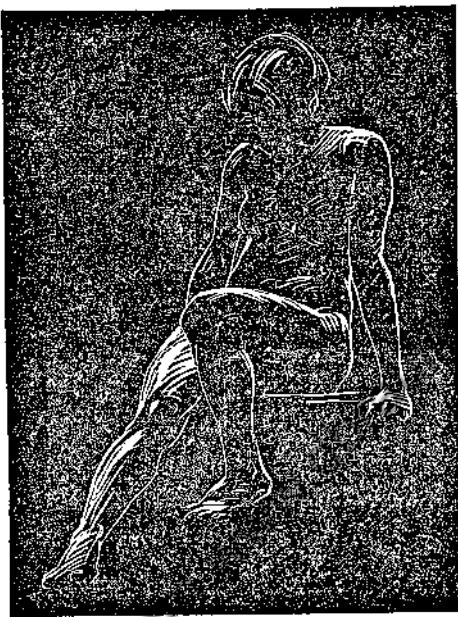




Studies of the Spine



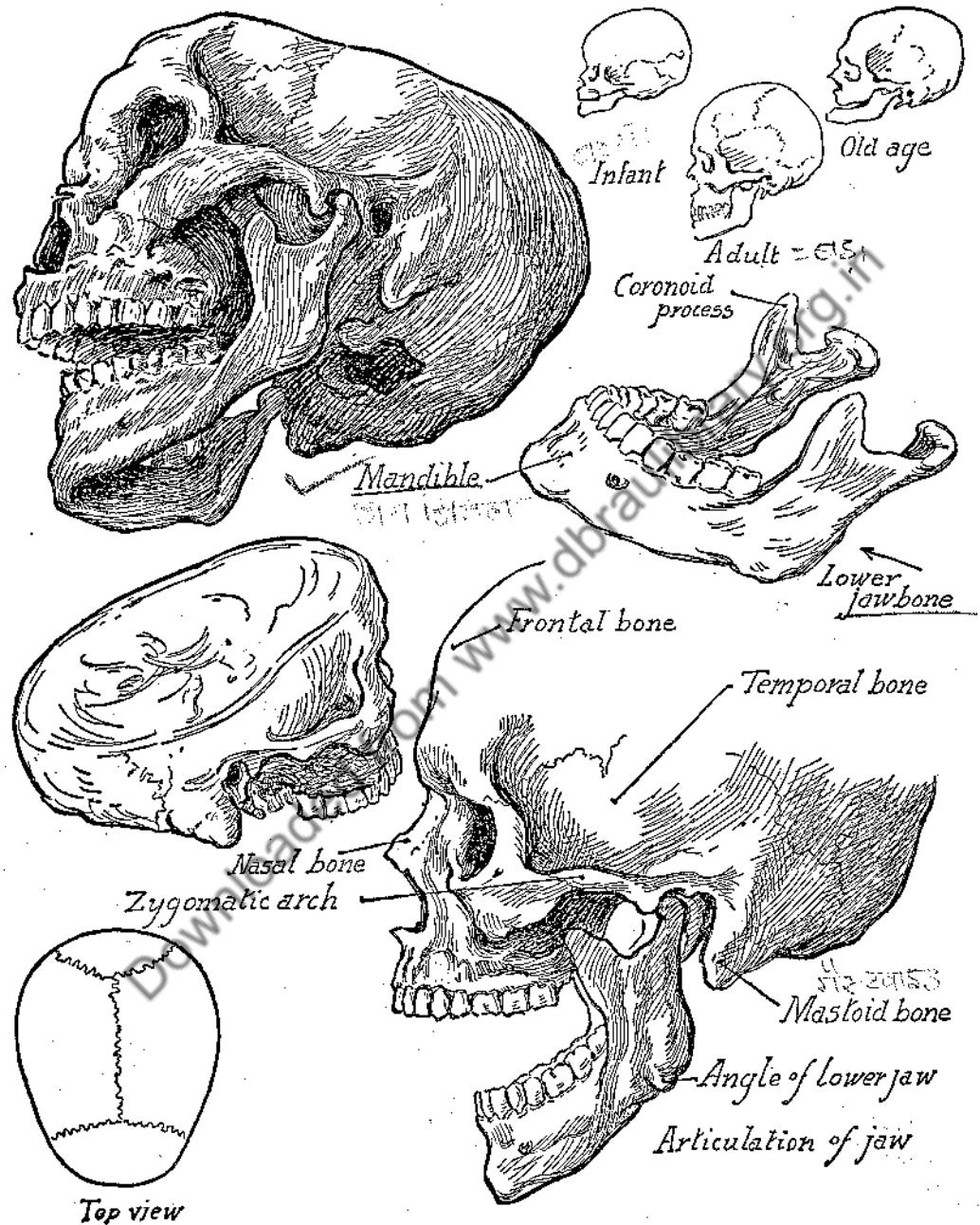




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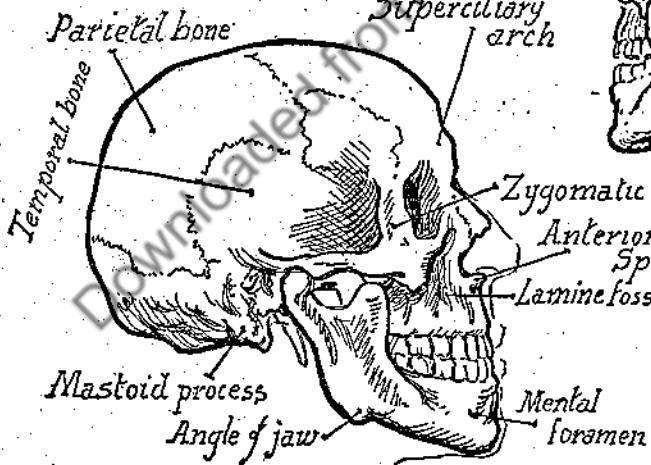
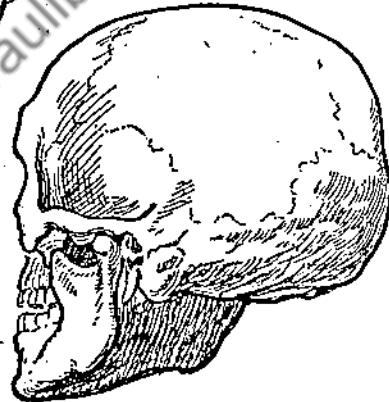
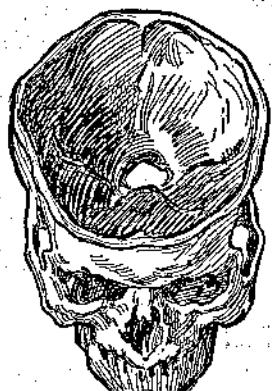
PART THREE

THE HEAD and NECK

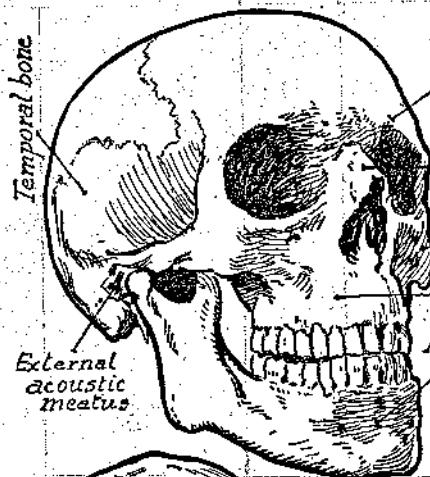


The SKULL

Infra orbital foramen



Temporal bone



Zygomatic bone
Superciliary arch

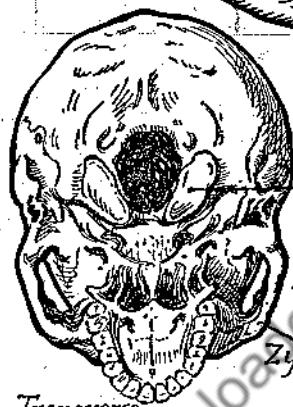
Nasal bone

Zygomatic arch

Maxilla

Mandible

Angle of jaw



Articular surface
(occipital condyle)
Under view of skull

Transverse process

Superior articular surface

Posterior tubercle

Ondontoid process
Articular surface

Transverse pro.
Spine

Back of Skull

Upper view of Atlas

Odontoid process
of Second vertebra

Articular surface

Atlas
Axis

Atlas first vertebra

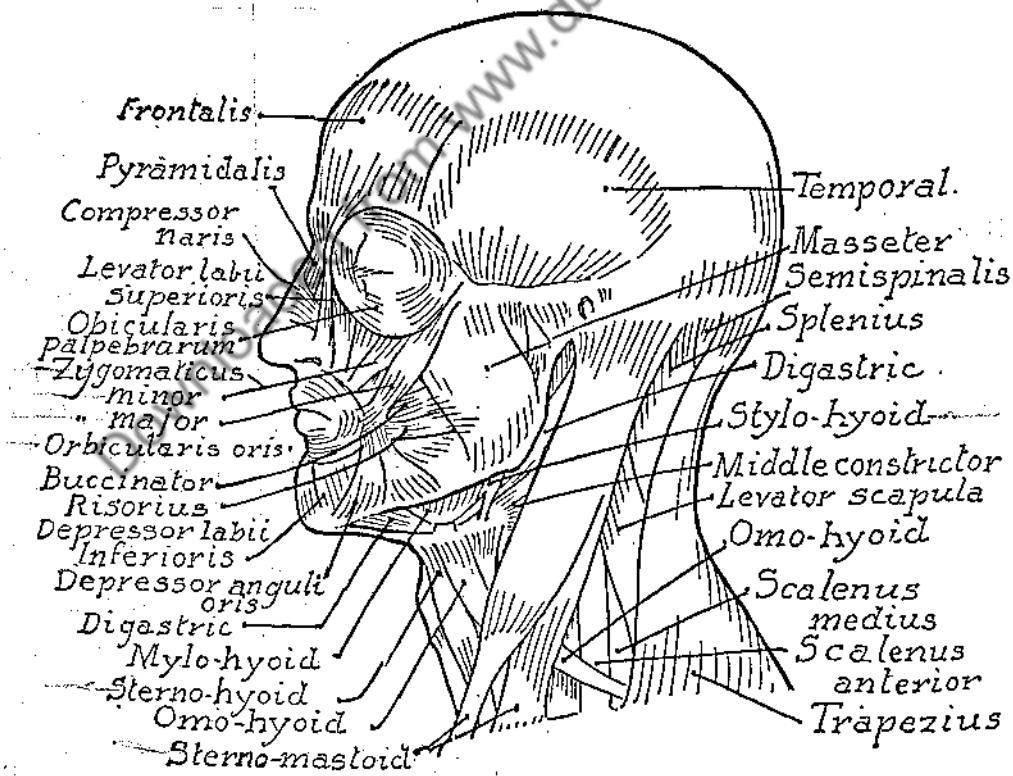
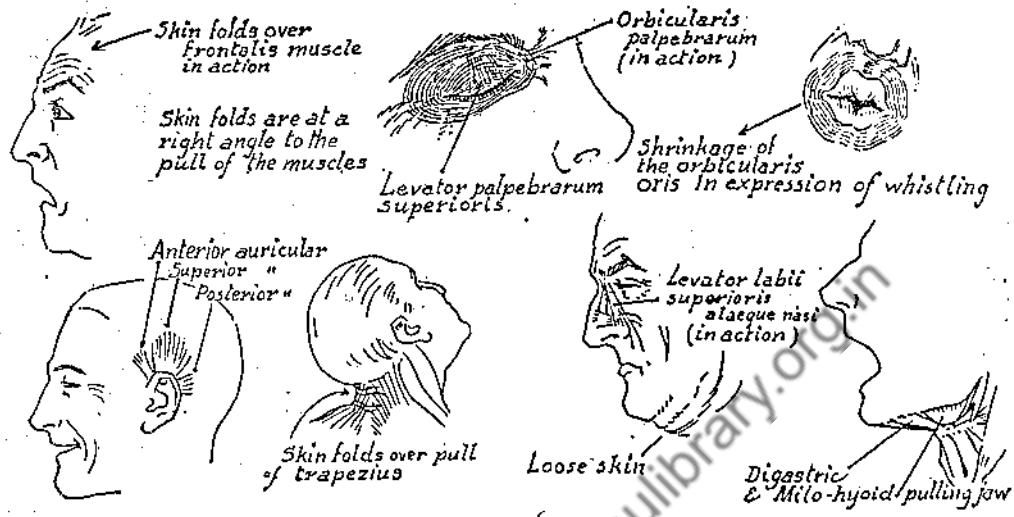
Axis. Second vertebra

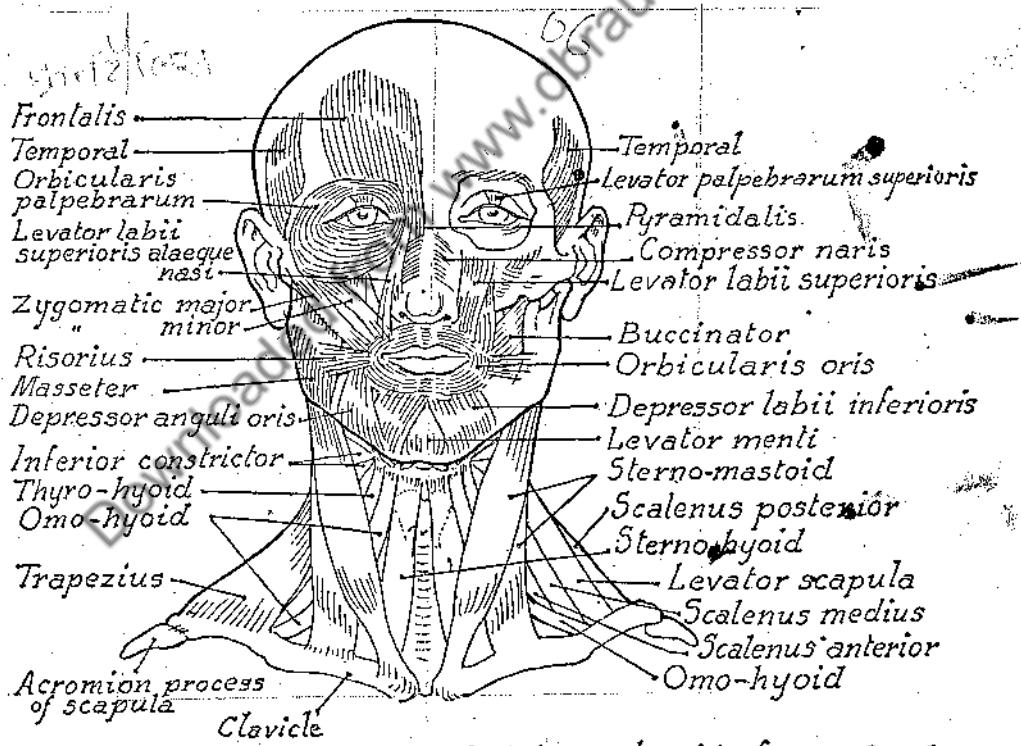
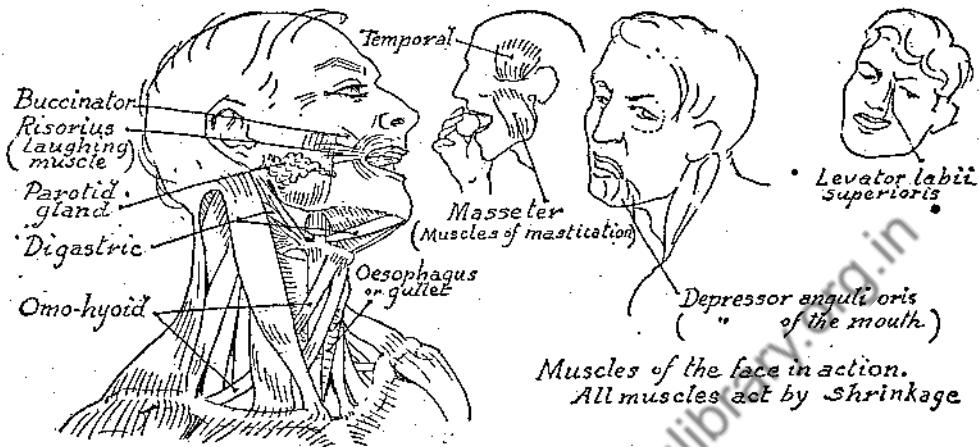
Spine

Inner view of Atlas & Axis

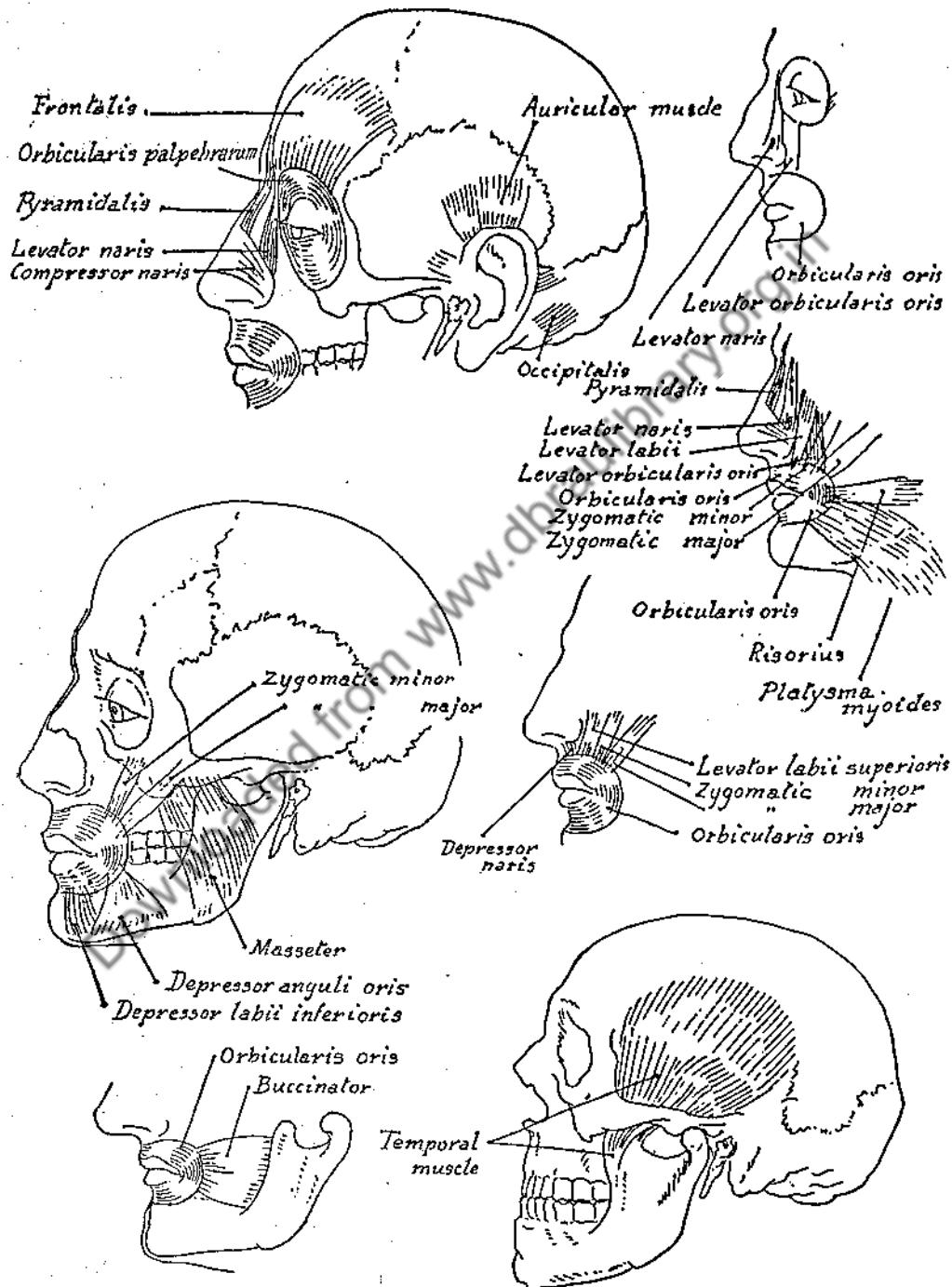
Axis

View from behind & above

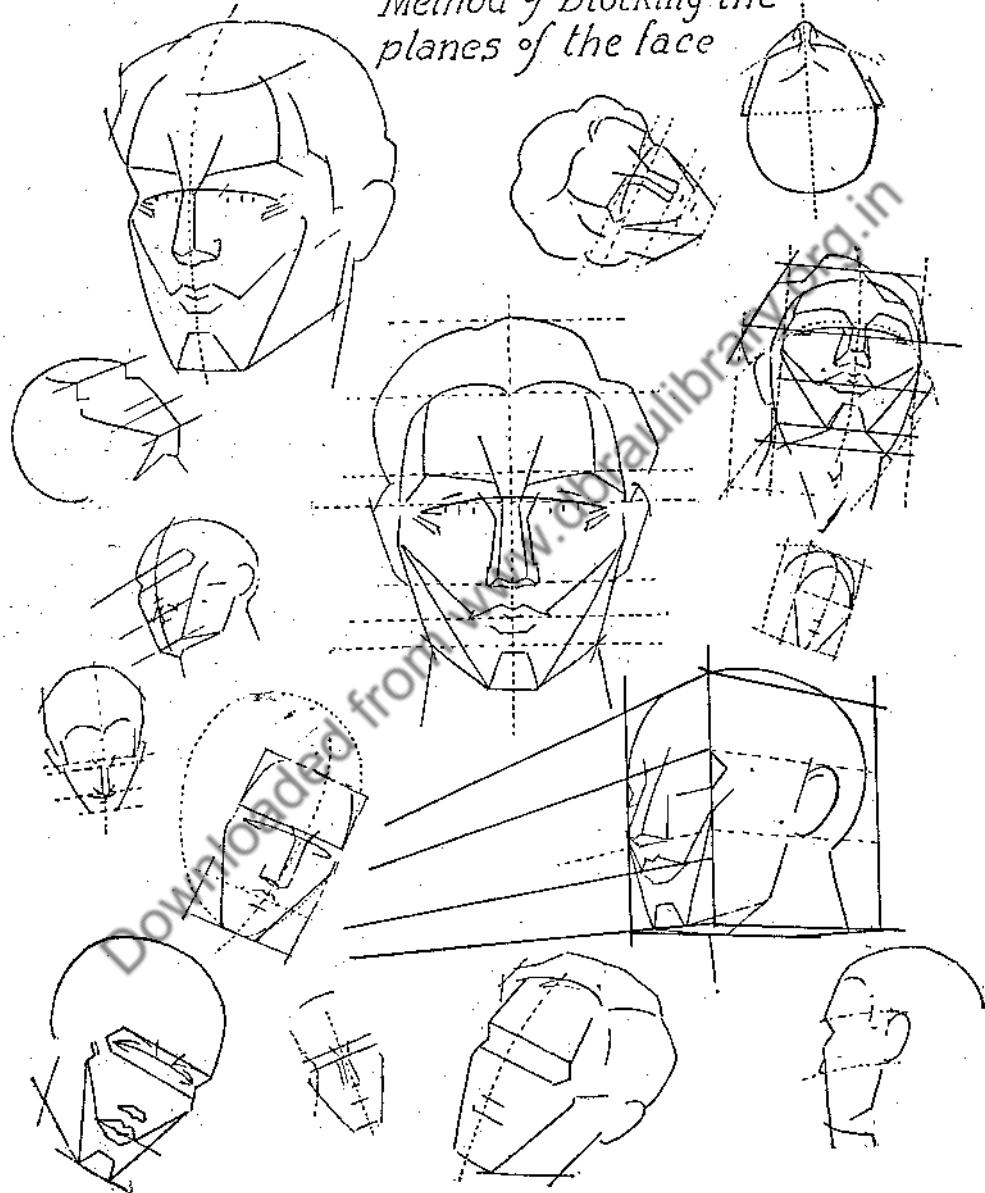


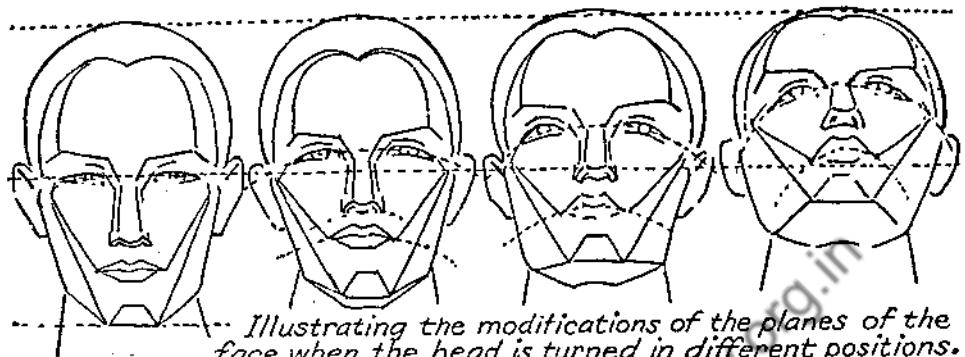


The underlying and the superficial muscles of the face and neck.

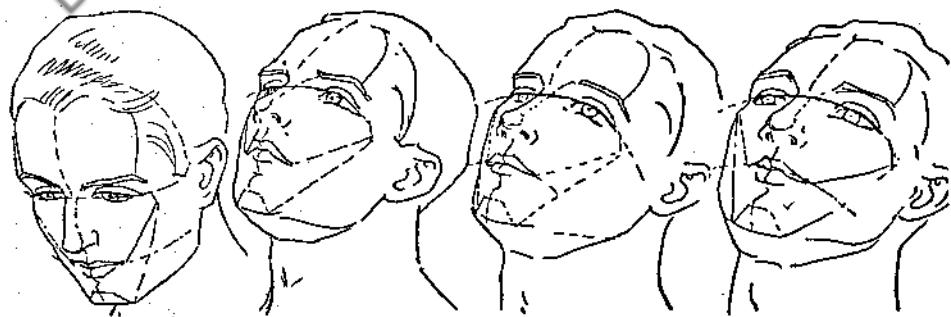
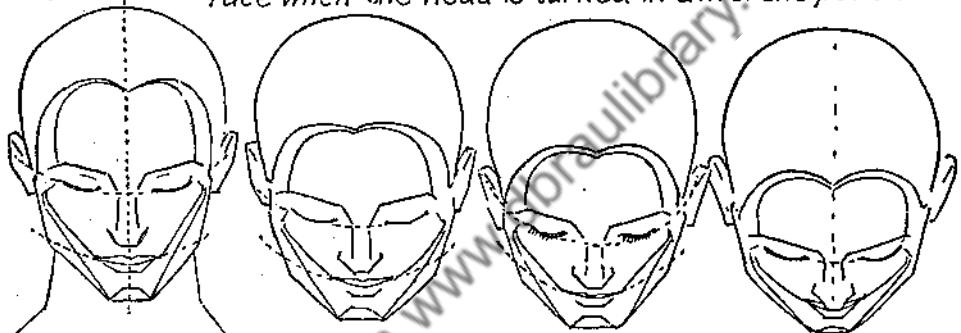


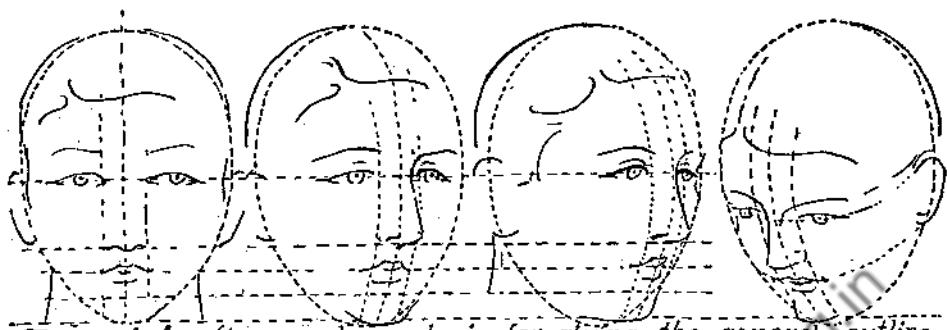
Method of blocking the planes of the face



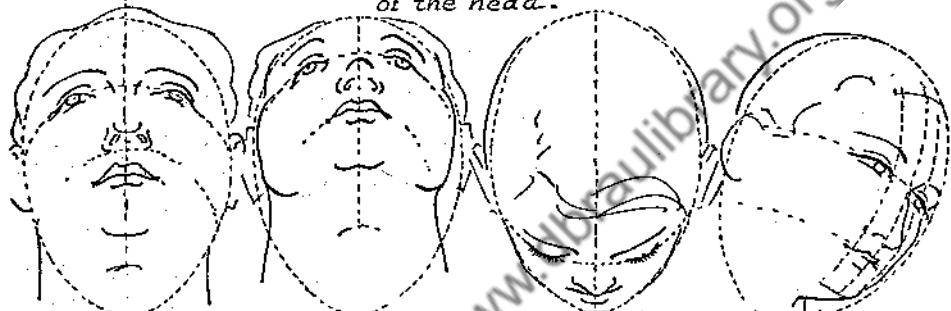


Illustrating the modifications of the planes of the face when the head is turned in different positions.





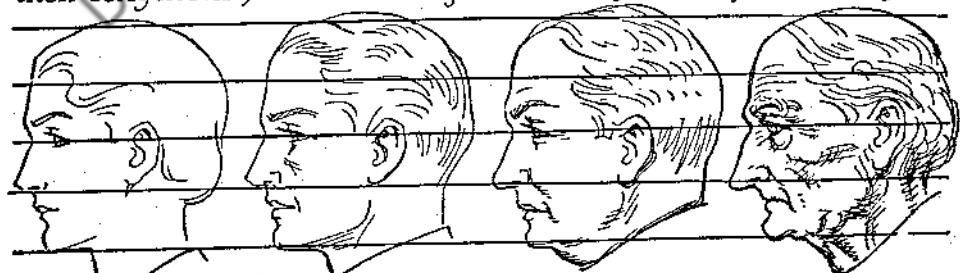
The oval is often used as a basis for giving the general outline of the head.

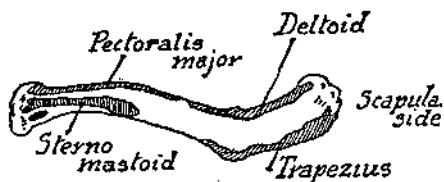


Imaginary lines will help to place the features in their proper relation and to give convexity to the head.

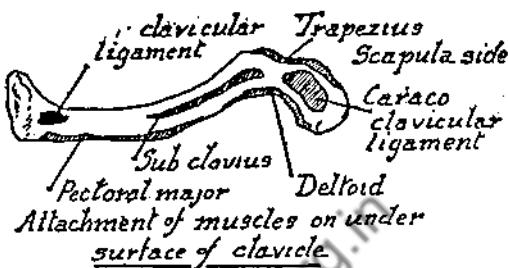


Showing changes in the relative proportions of features and skull at different ages. The nose gradually straightens, then lengthens, the ears lengthen, the eyes are placed higher.

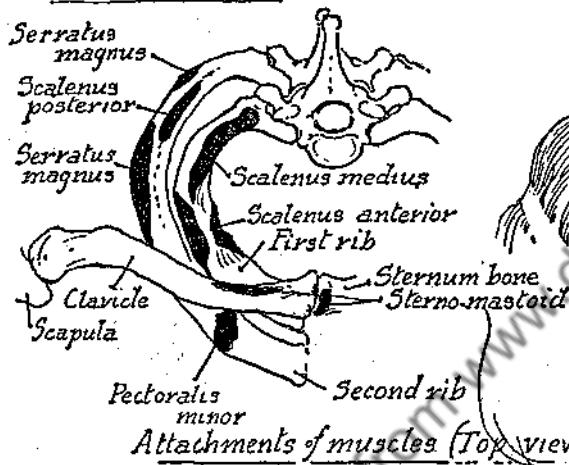




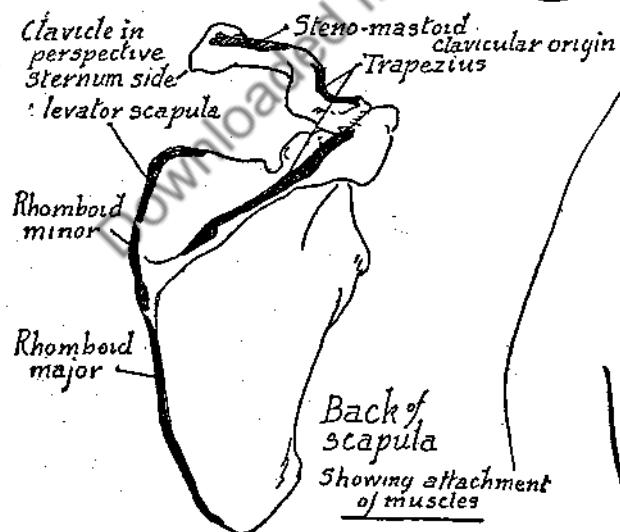
Attachment of muscles on upper surface of clavicle



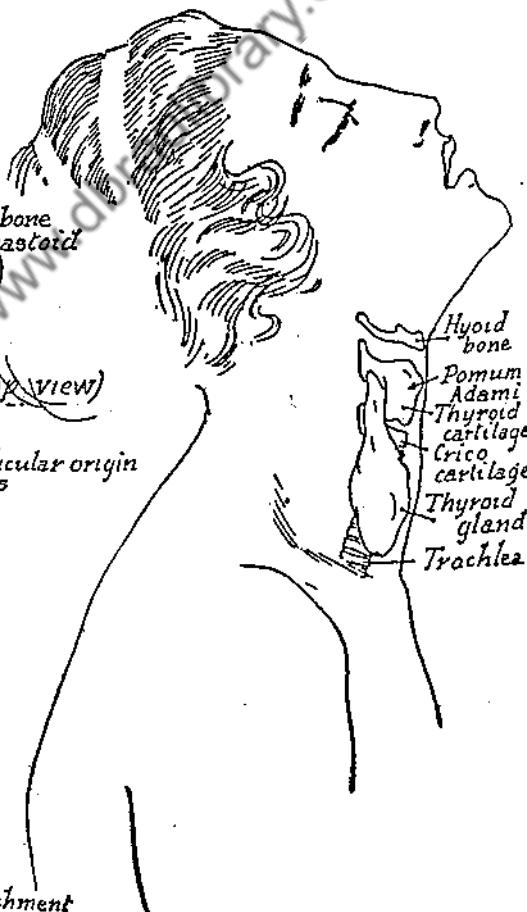
Attachment of muscles on under surface of clavicle

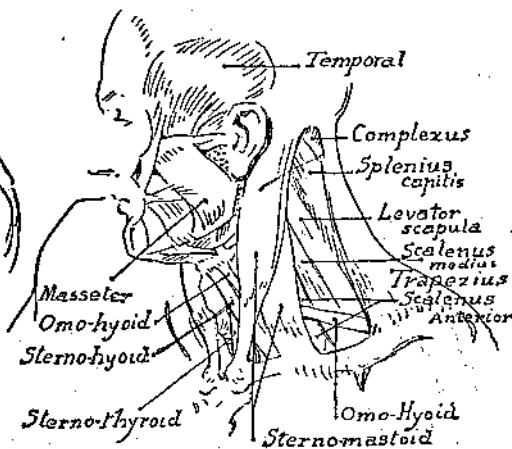
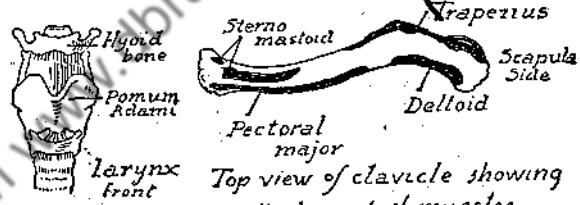
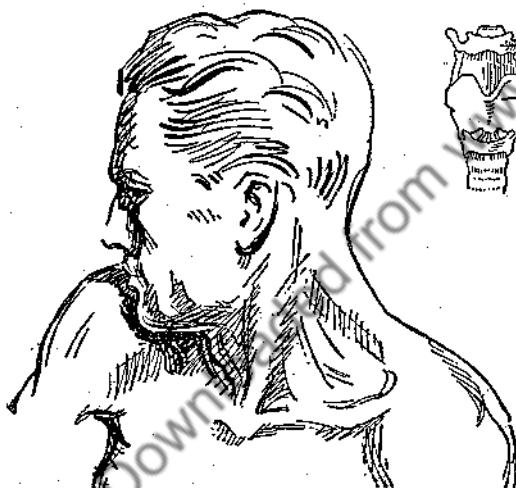
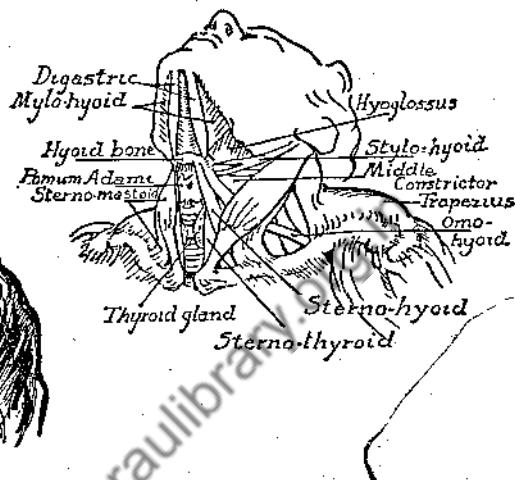


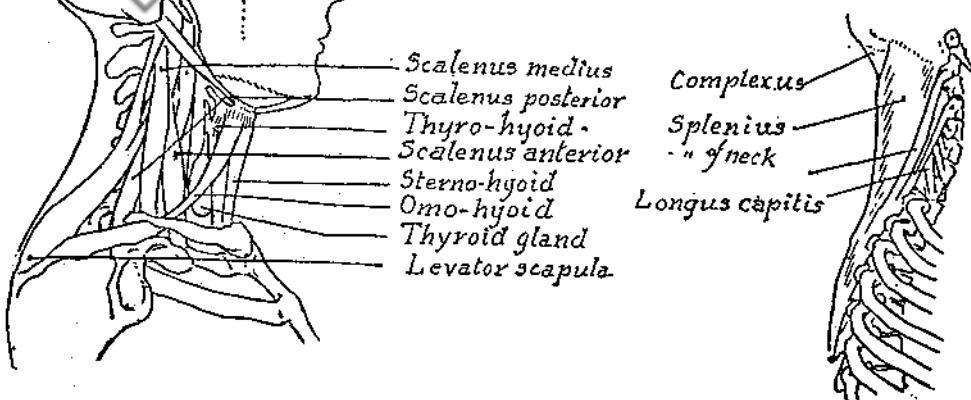
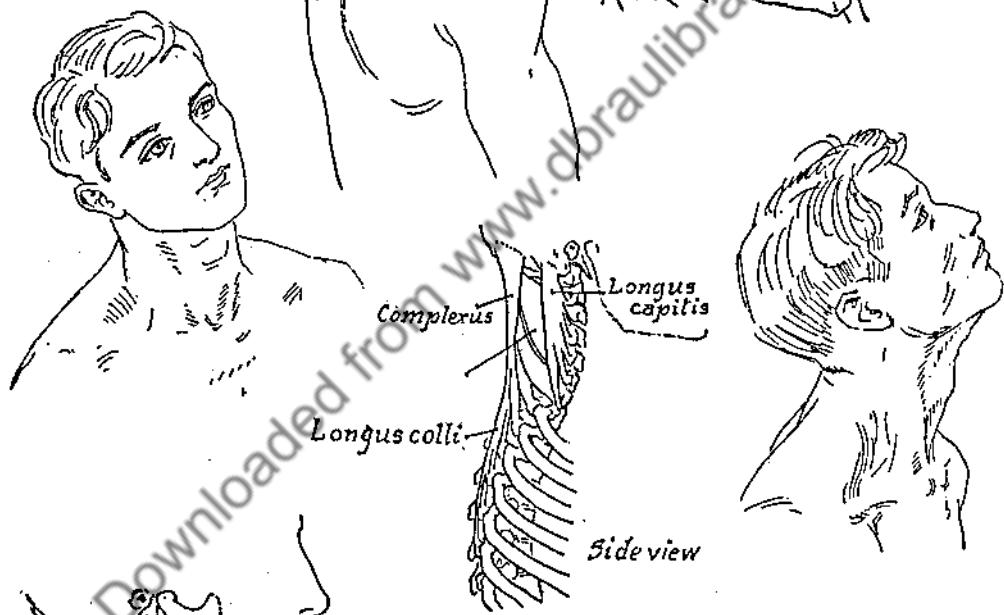
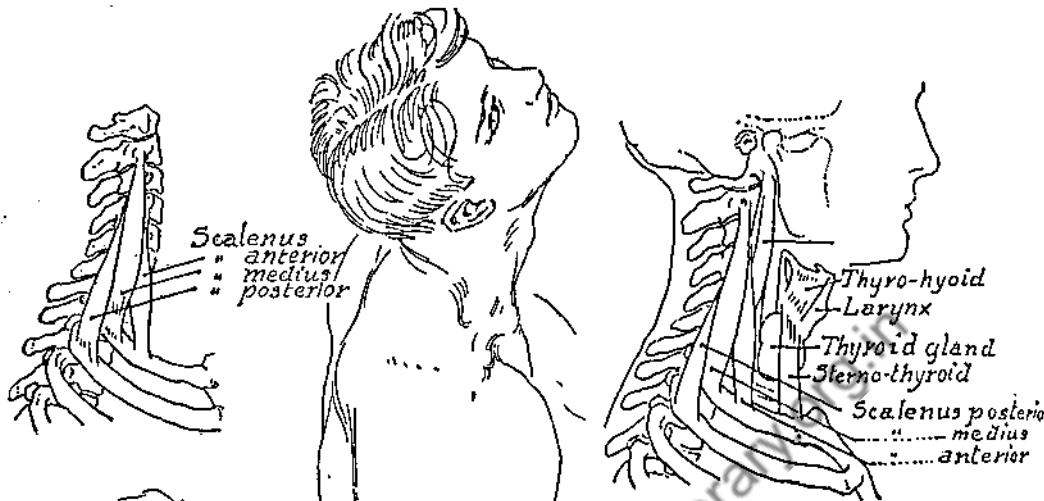
Attachments of muscles (Top view)

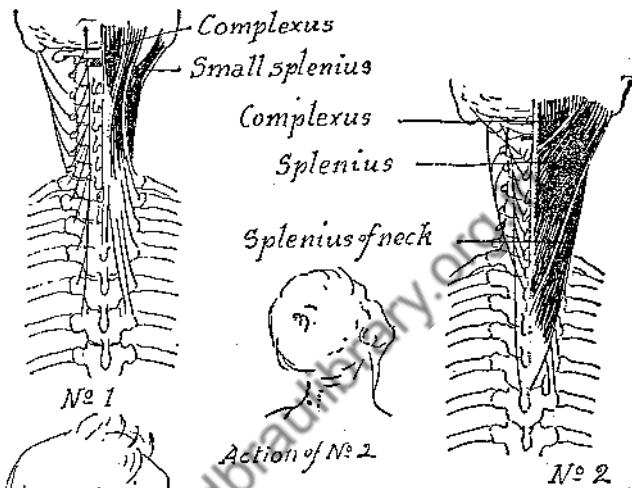
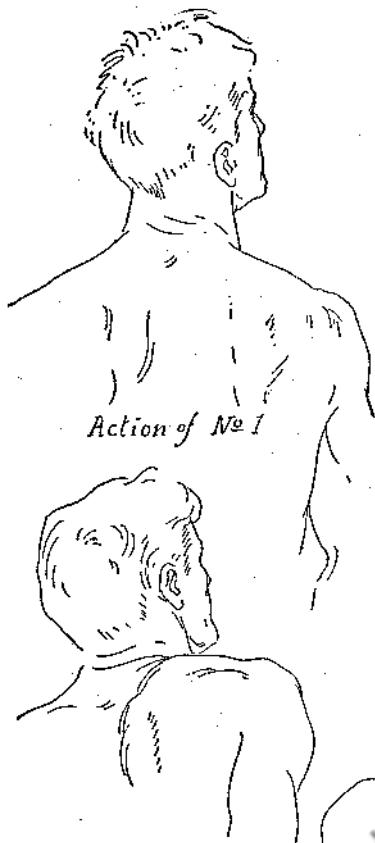


Back of scapula
Showing attachment of muscles

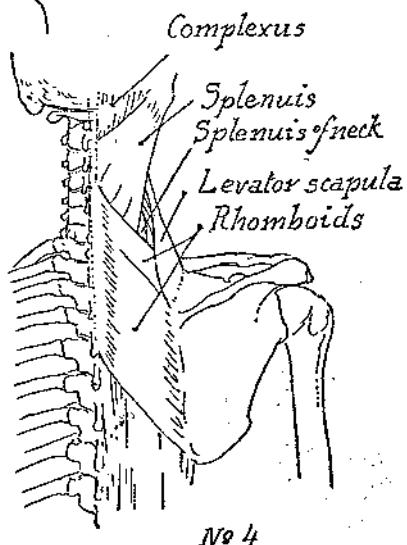
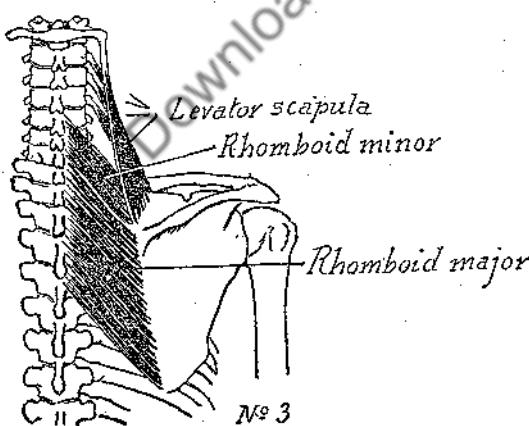


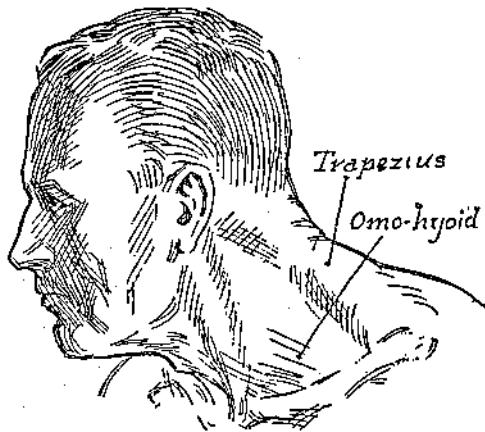




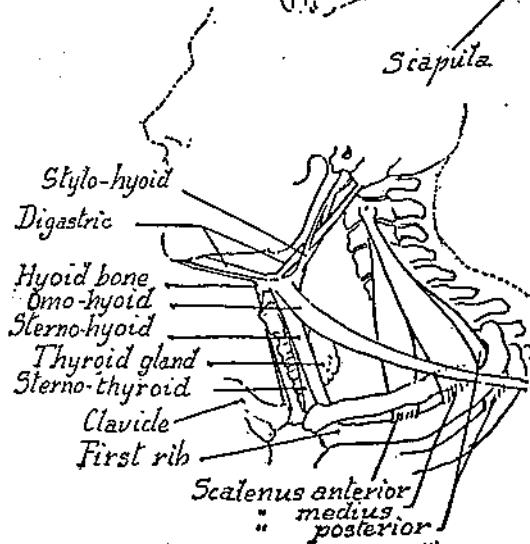
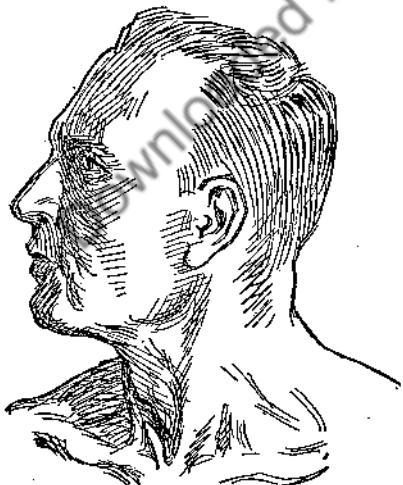
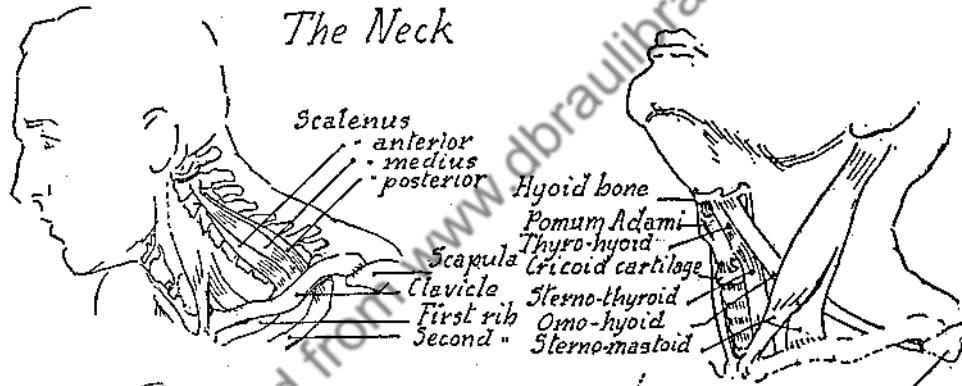


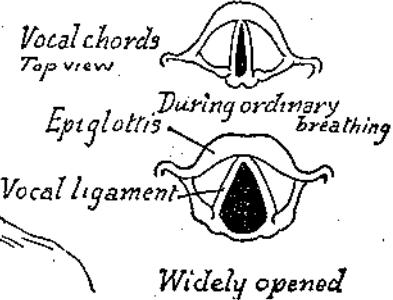
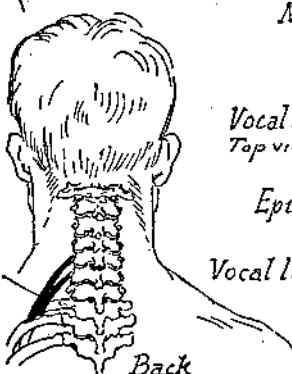
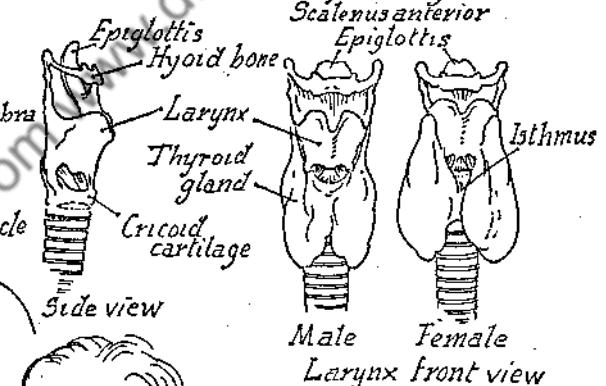
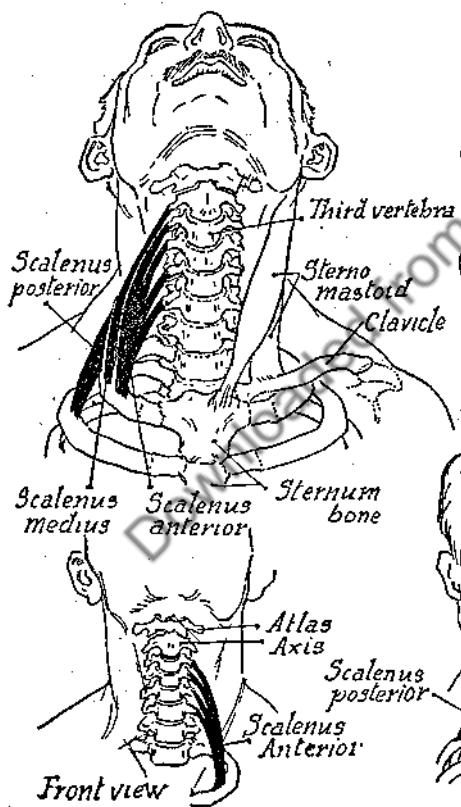
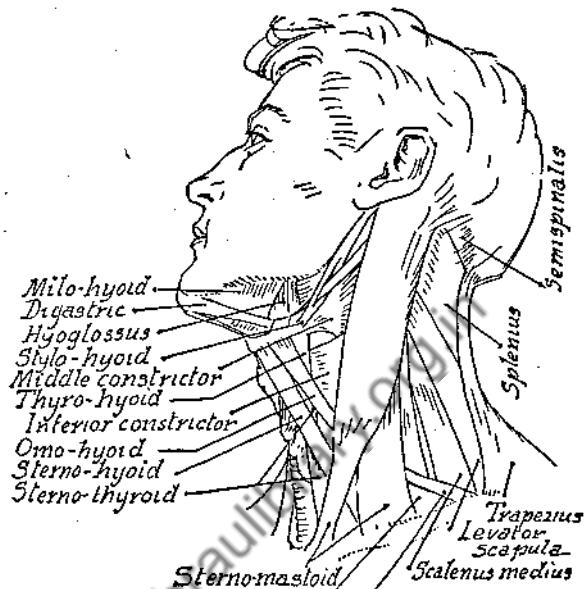
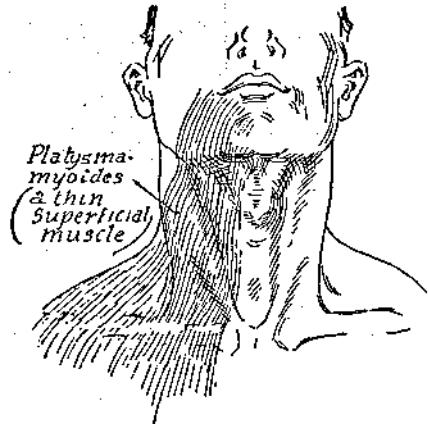
Muscles of back of neck

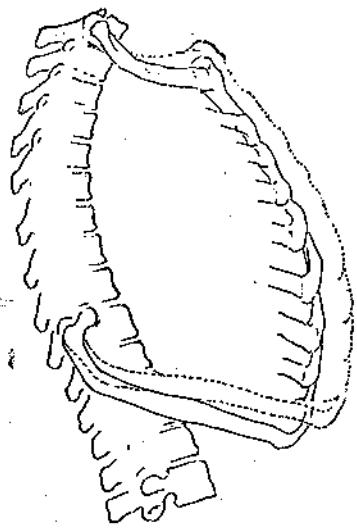




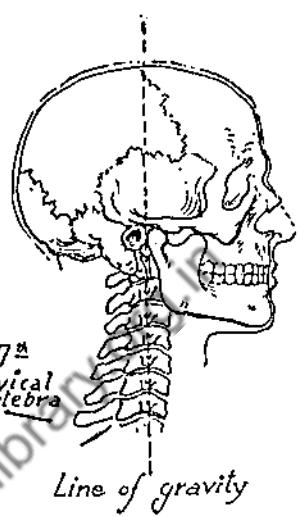
The Neck





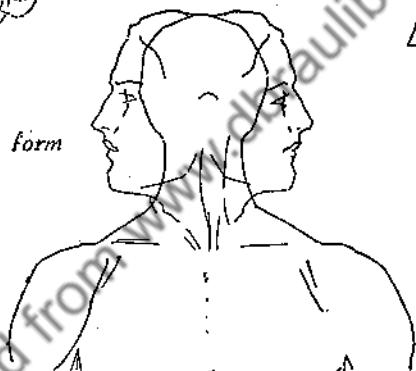


Modification of chest form
in breathing

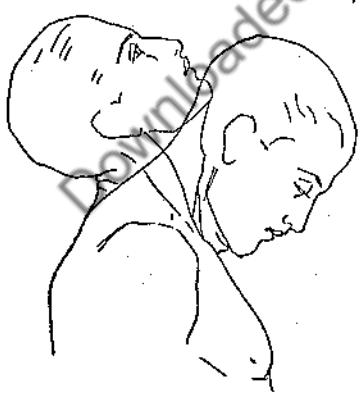


7th
Cervical
vertebra

Line of gravity



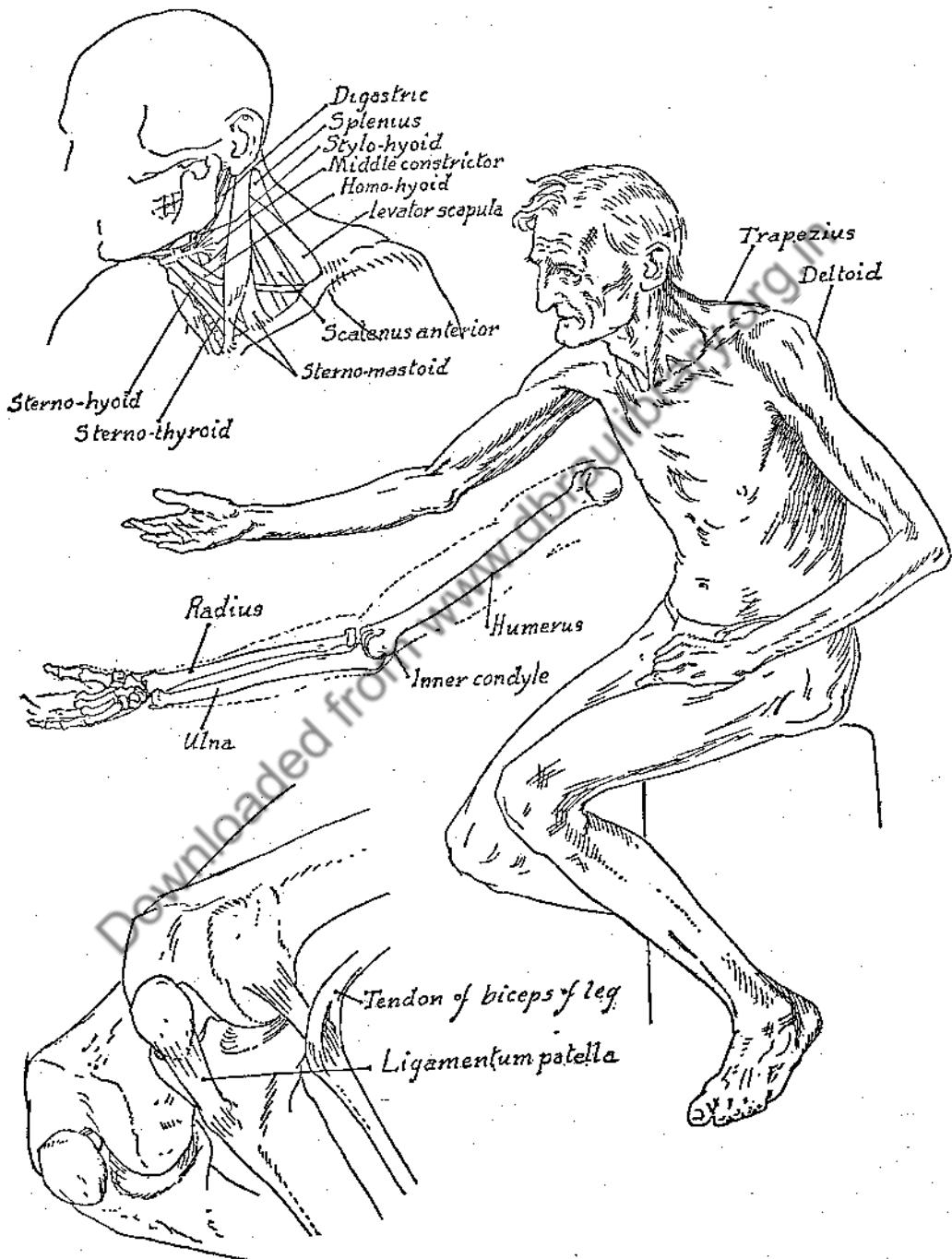
Relation of head and
neck to shoulders
in extreme side
movements

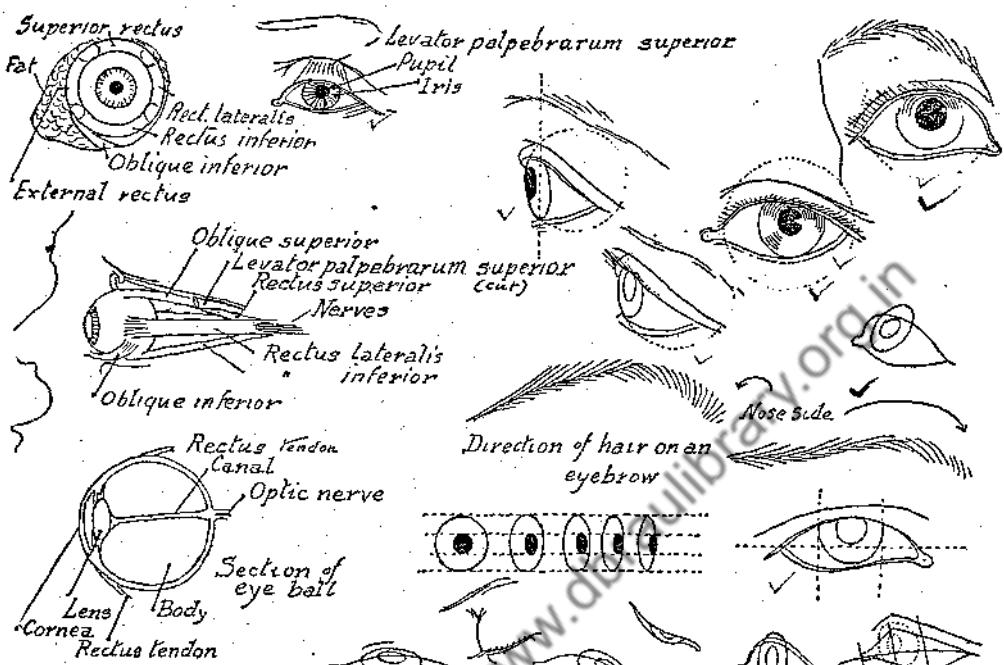


Extent of bending forward and back

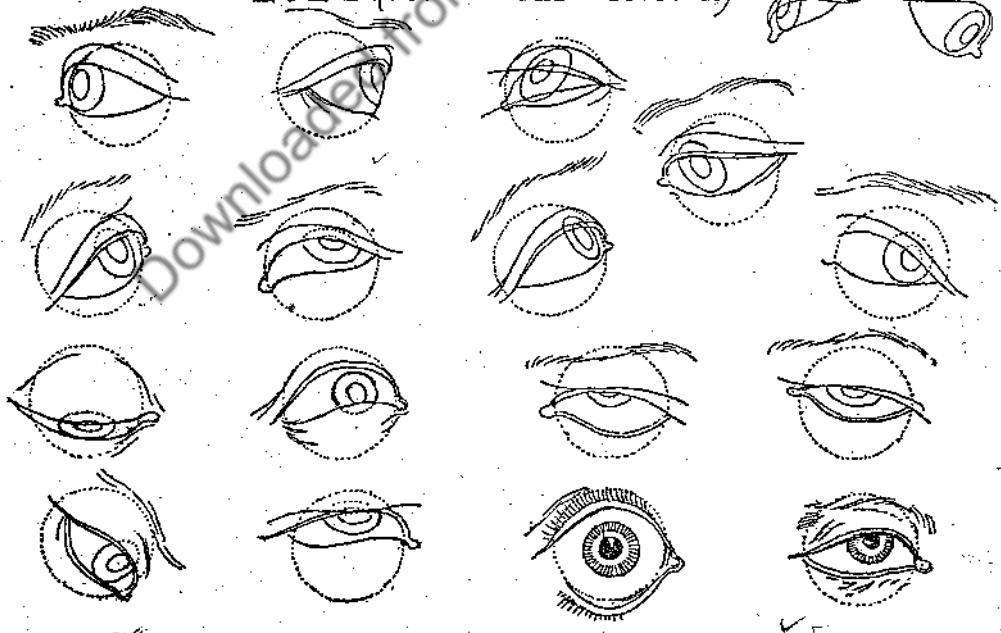


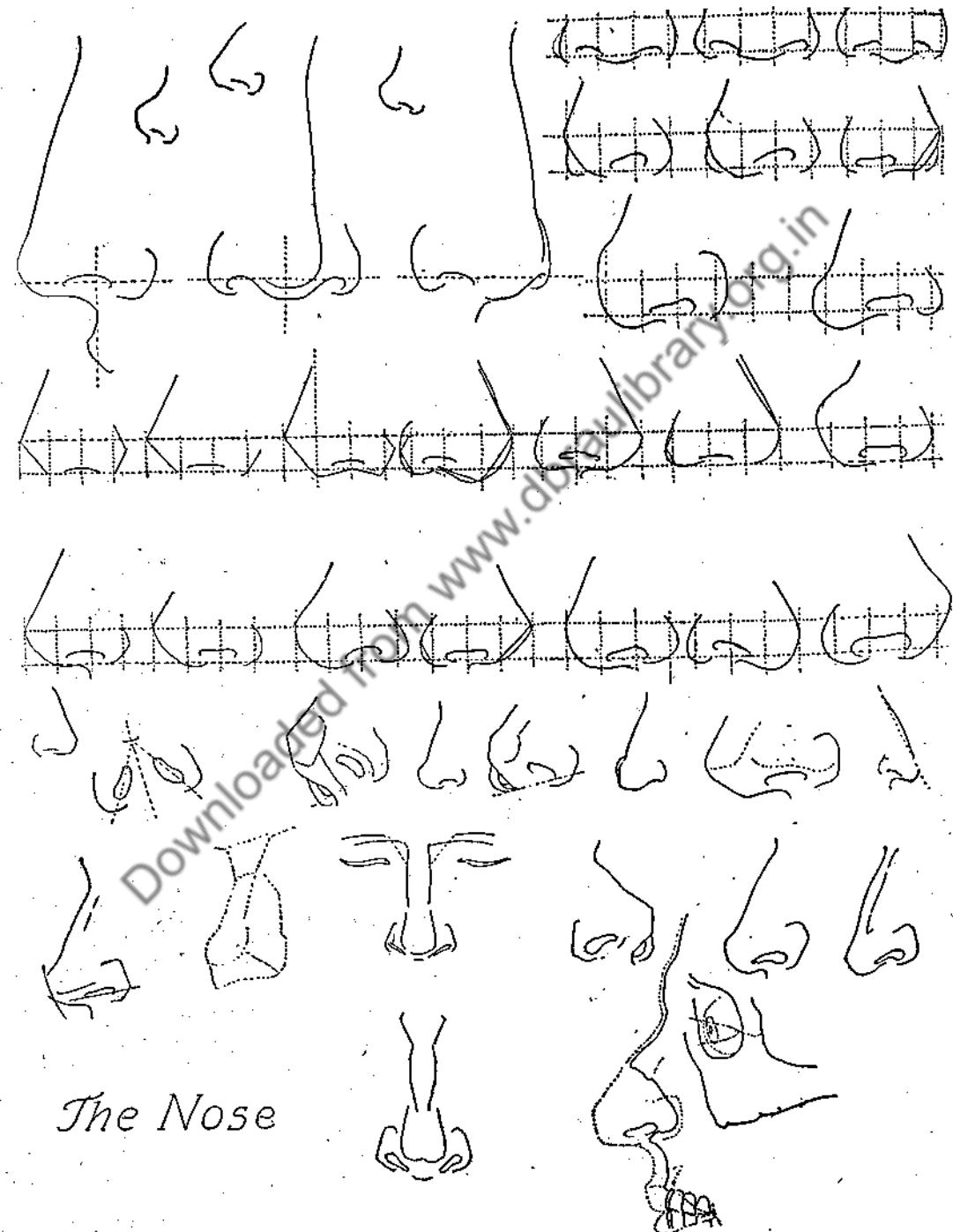
Flexion of head
without moving neck





EYE S (PRINCIPLES & ACTION)





The Nose



Caucasian
(white race)



Mongolian
(yellow race)



Ethiopian
(black race)



American Indian
(red race)

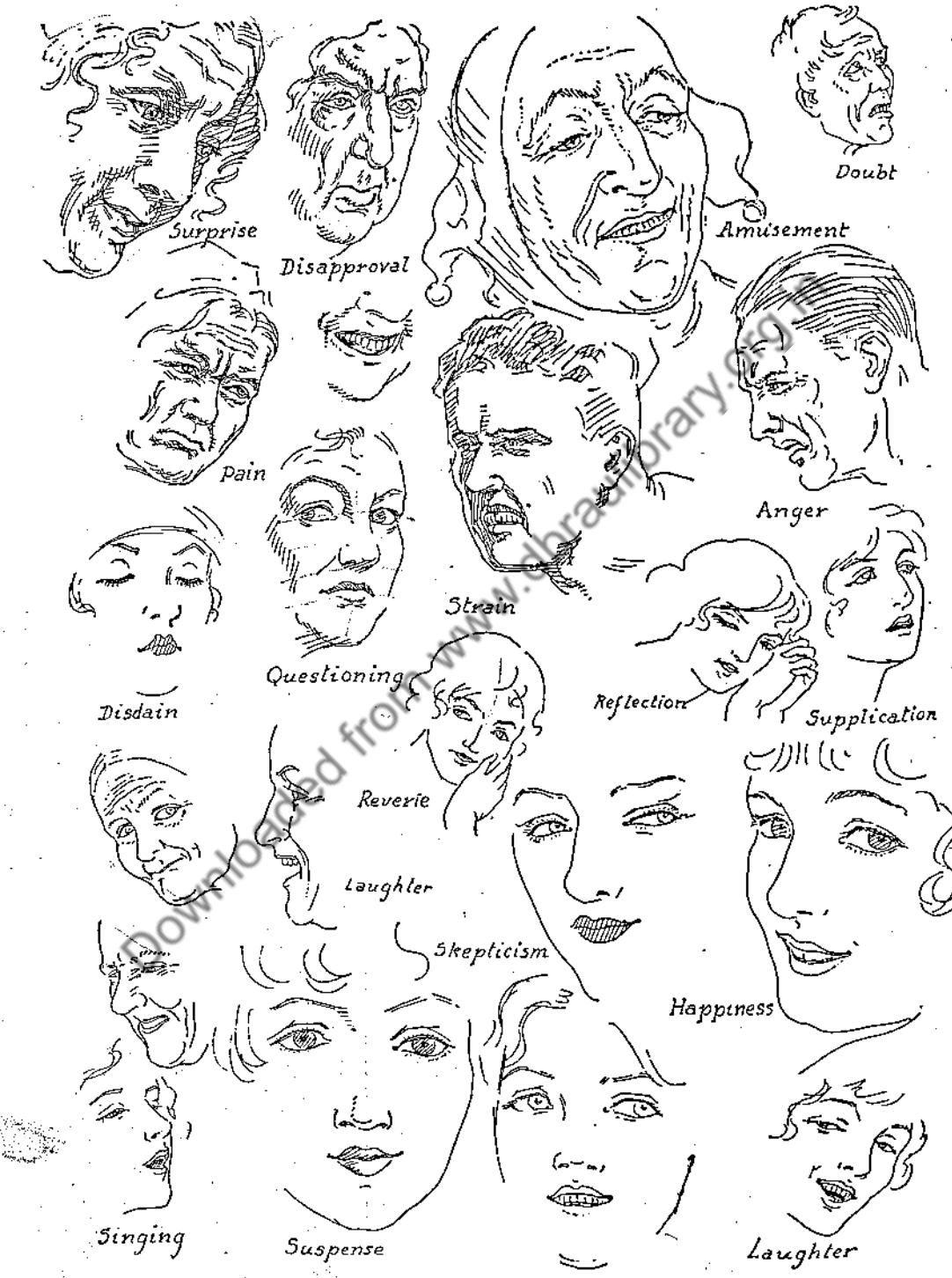


Malayan
(brown race)



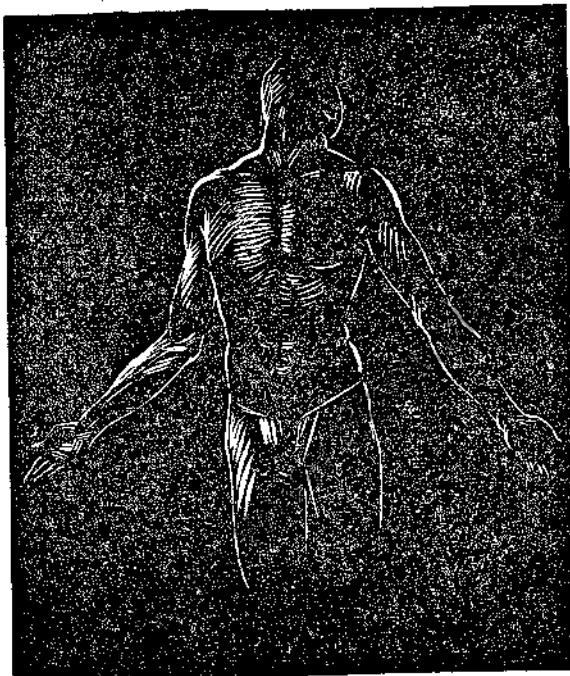
The five races of man







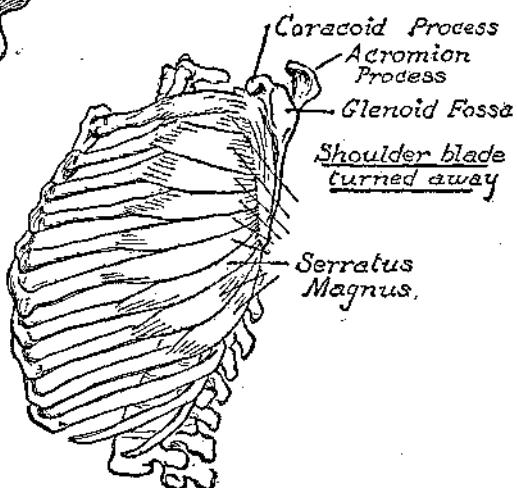
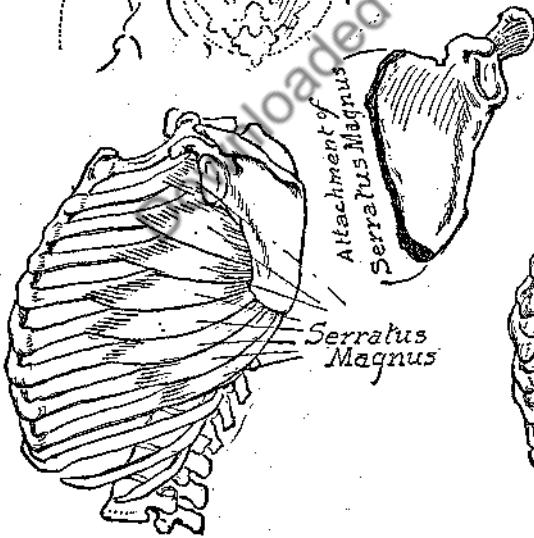
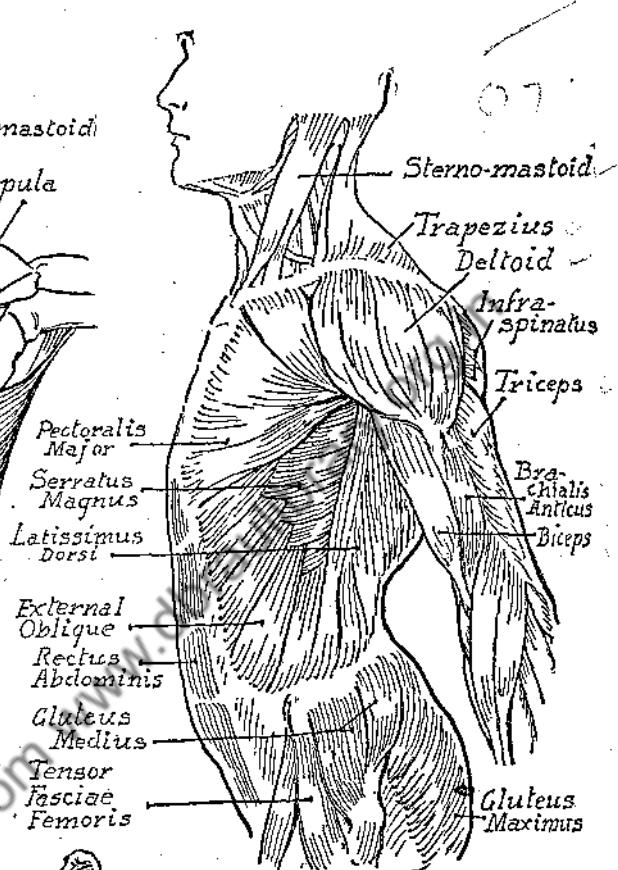
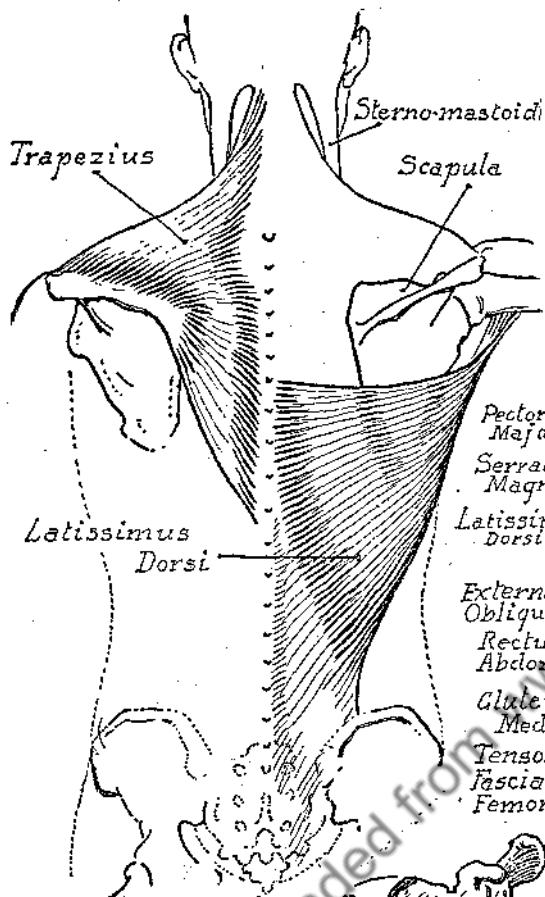
Studies of Expression



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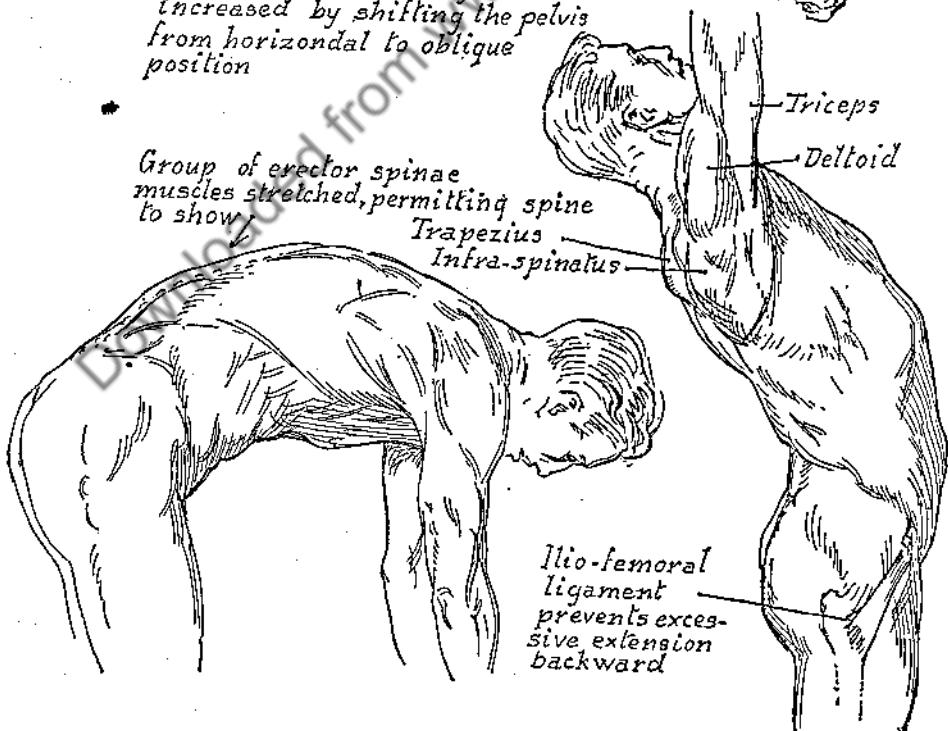
PART FOUR

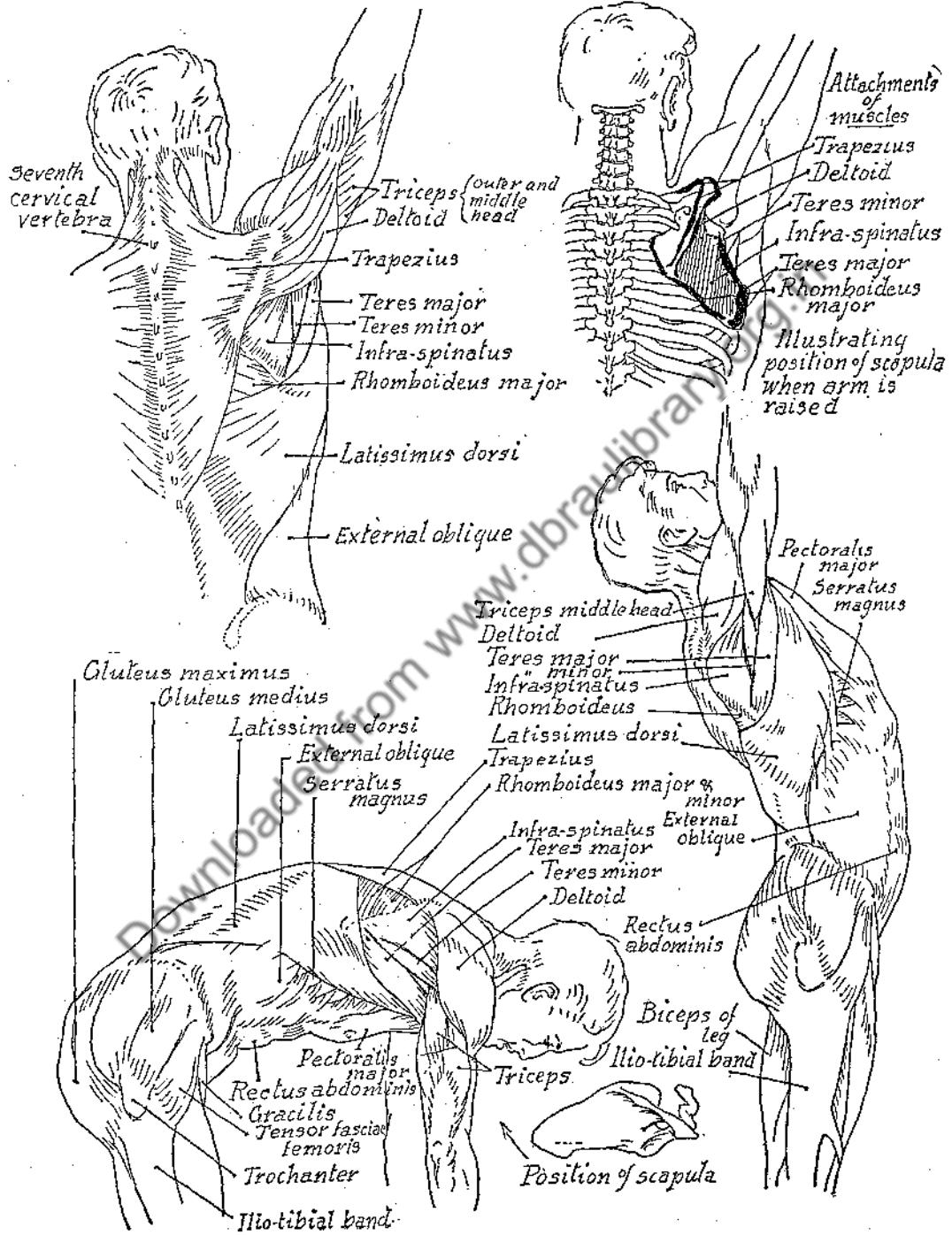
THE TORSO

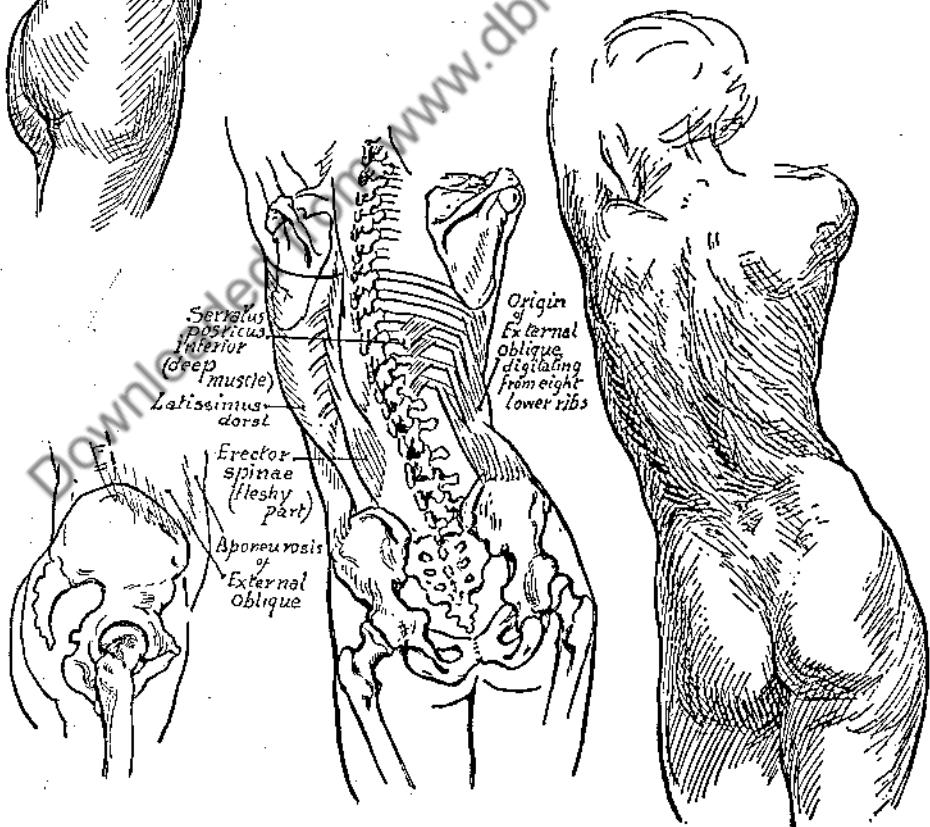
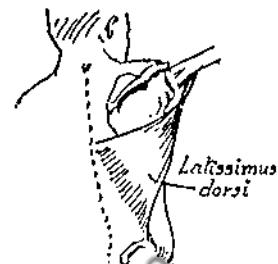
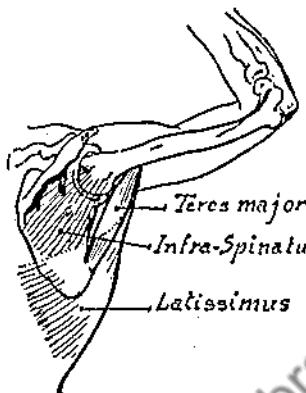
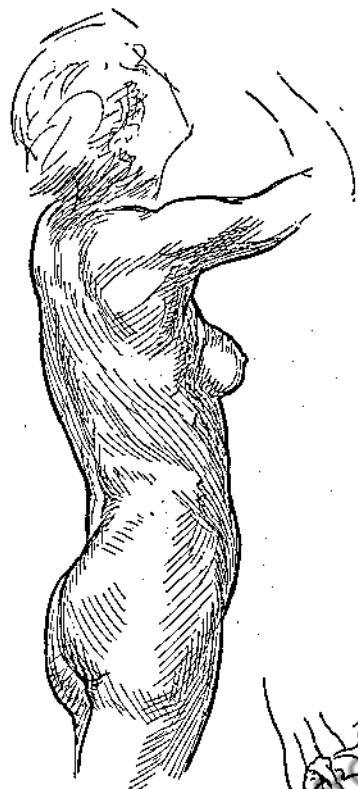


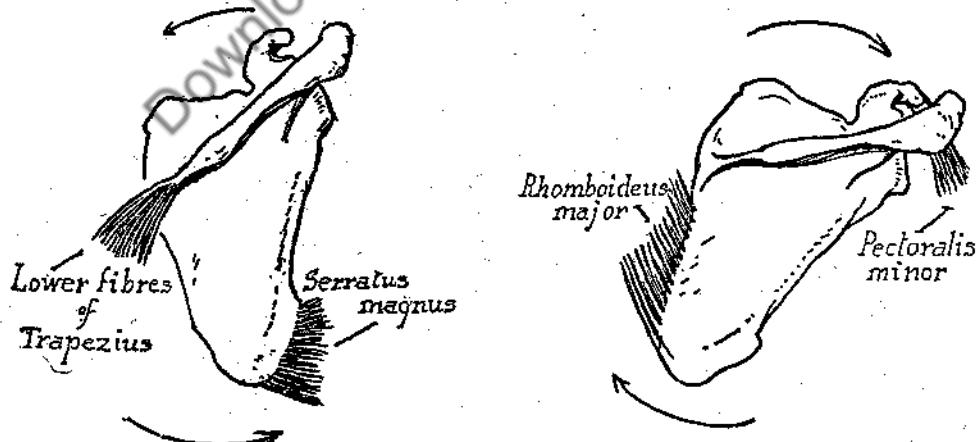
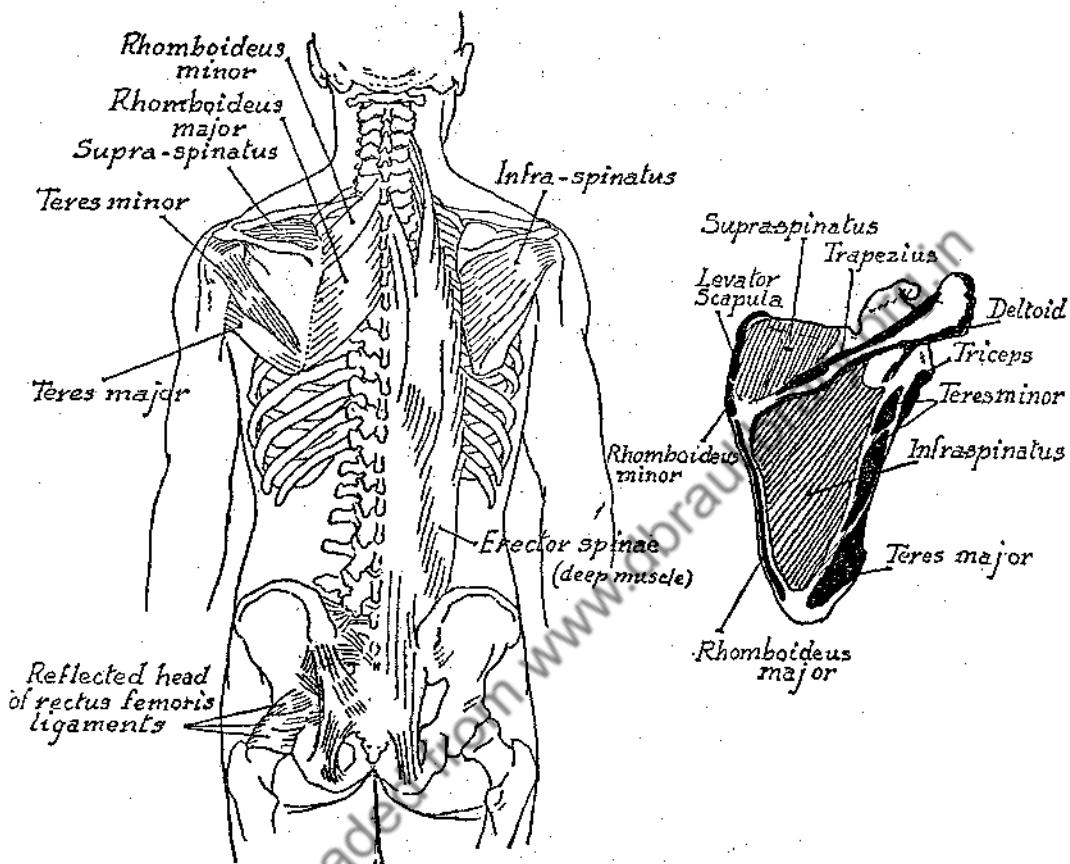


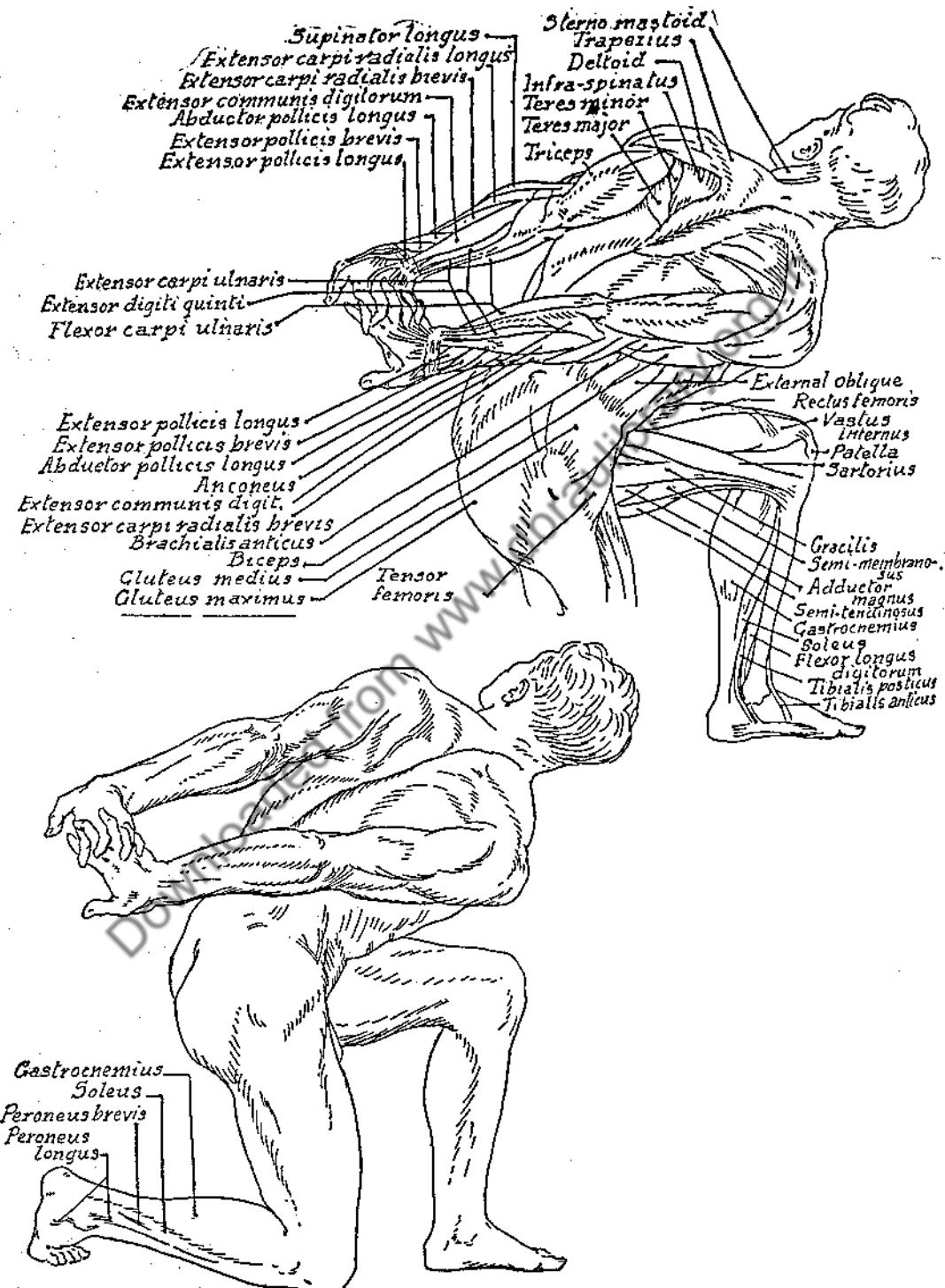
*Side inclination of body
increased by shifting the pelvis
from horizontal to oblique
position*

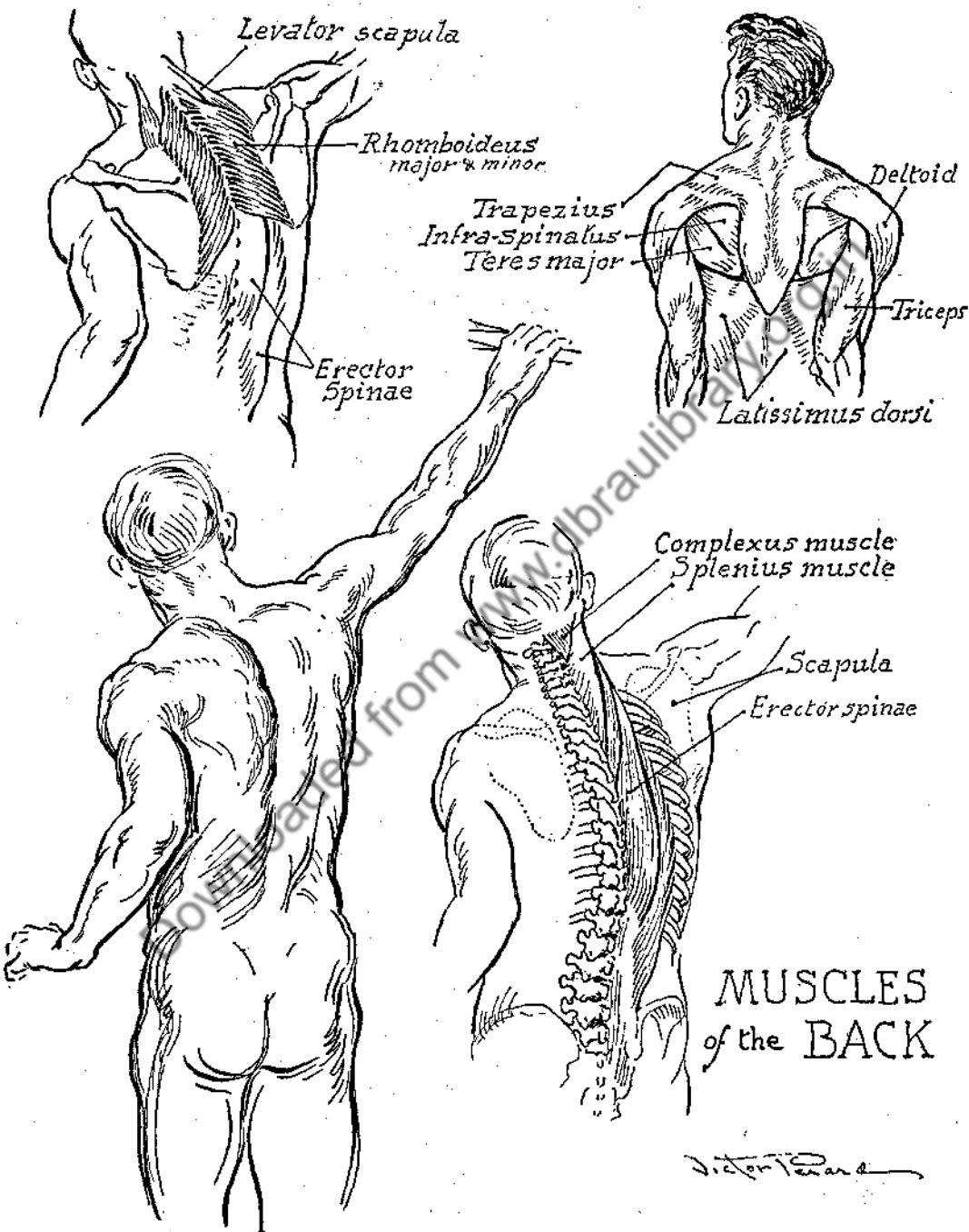


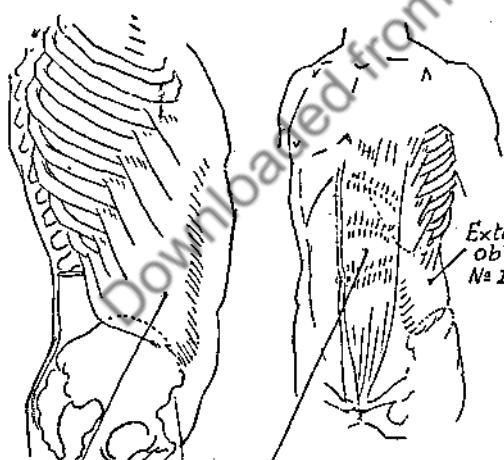
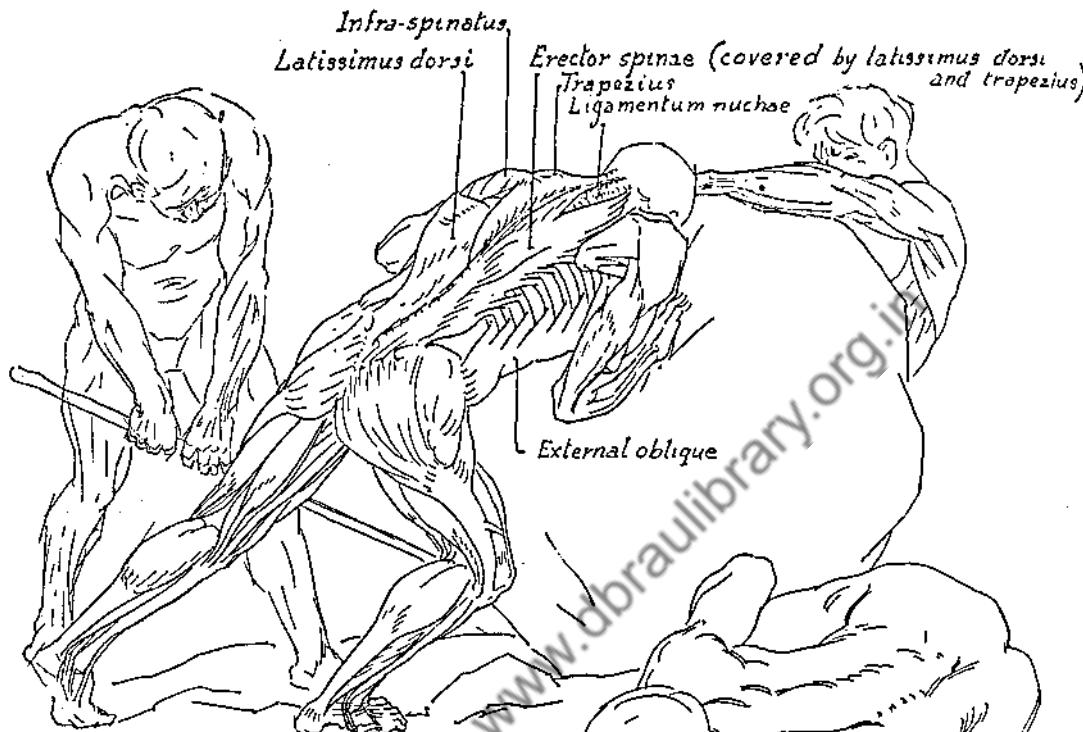




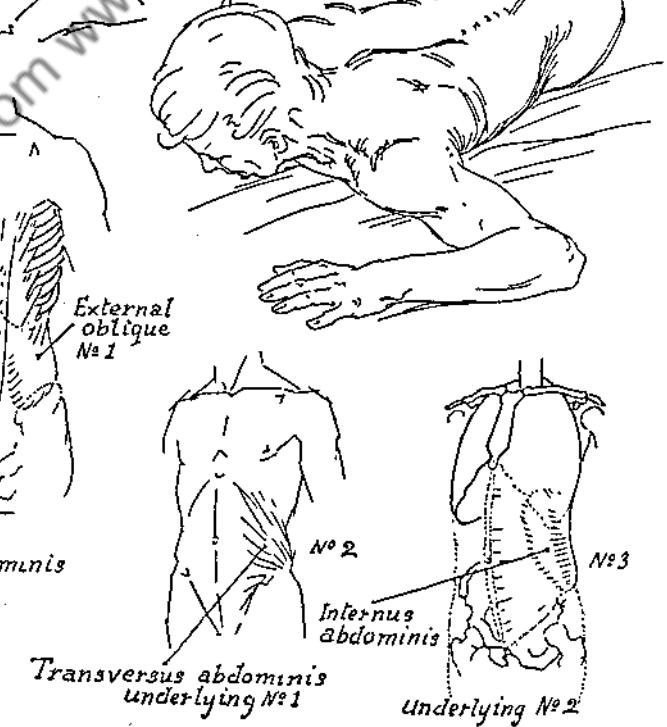






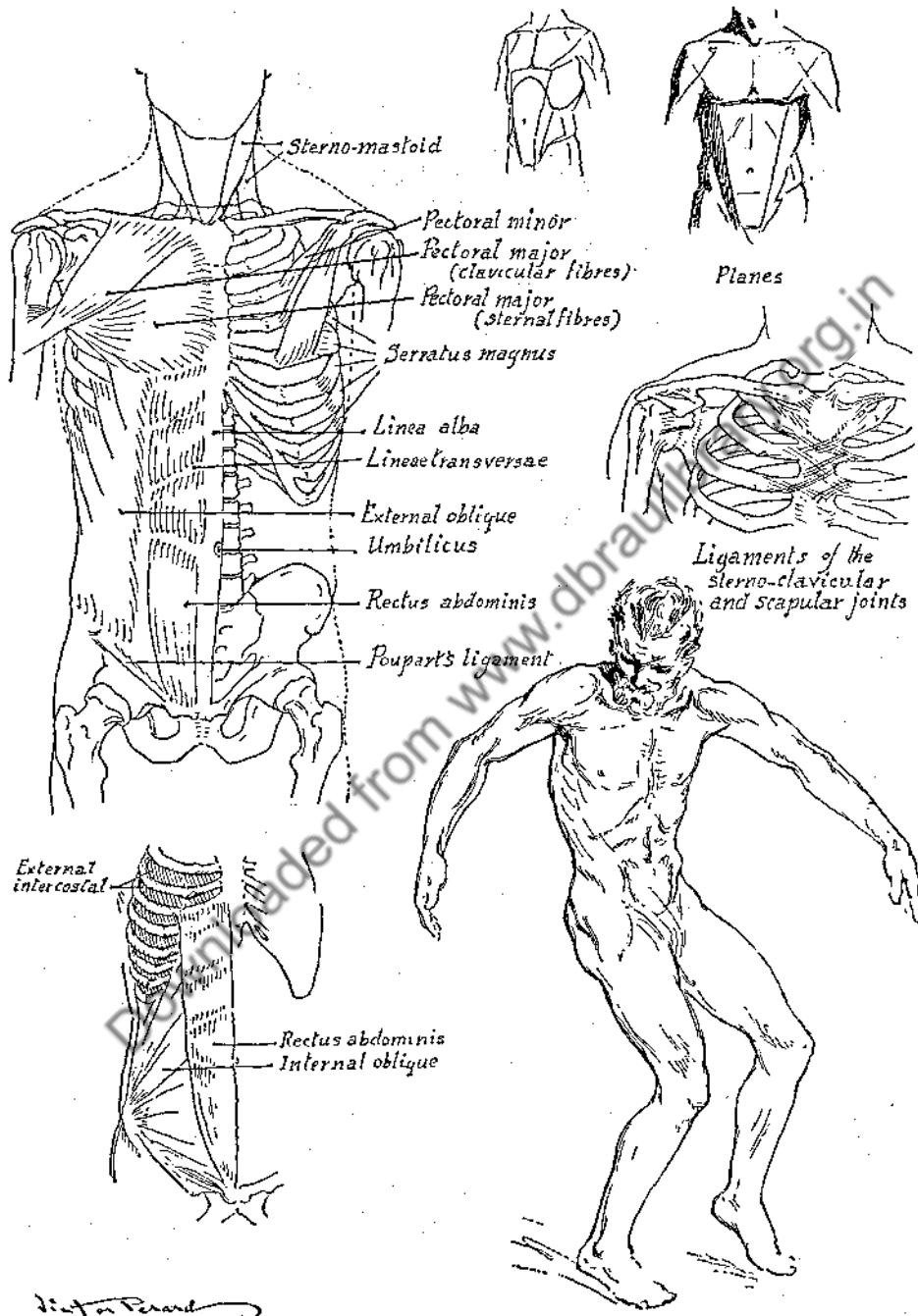


External oblique

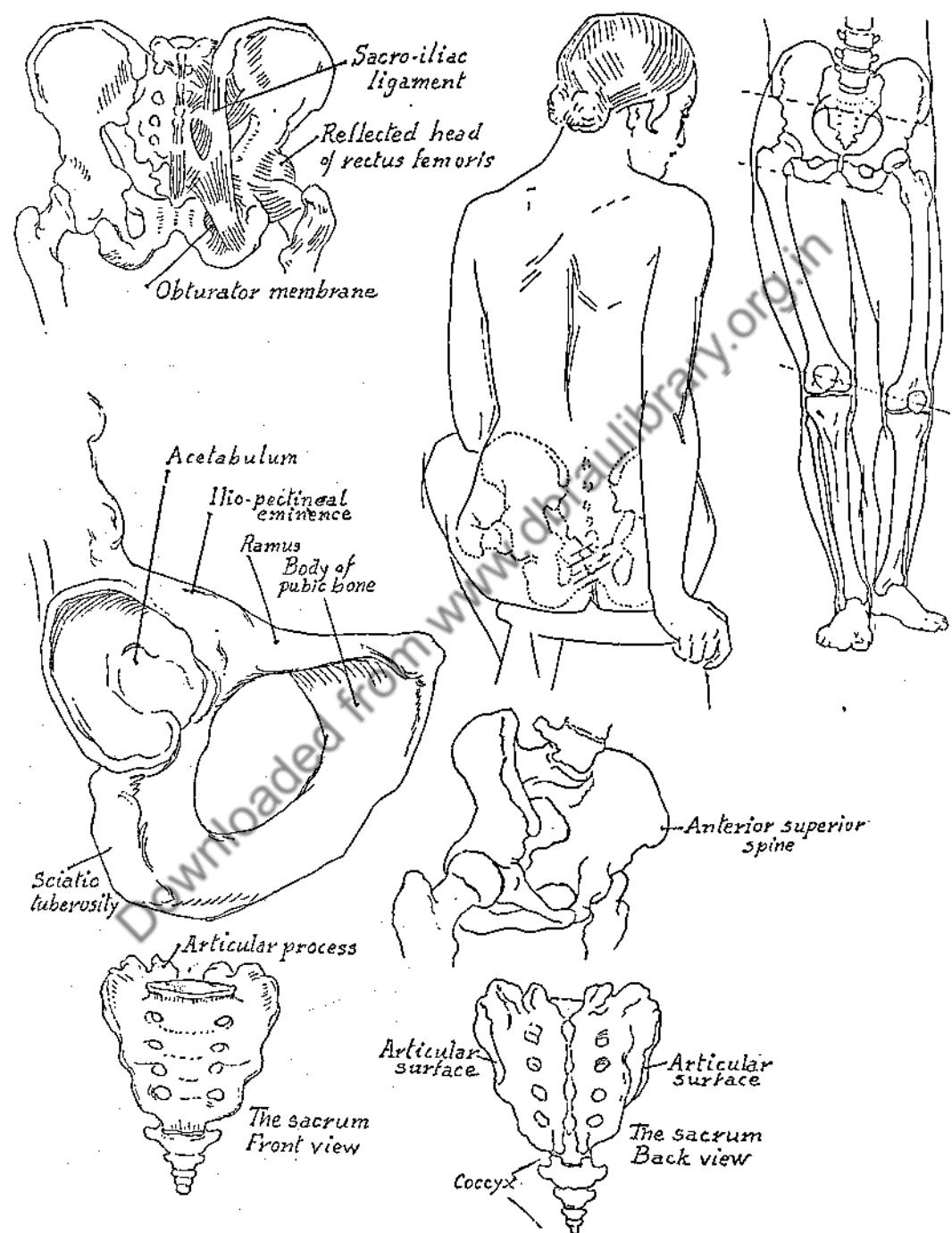


Transversus abdominis
underlying No. 1

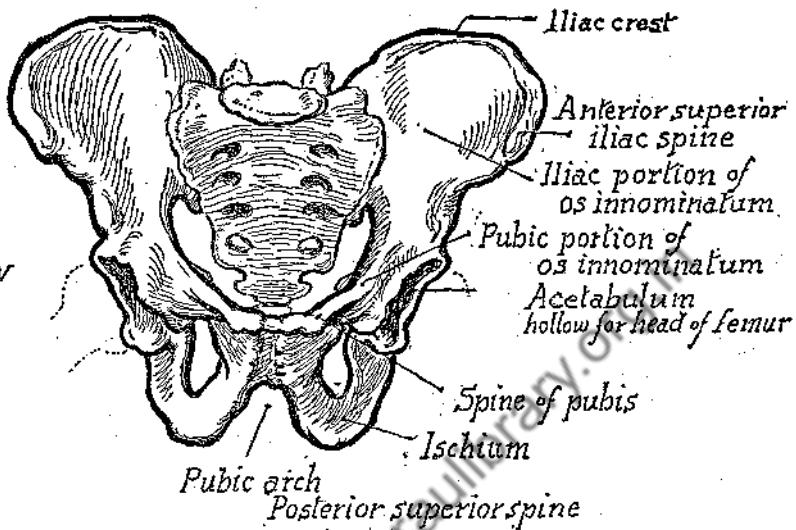
No. 2
No. 3
Internus abdominis
Underlying No. 2



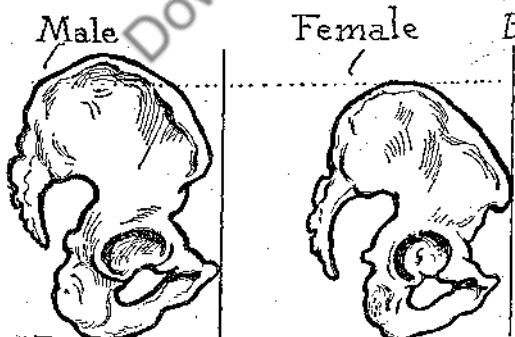
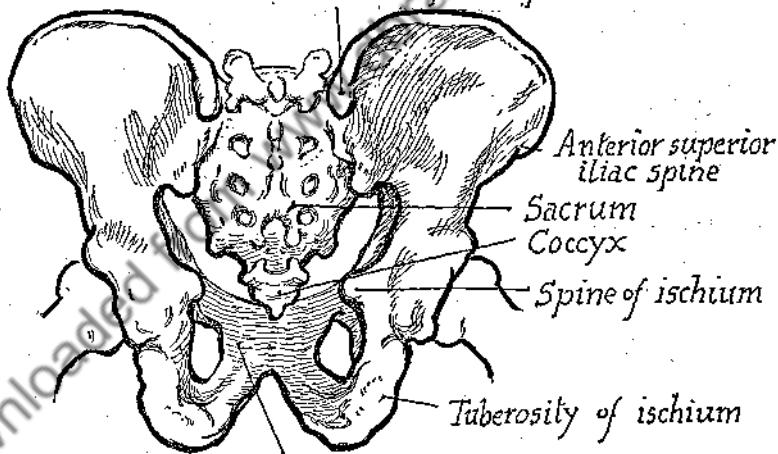
Digitized from
www.dbrary.in



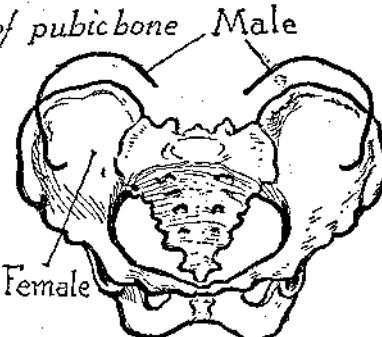
Male Pelvis
Front view



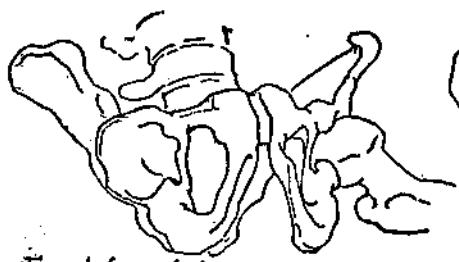
Male Pelvis
Back View



Showing female bone tilted forward



Difference of height and breadth



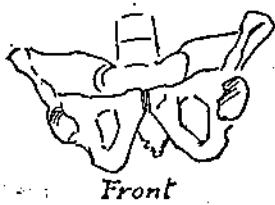
Front from below



Front



Three quarter front



Front



Side & back



Three quarter view within

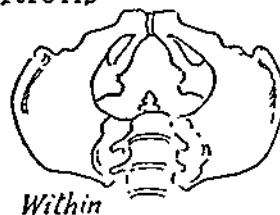


Three quarter back

Pelvic bone in various positions



Side view



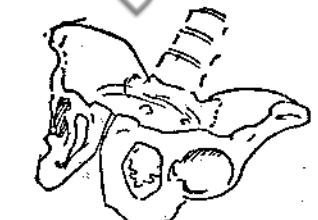
Within



Lying down



Looking within



Three quarter from below



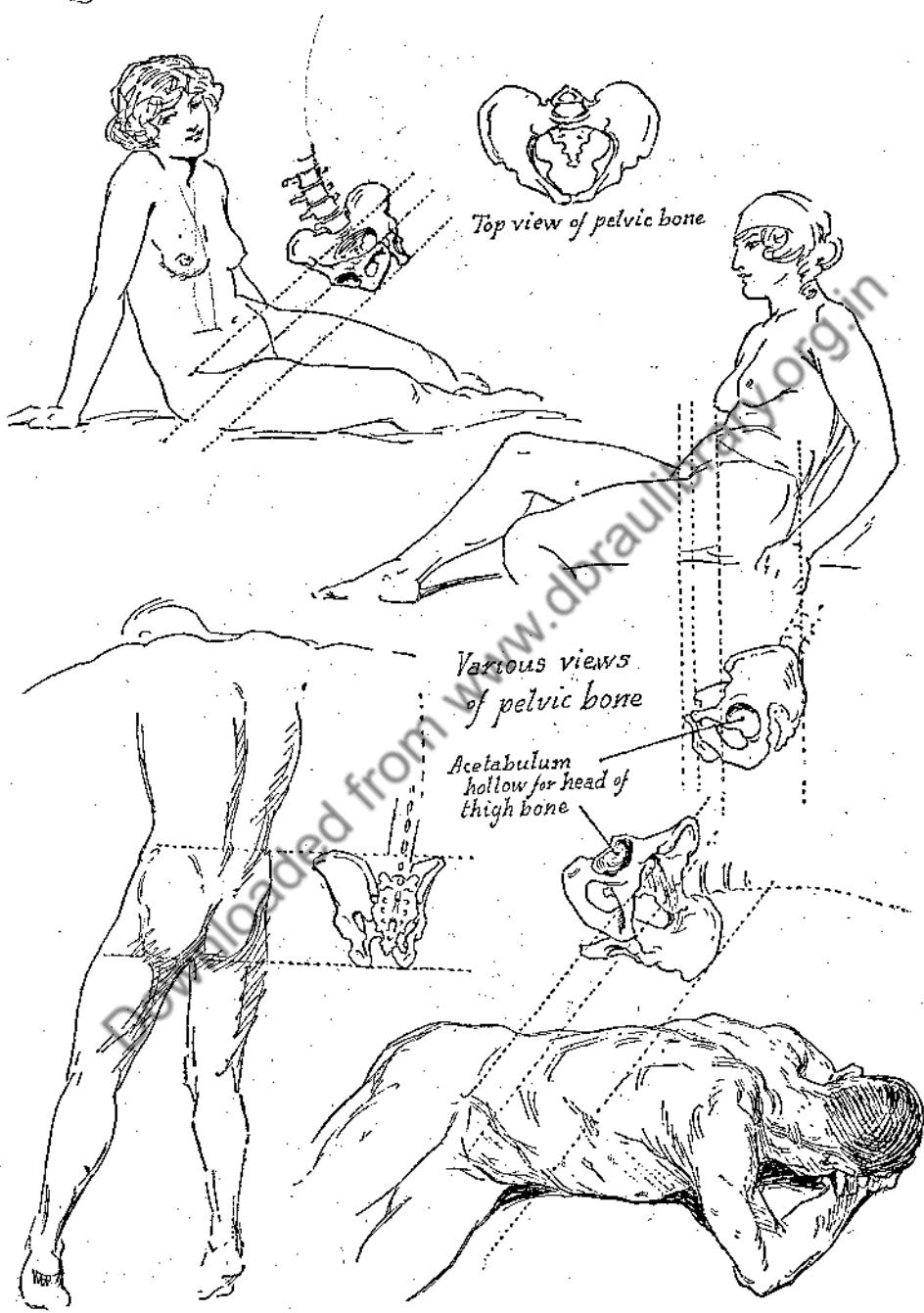
Side

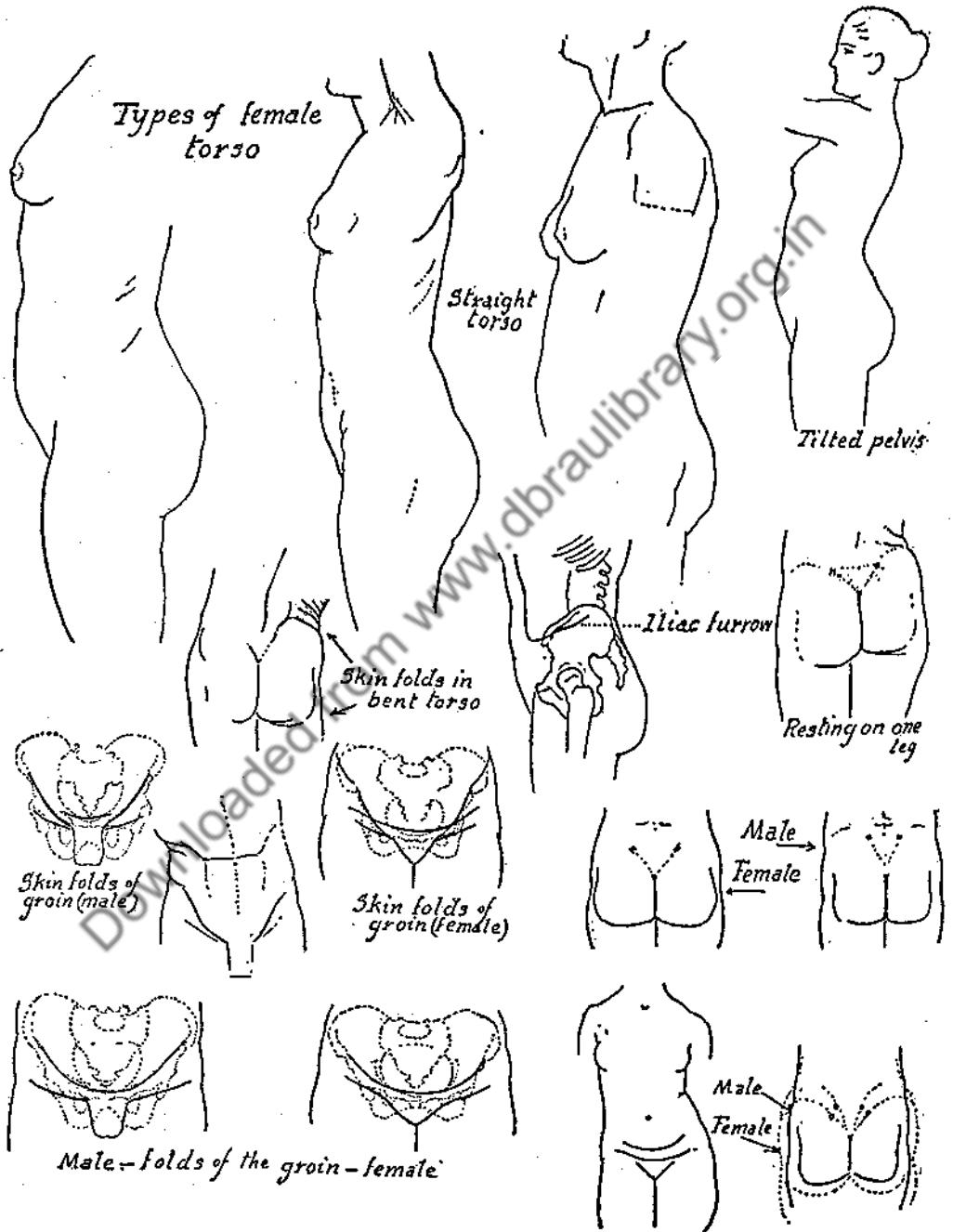


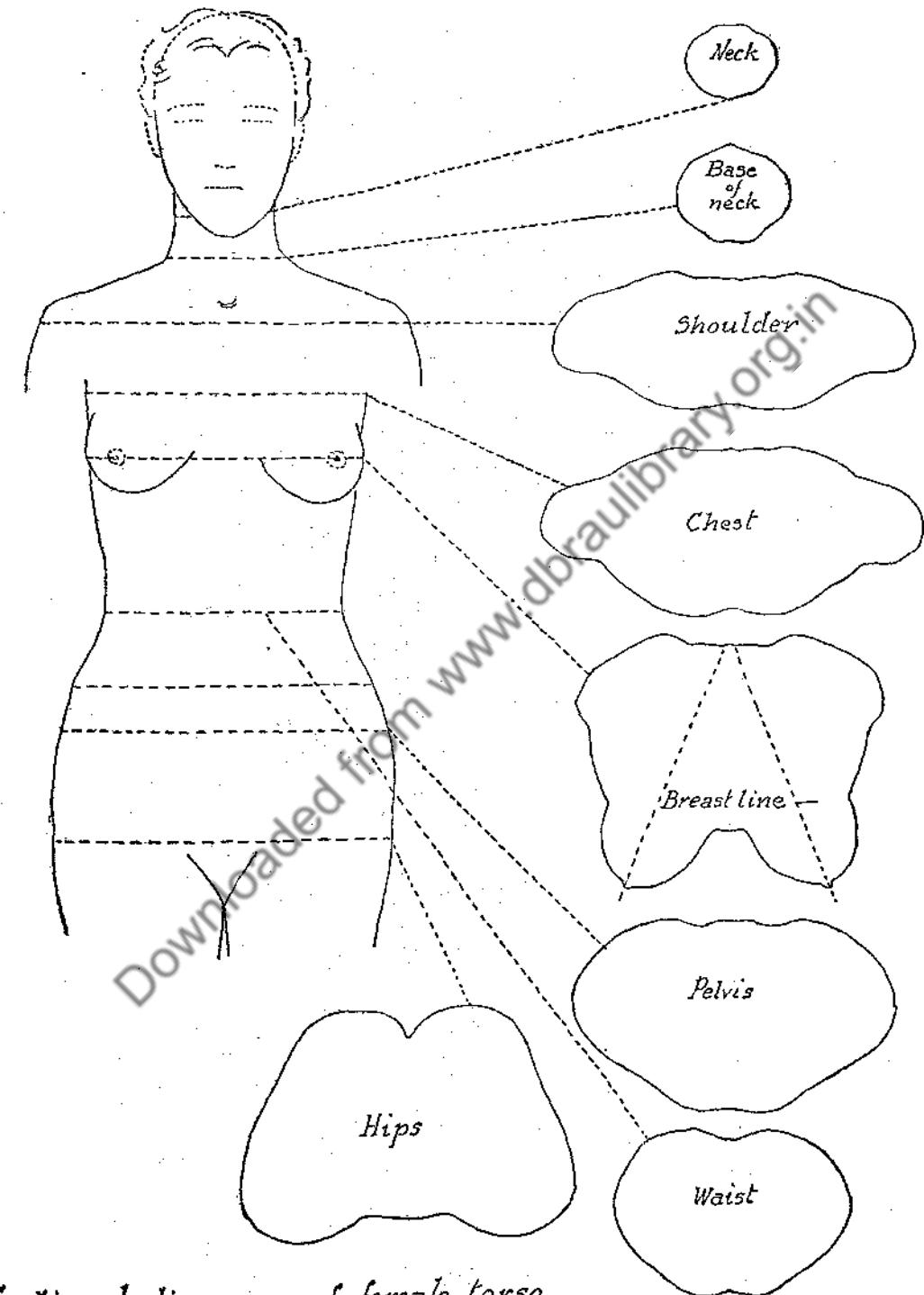
Under view



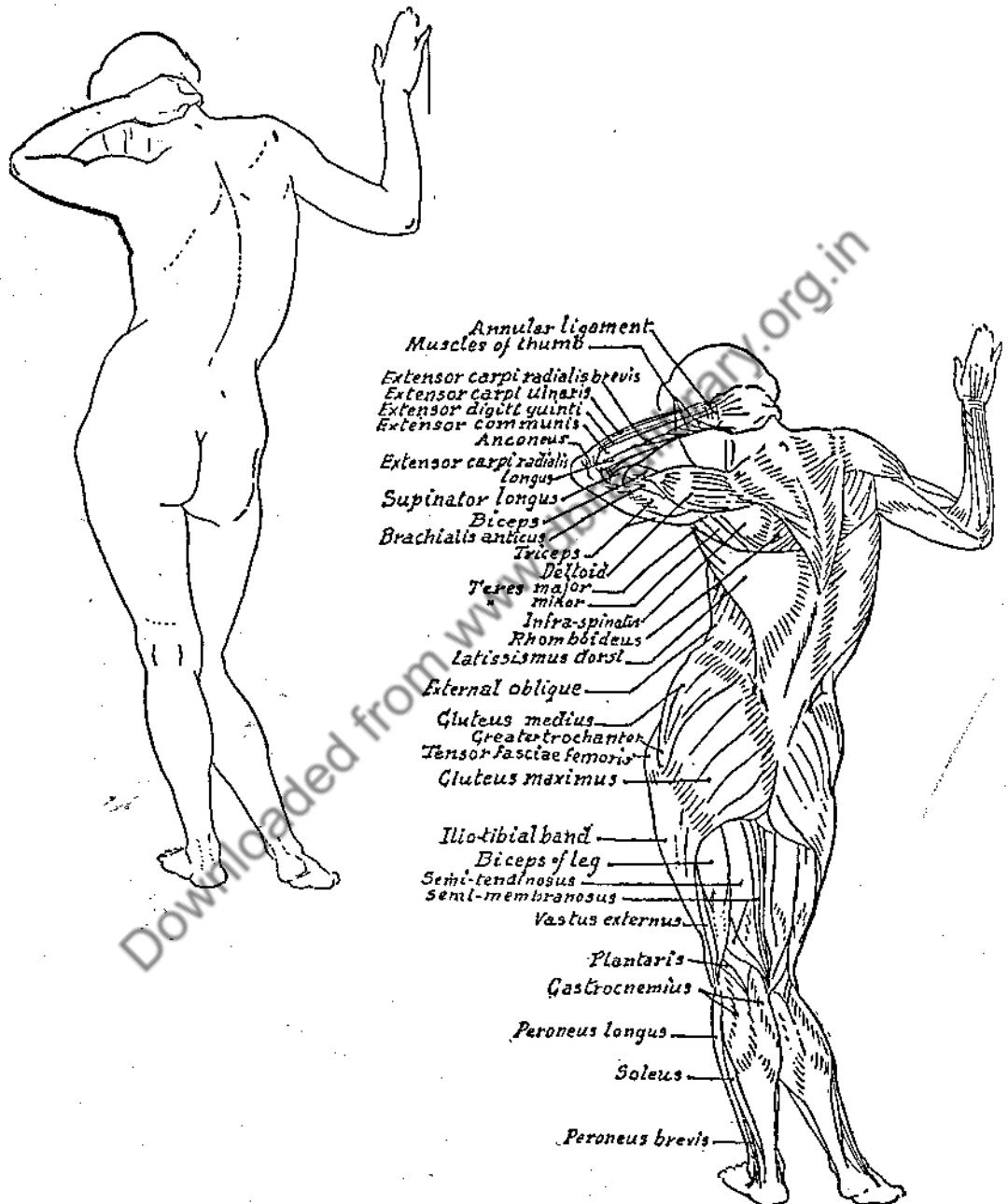
Three quarter back

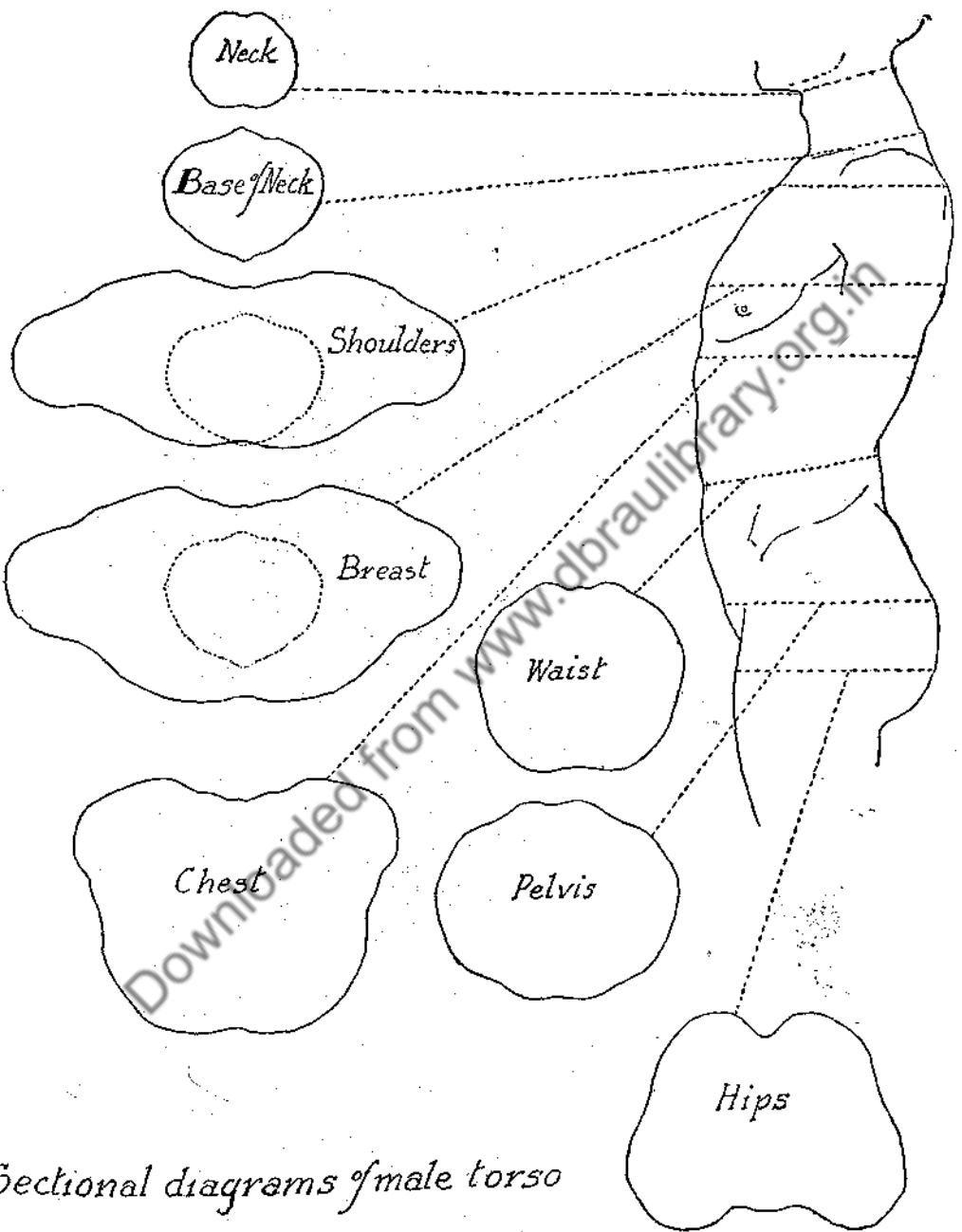






Sectional diagrams of female torso

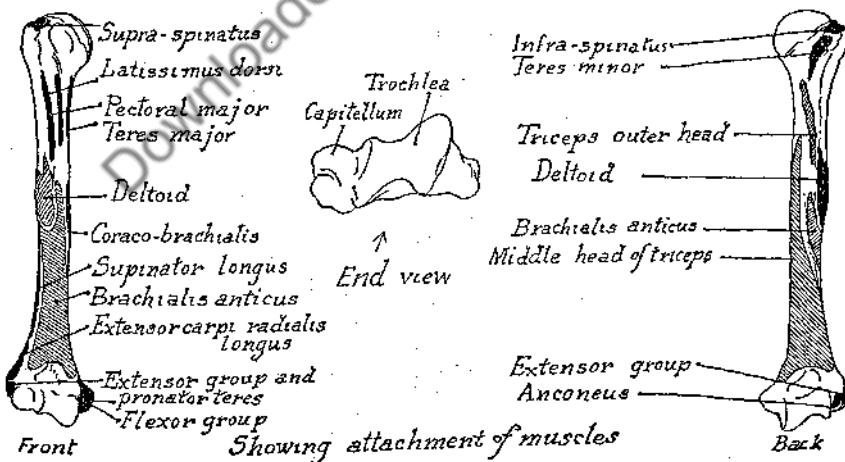
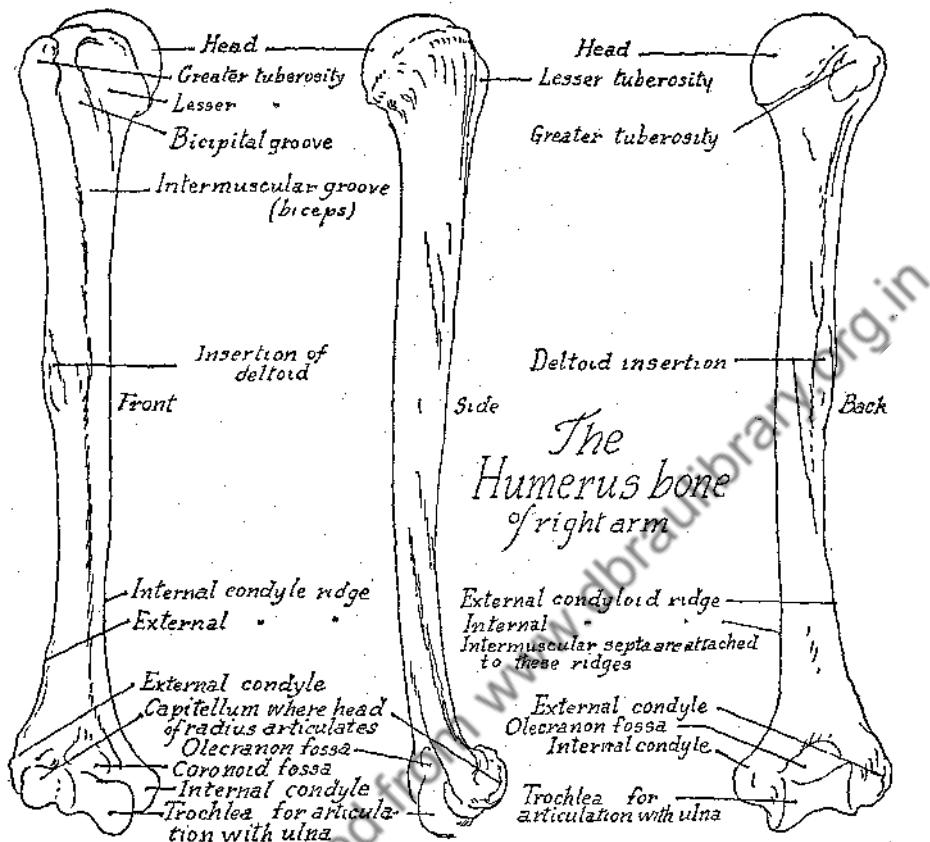




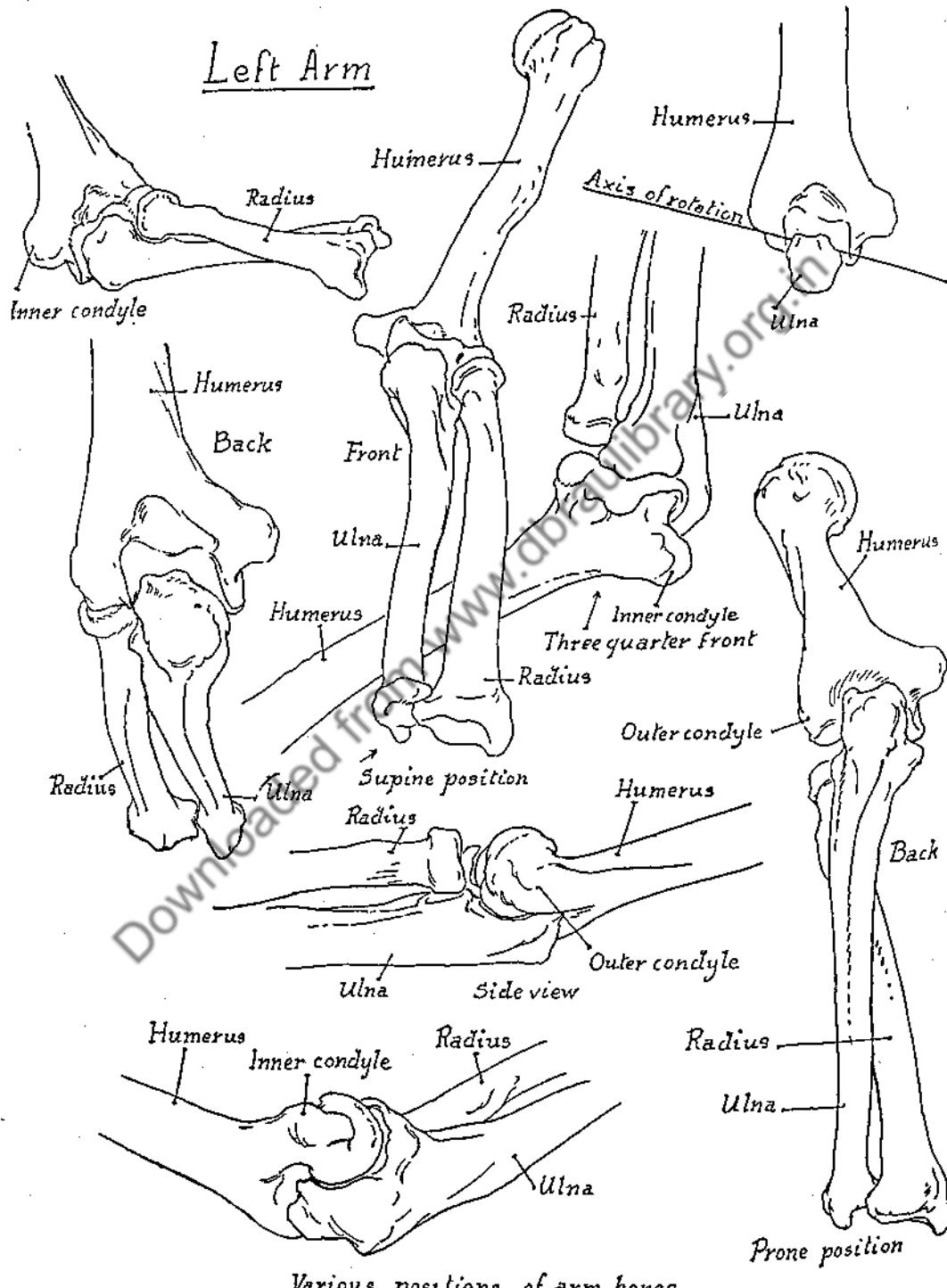
Sectional diagrams of male torso



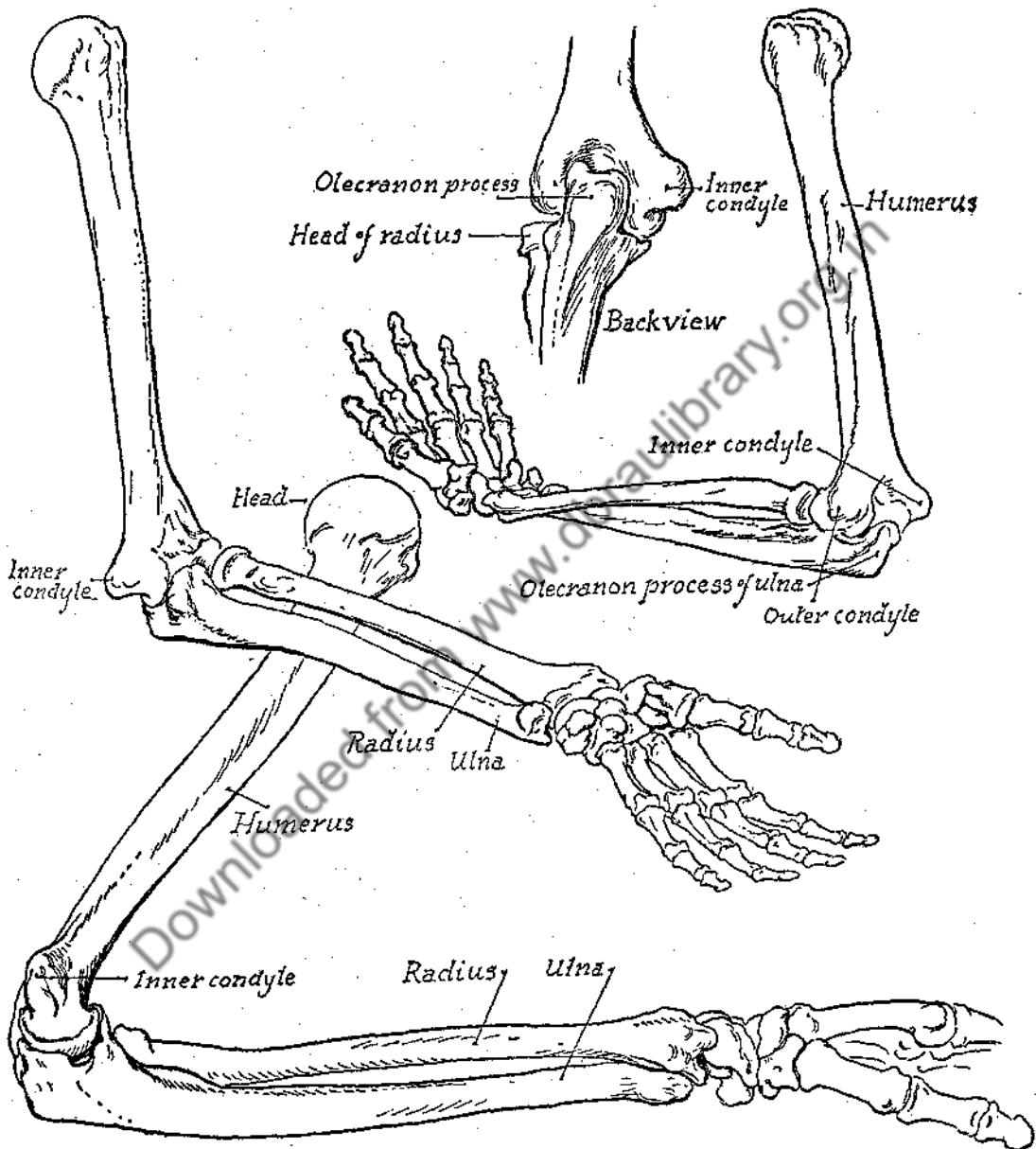
PART FIVE
THE ARM



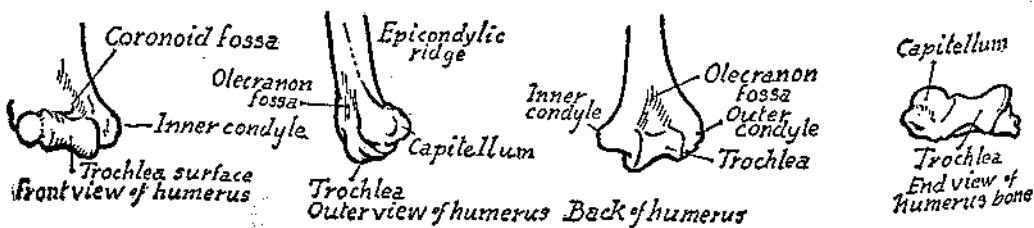
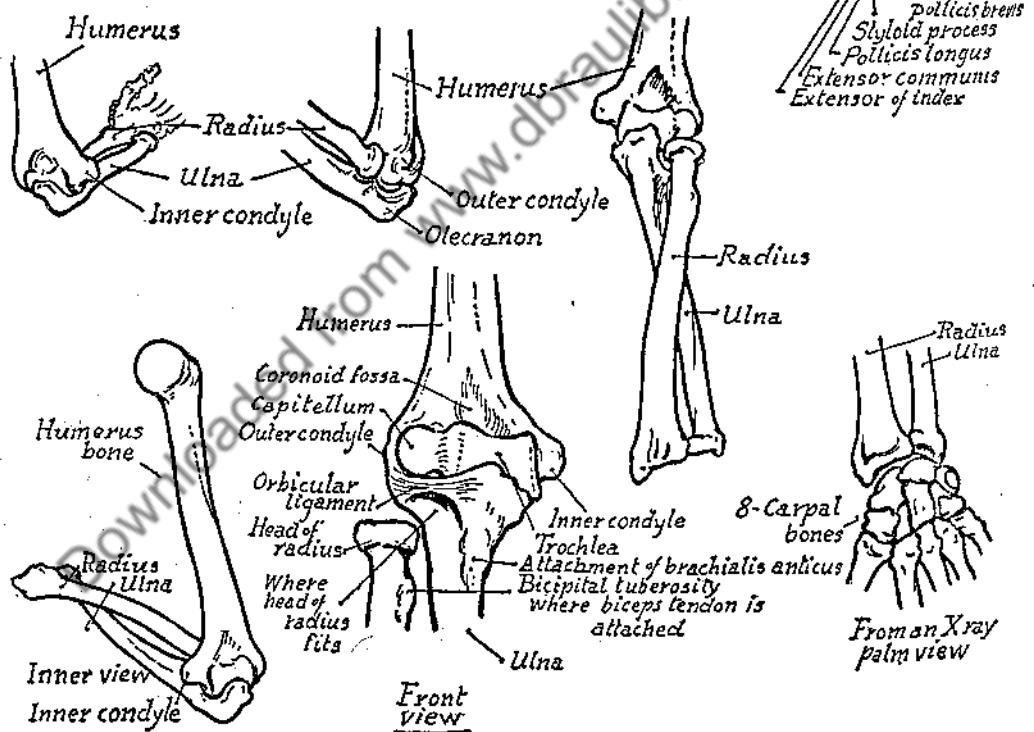
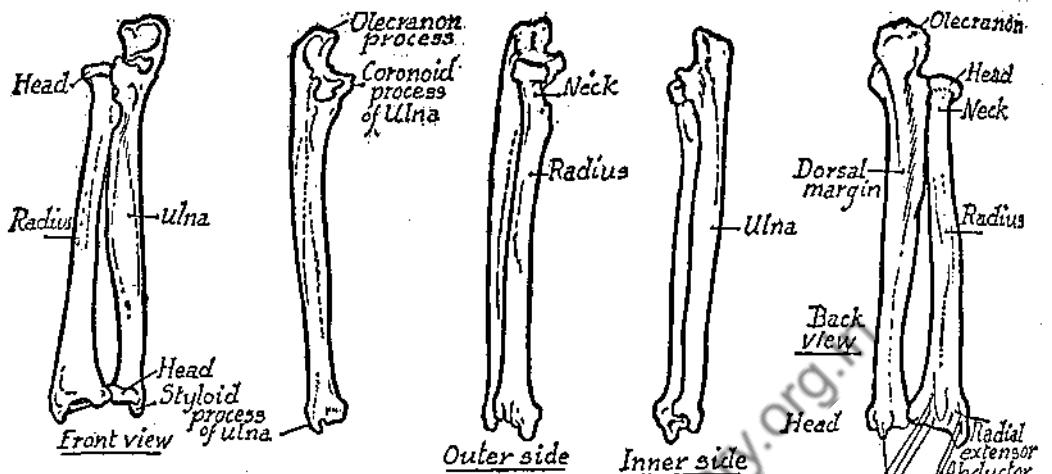
Left Arm

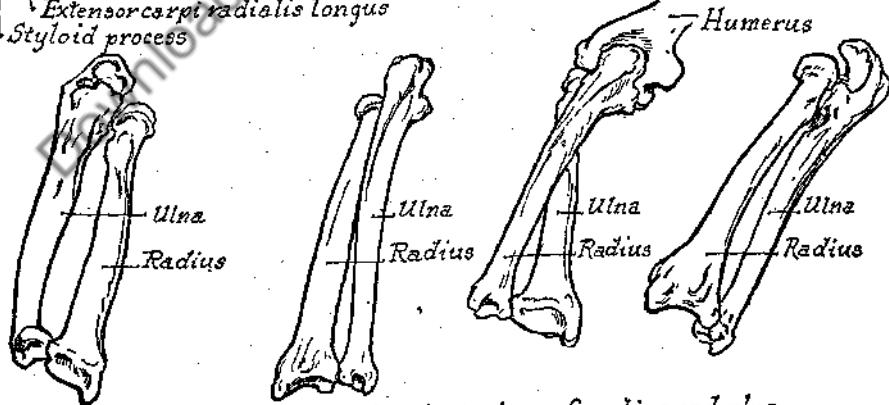
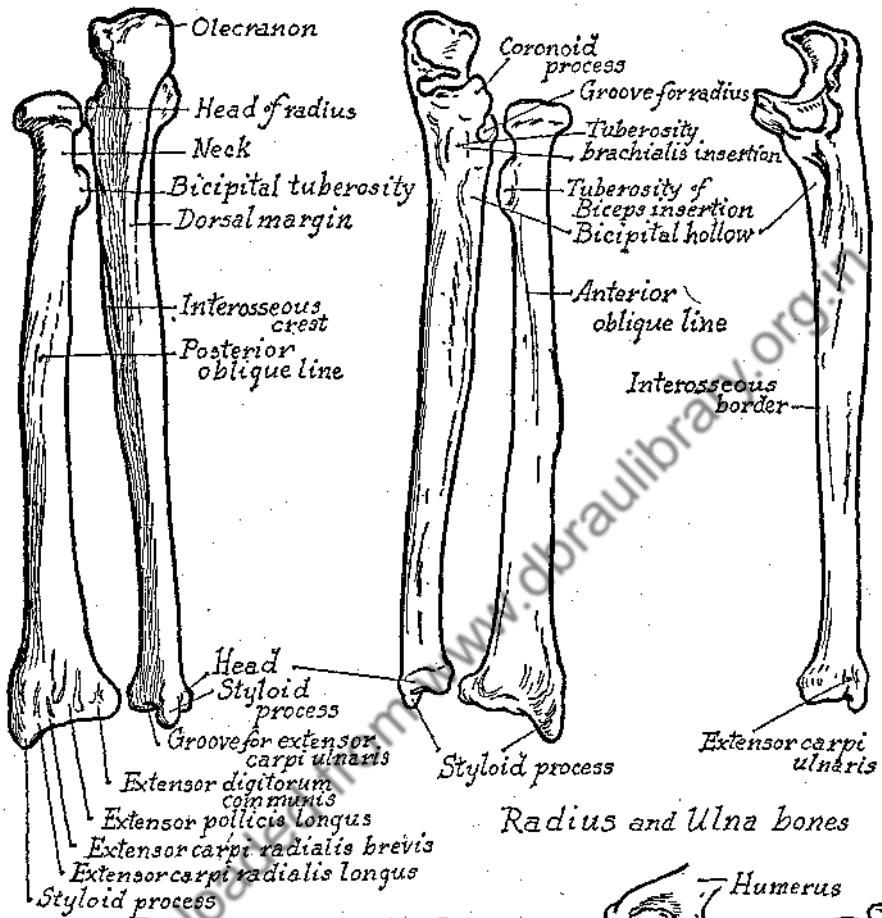


Various positions of arm bones

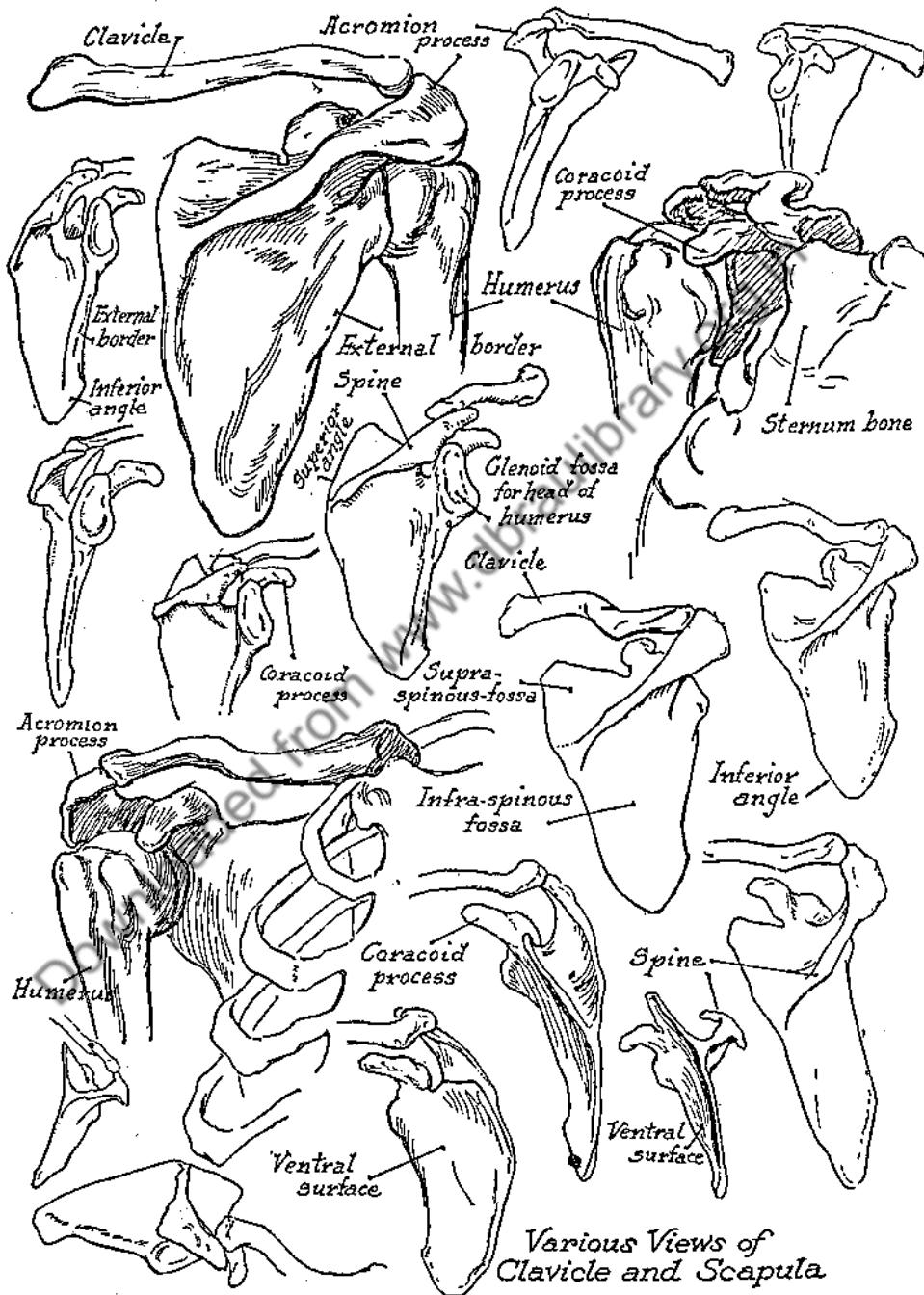


Bones of Arm and Hand

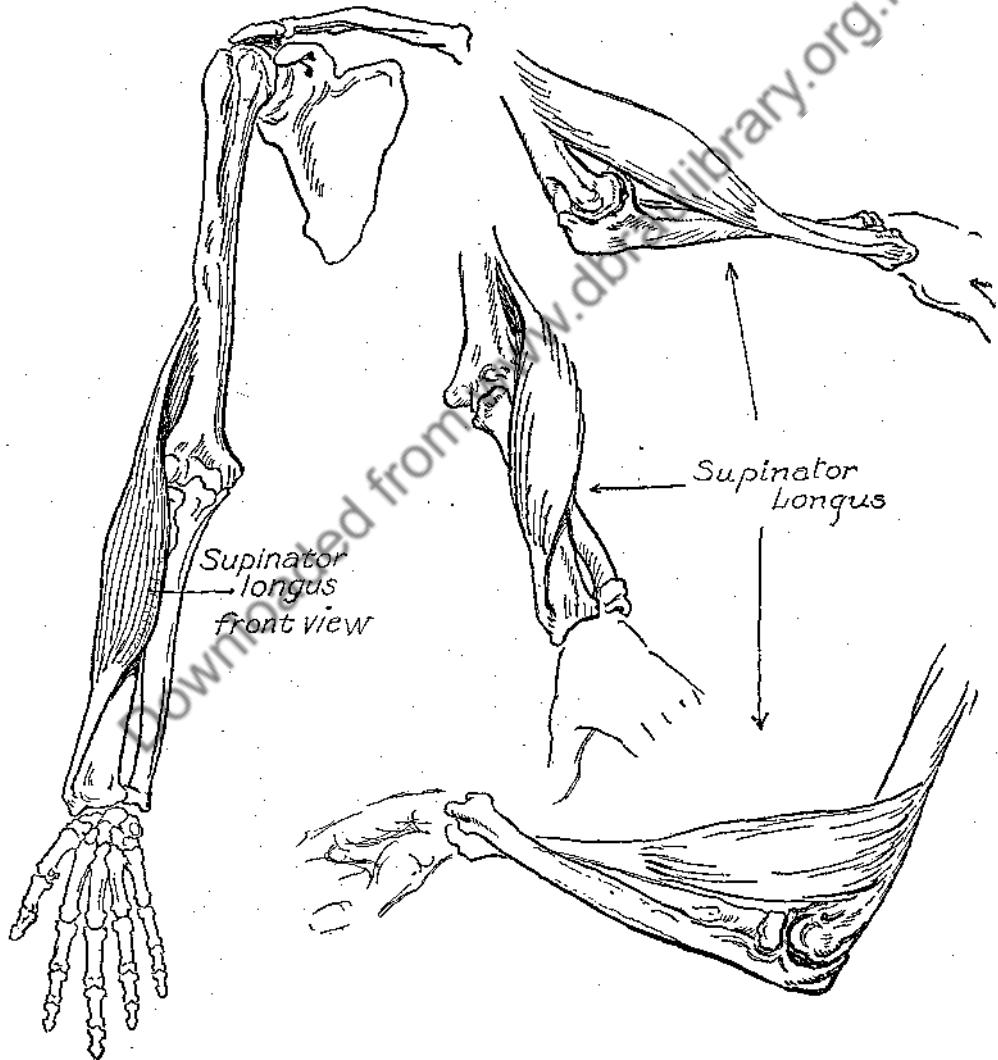
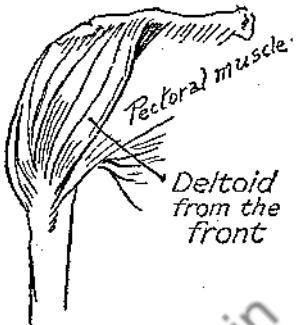
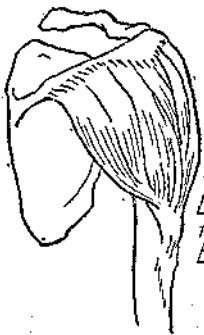
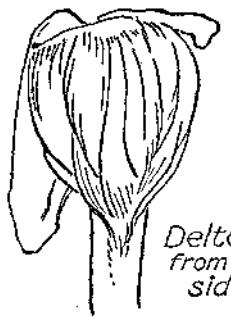


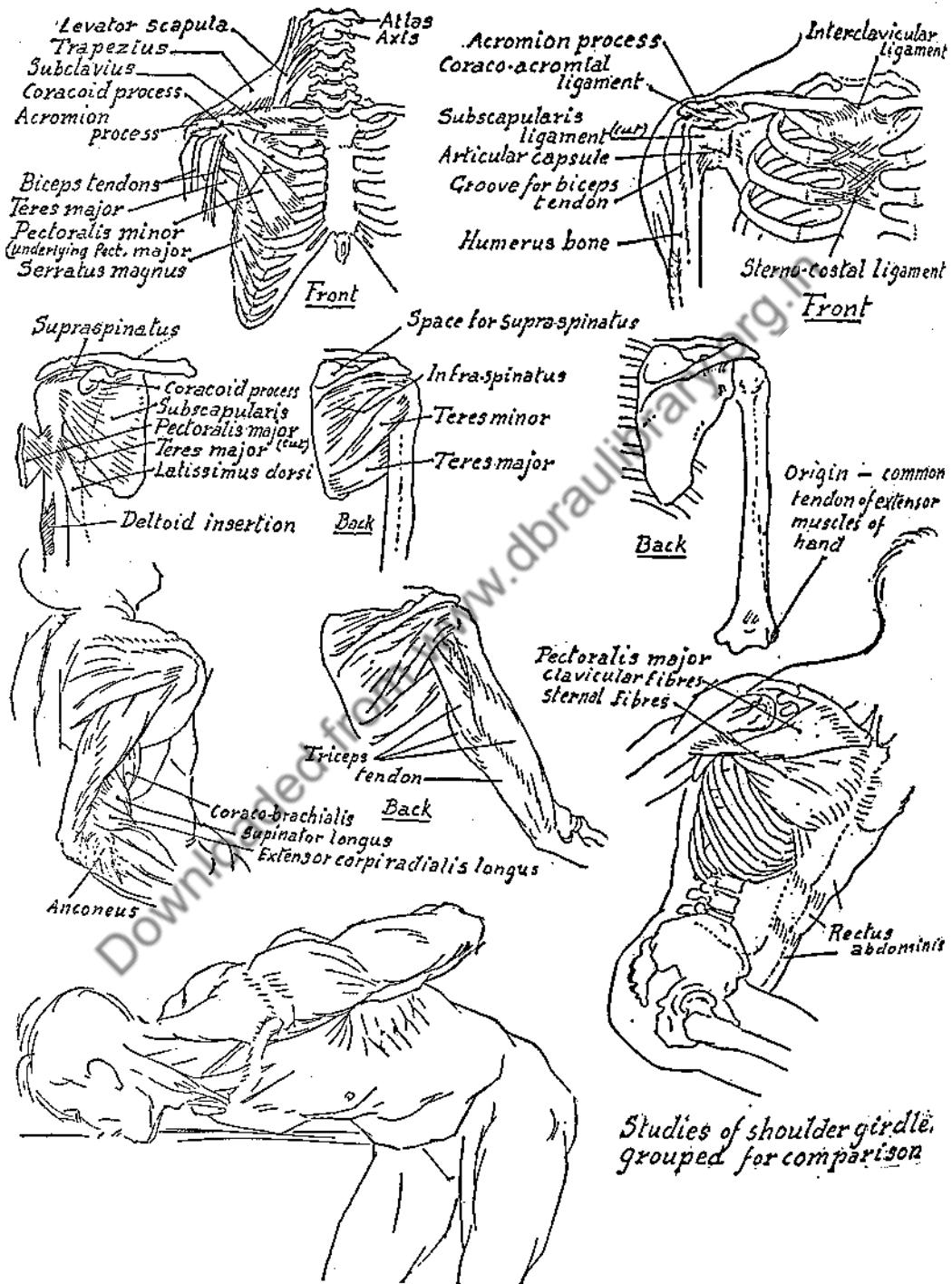


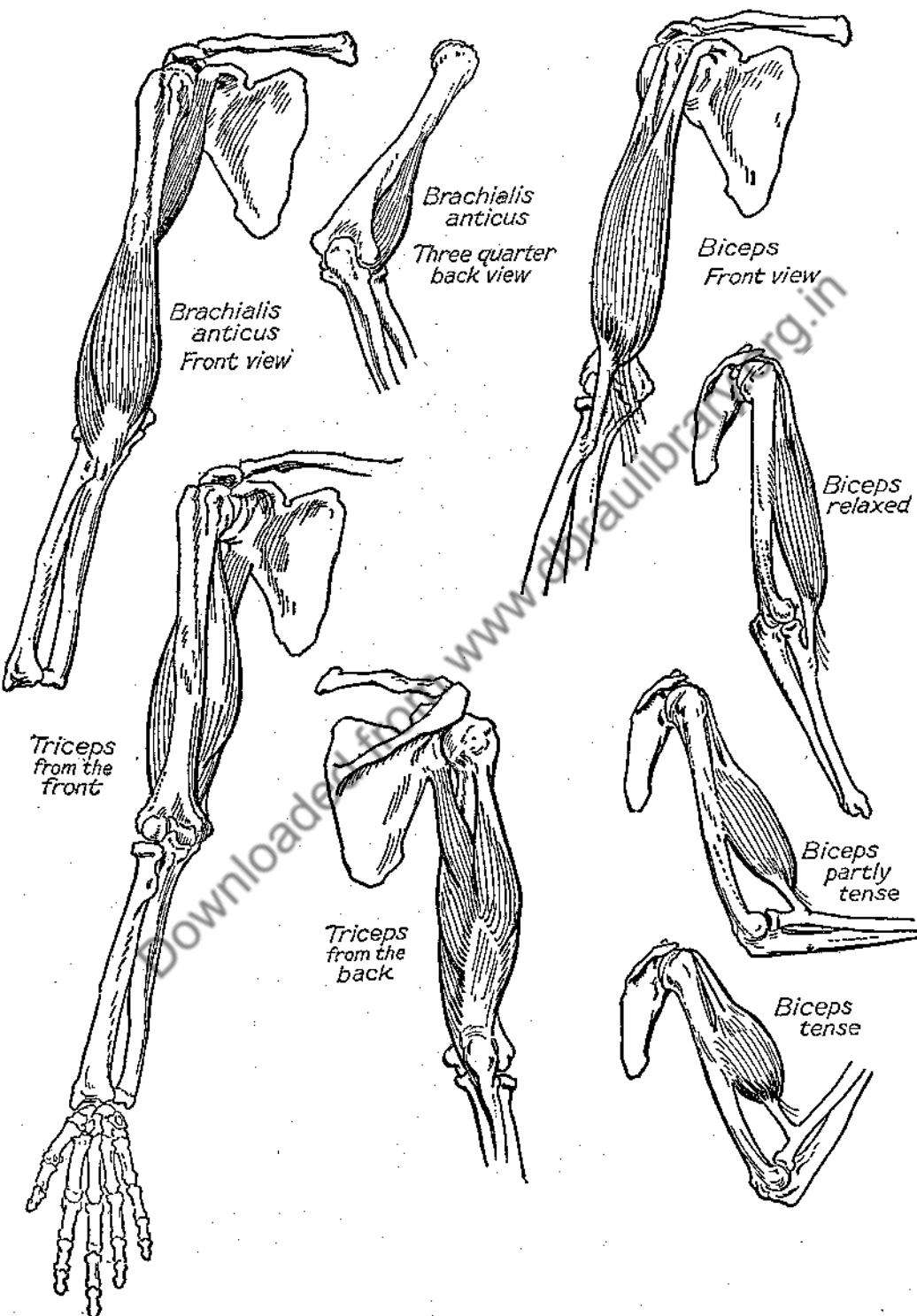
Relations and foreshortenings of radius and ulna

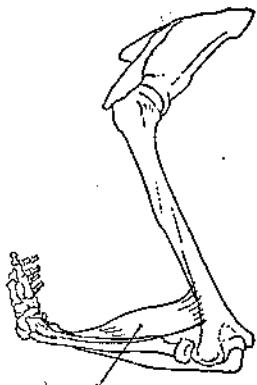


Various Views of
Clavicle and Scapula

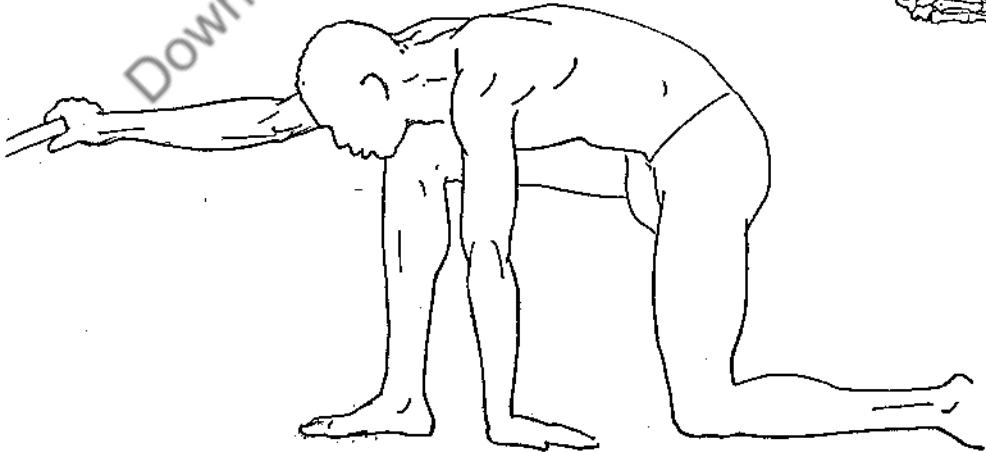
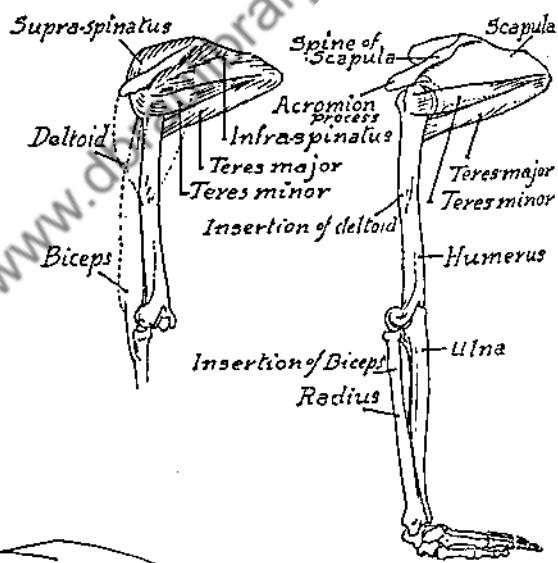
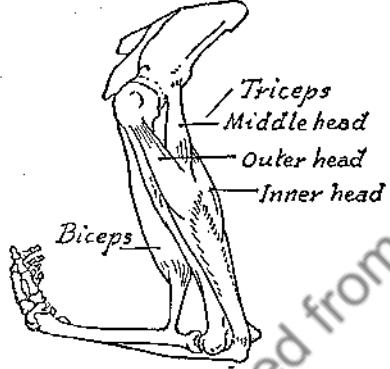
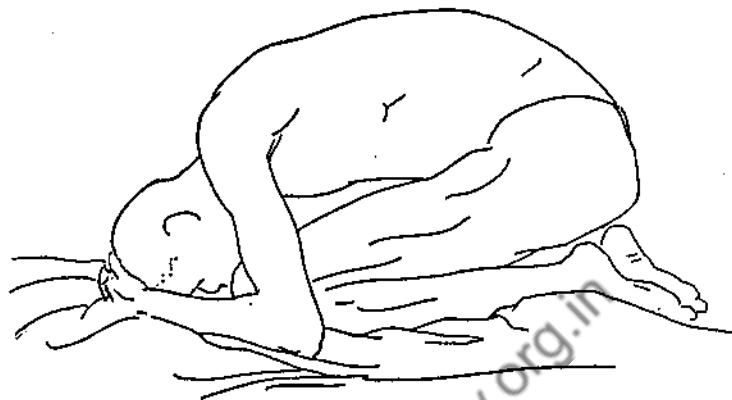


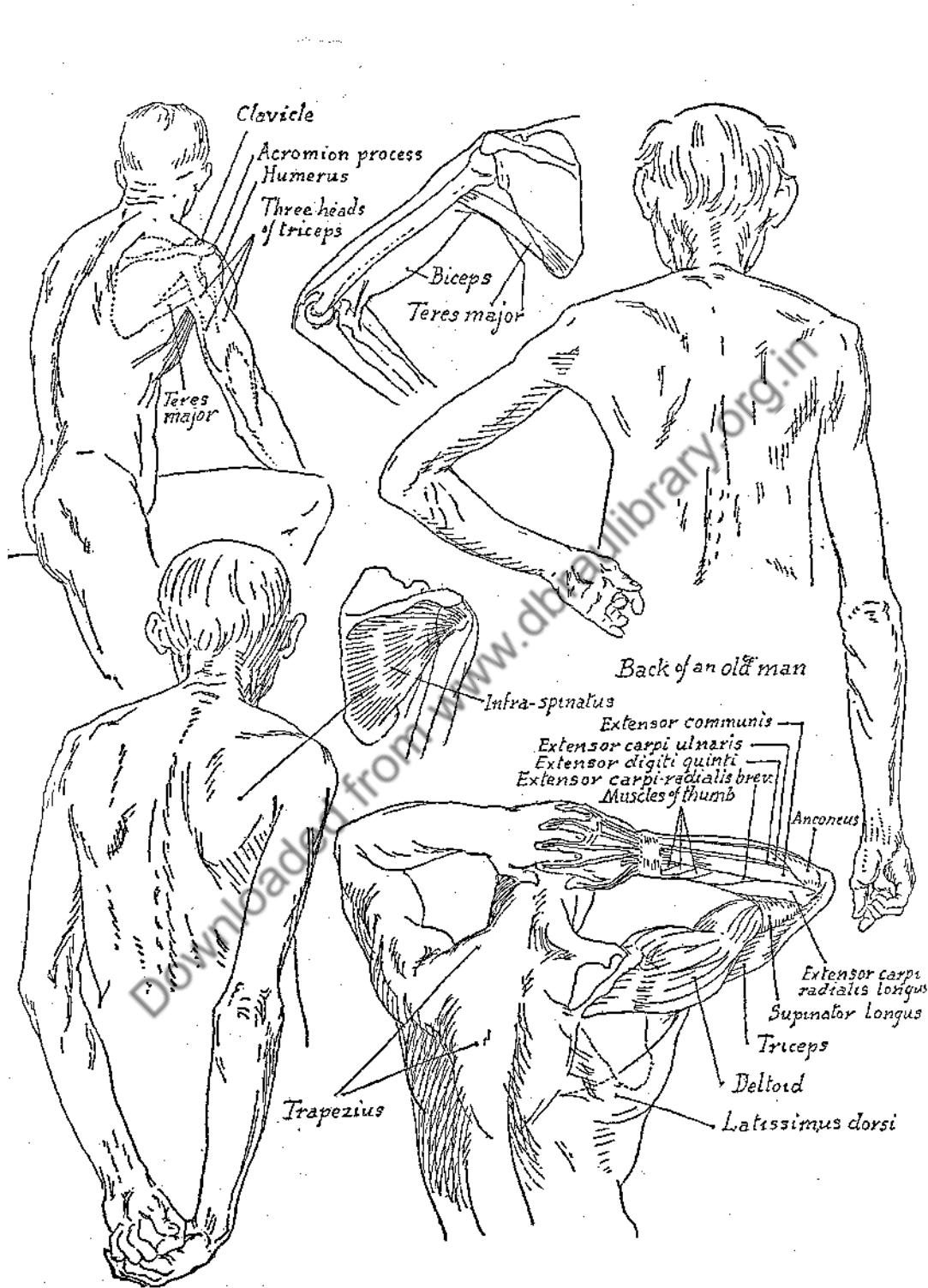


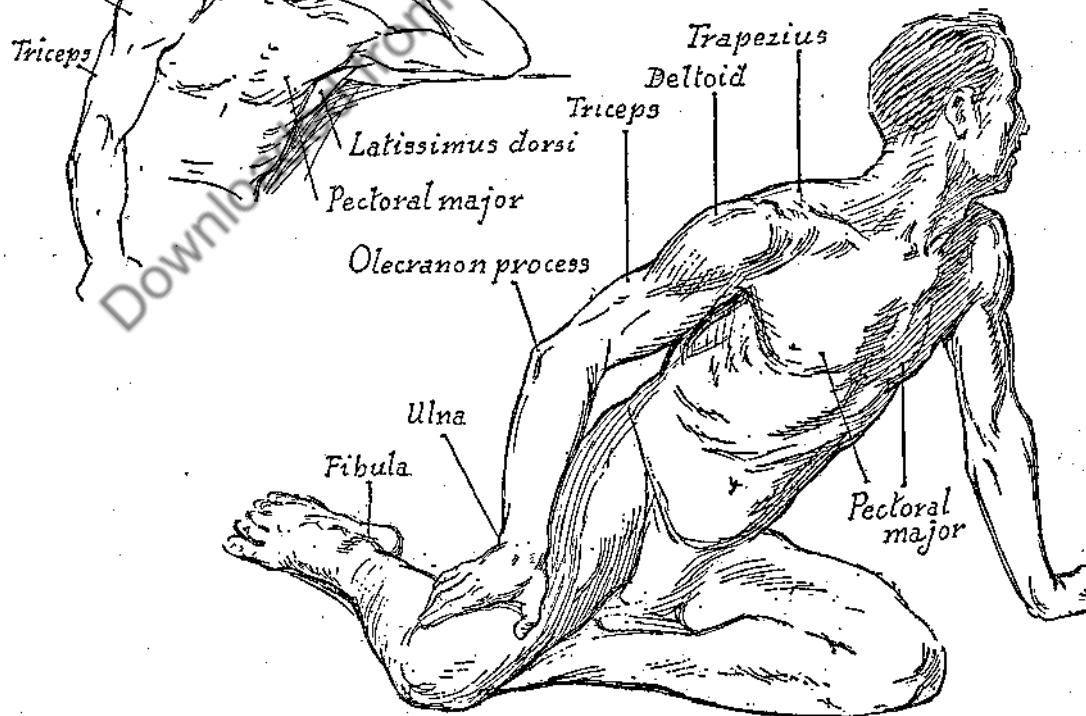
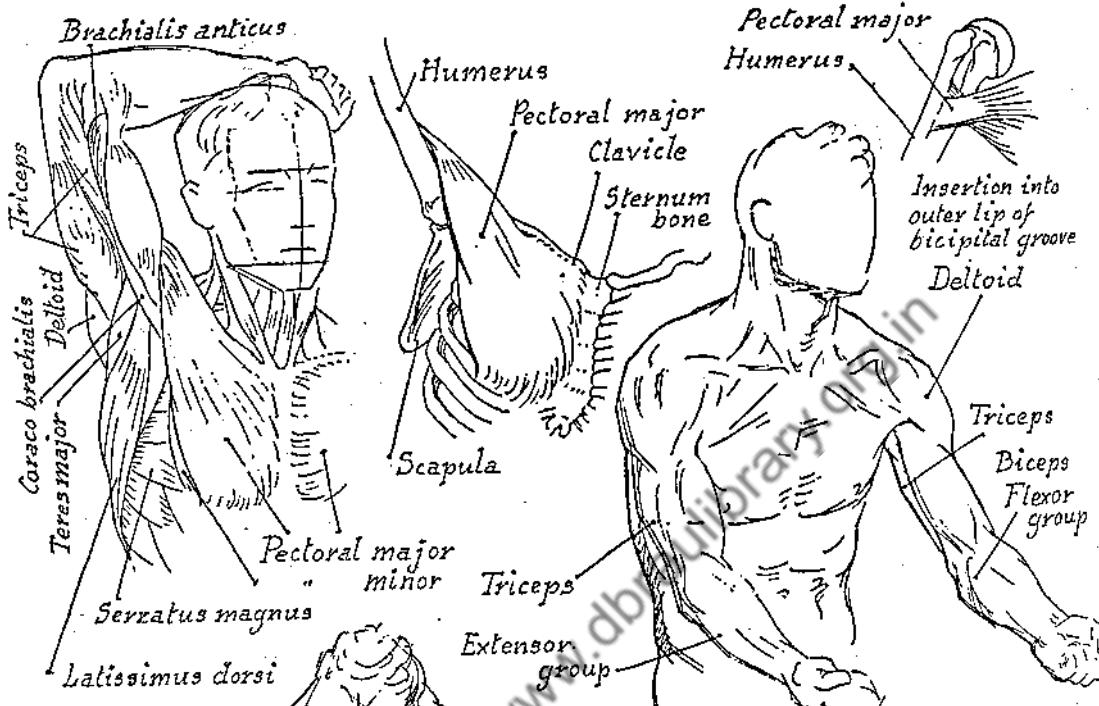


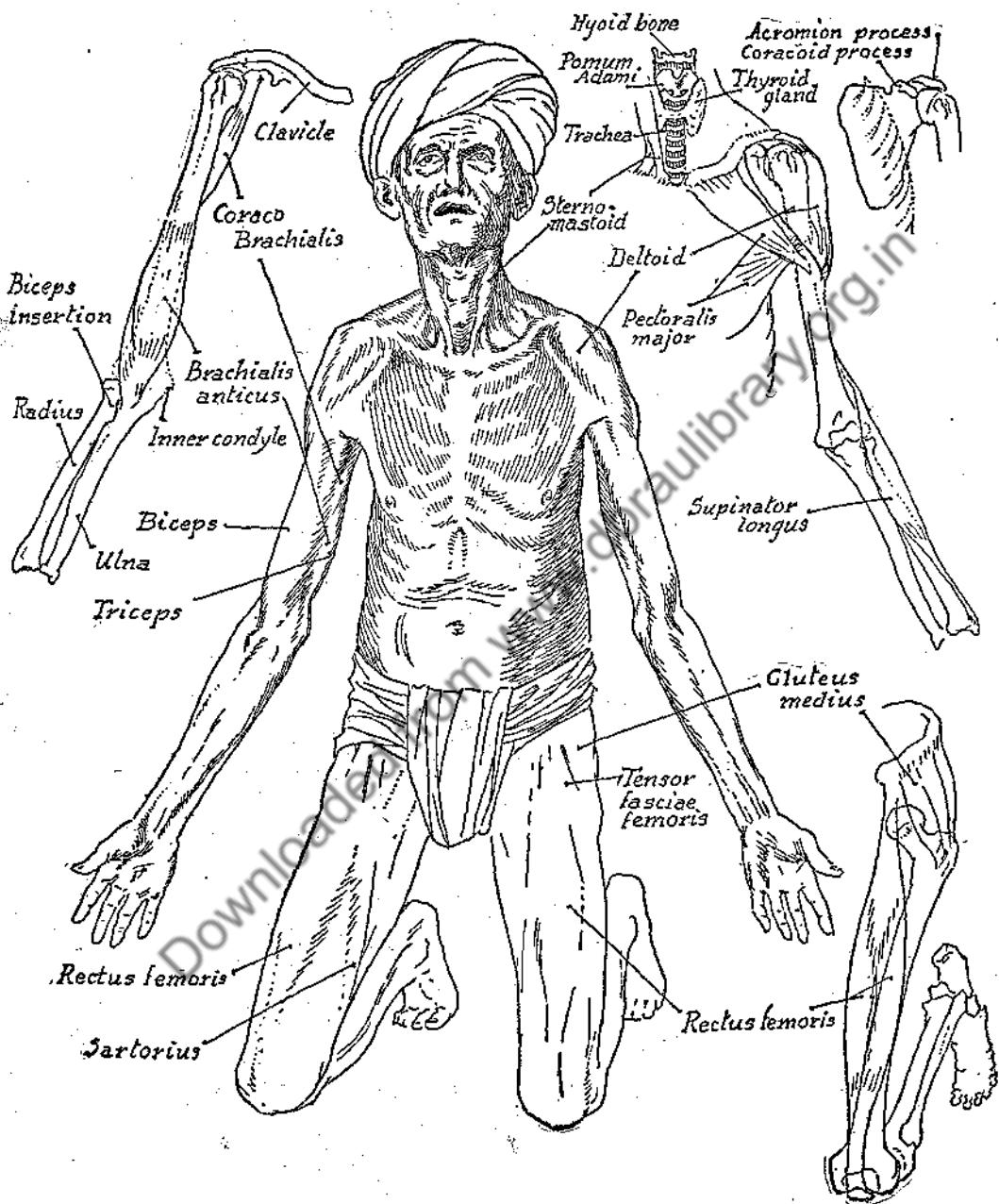


Supinator longus

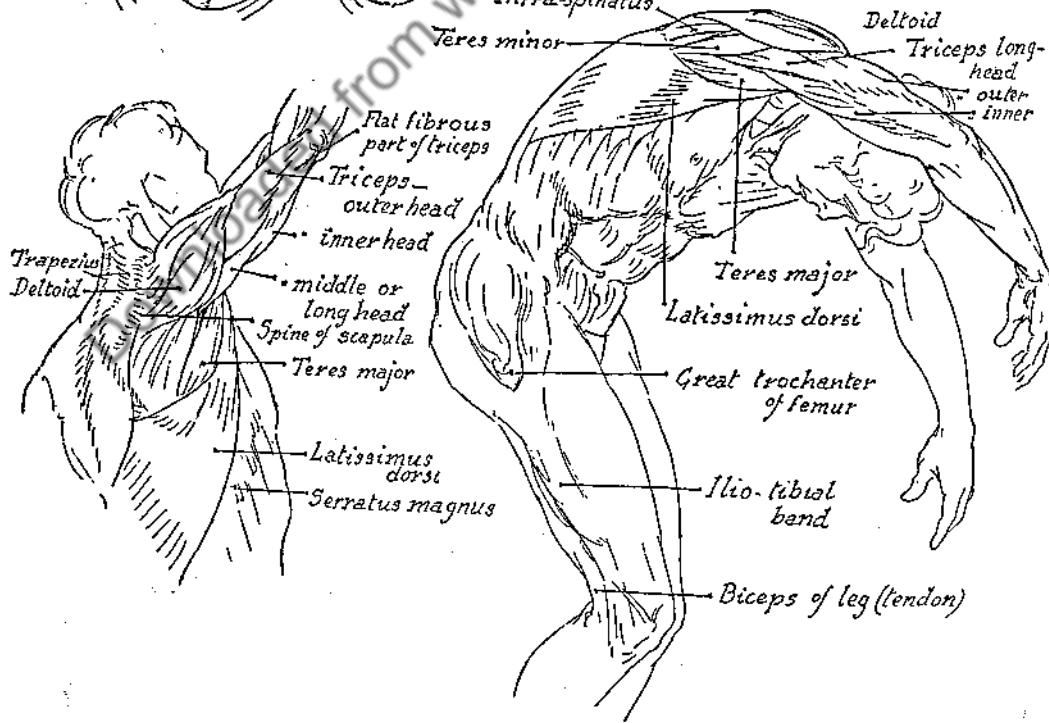
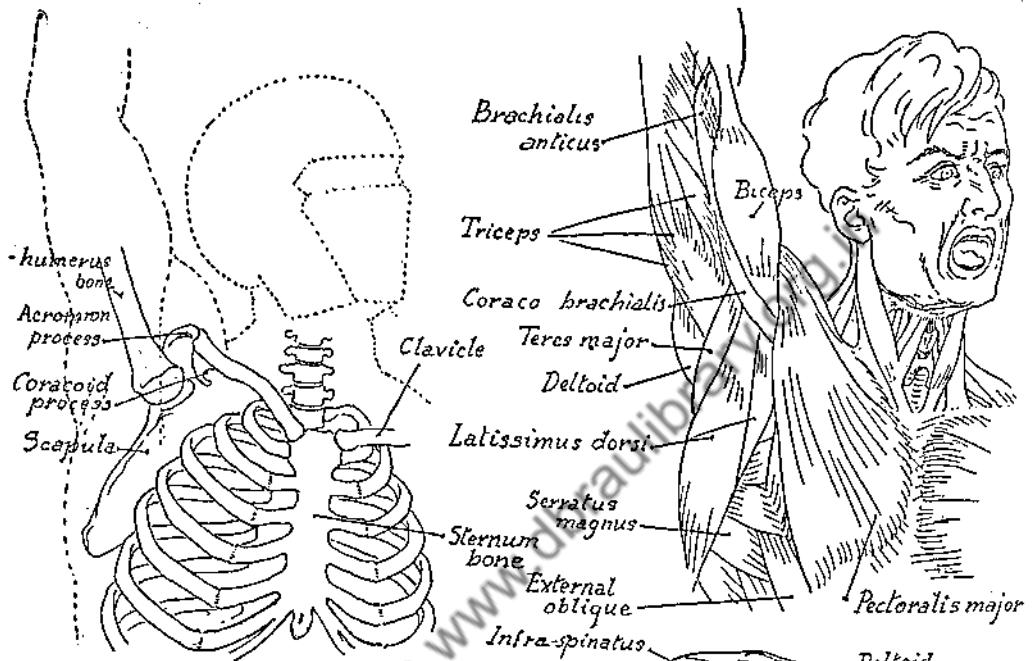




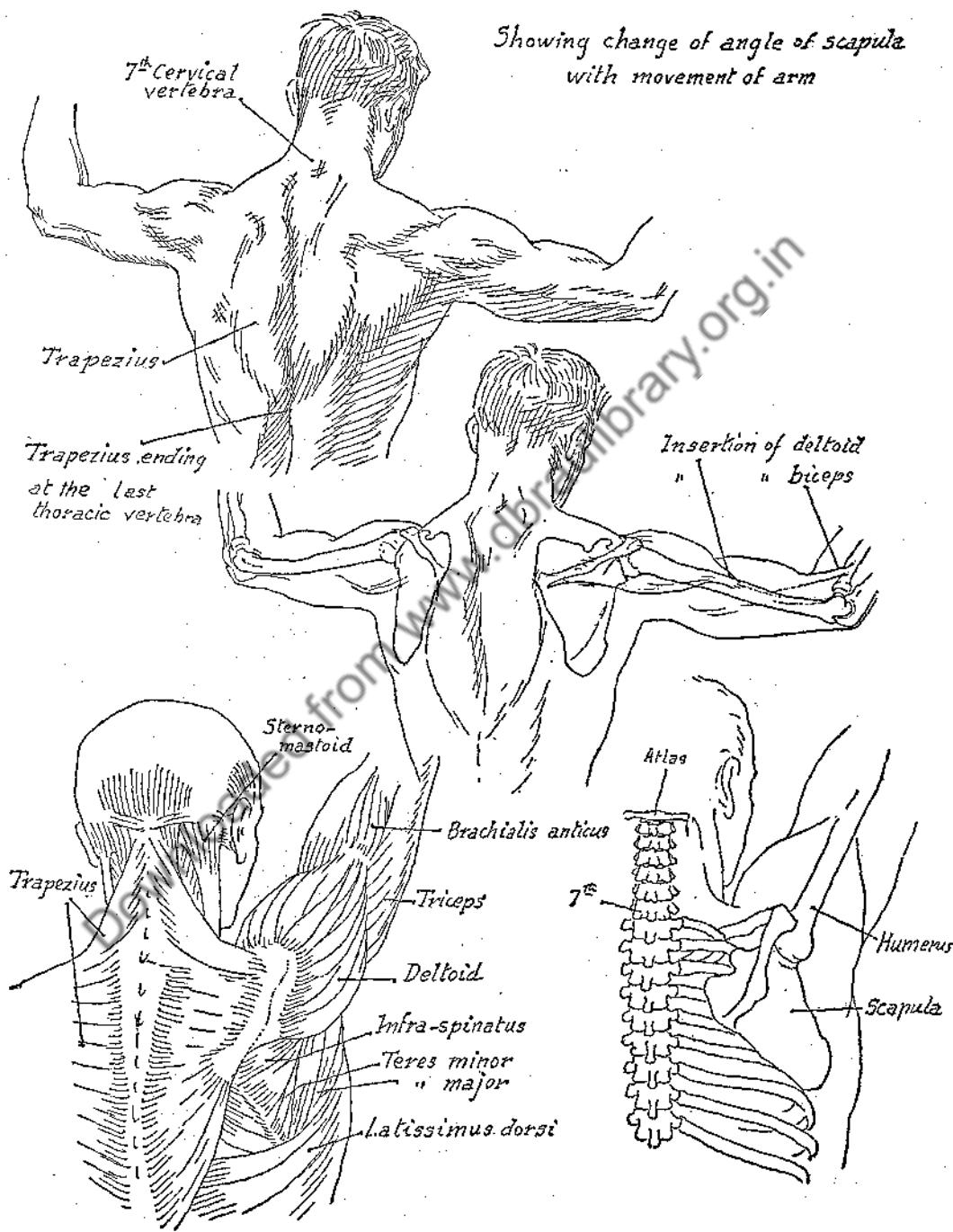


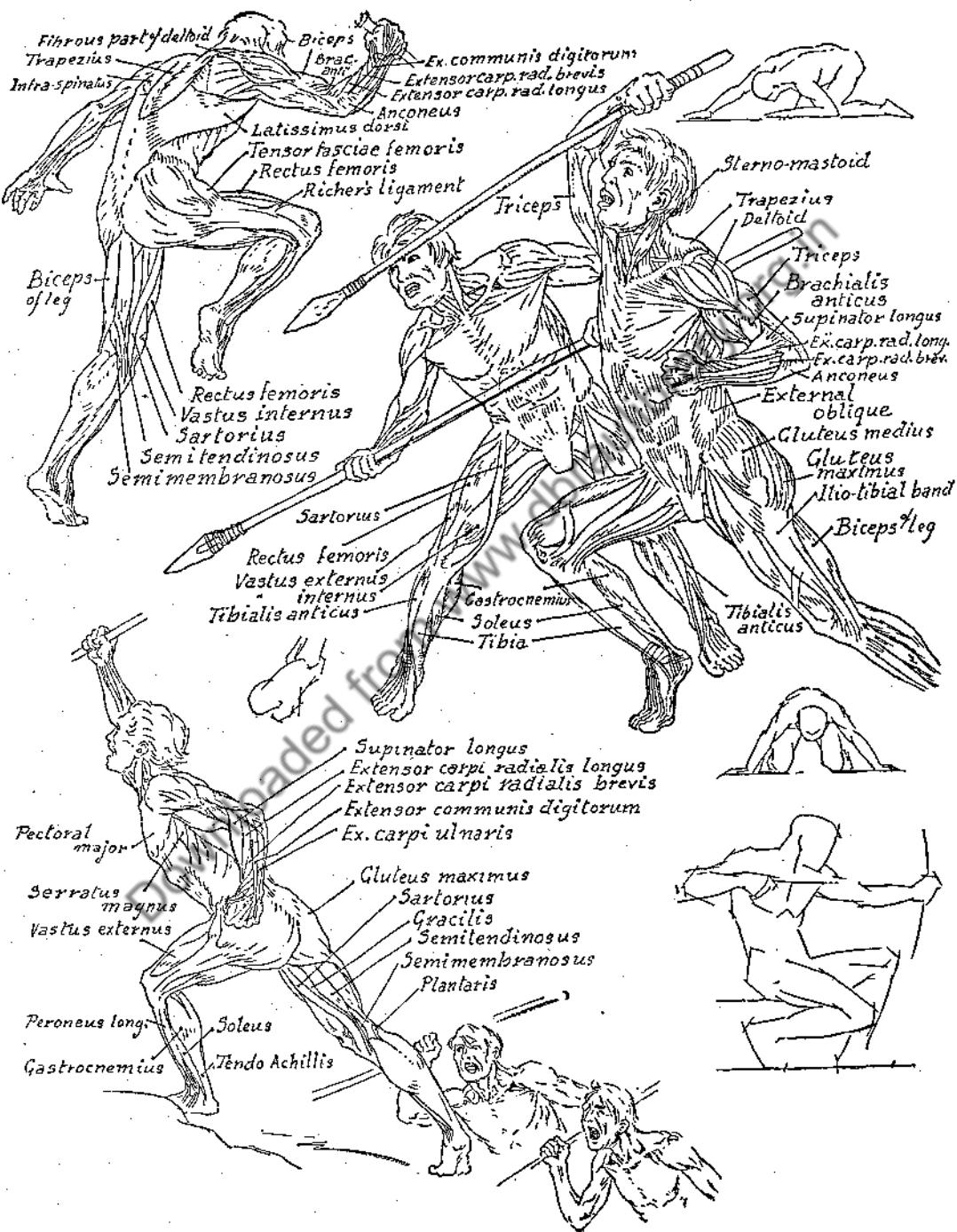


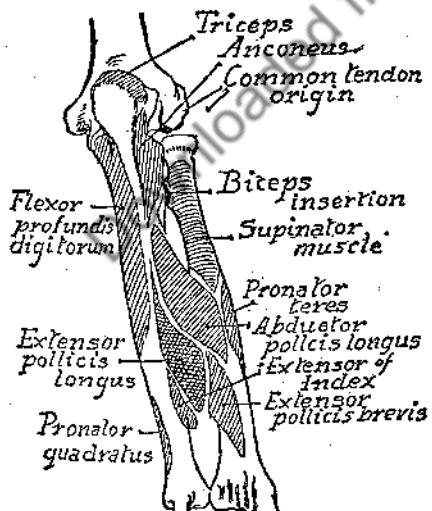
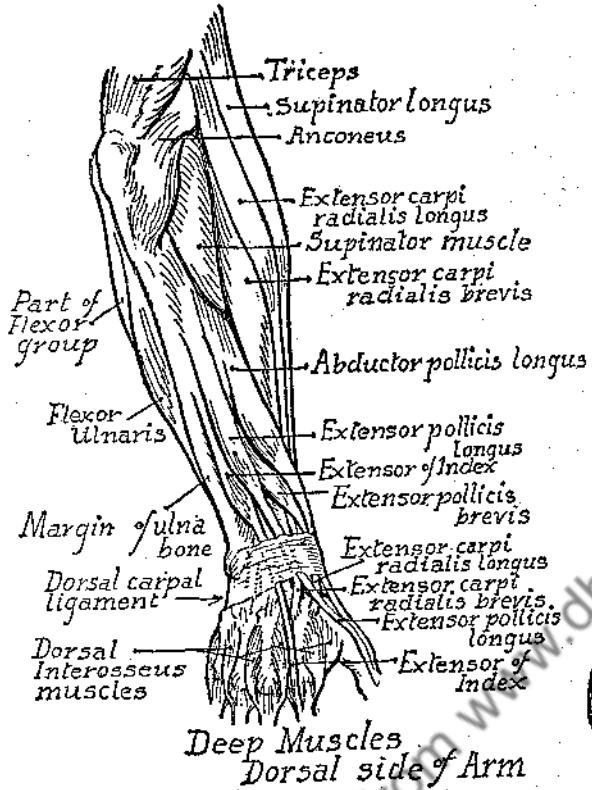
Emaciated figure



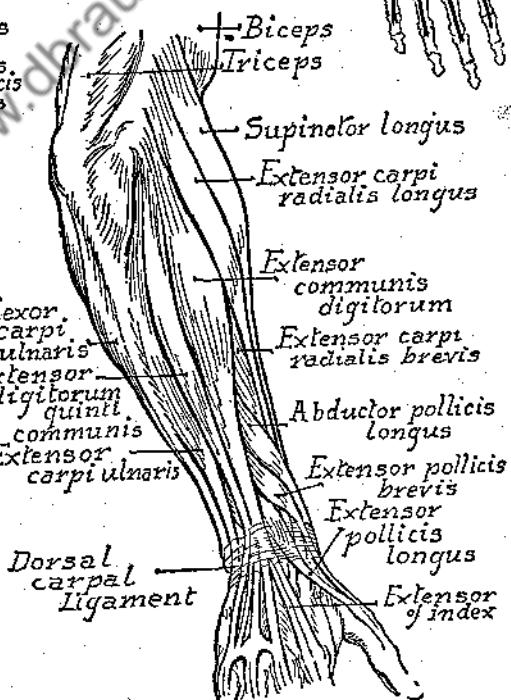
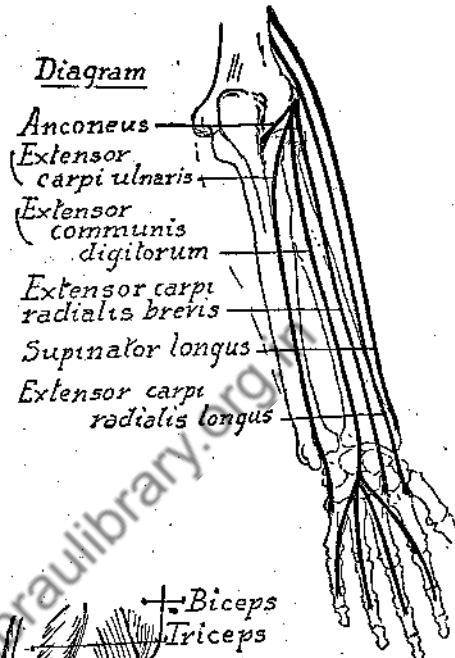
Showing change of angle of scapula
with movement of arm



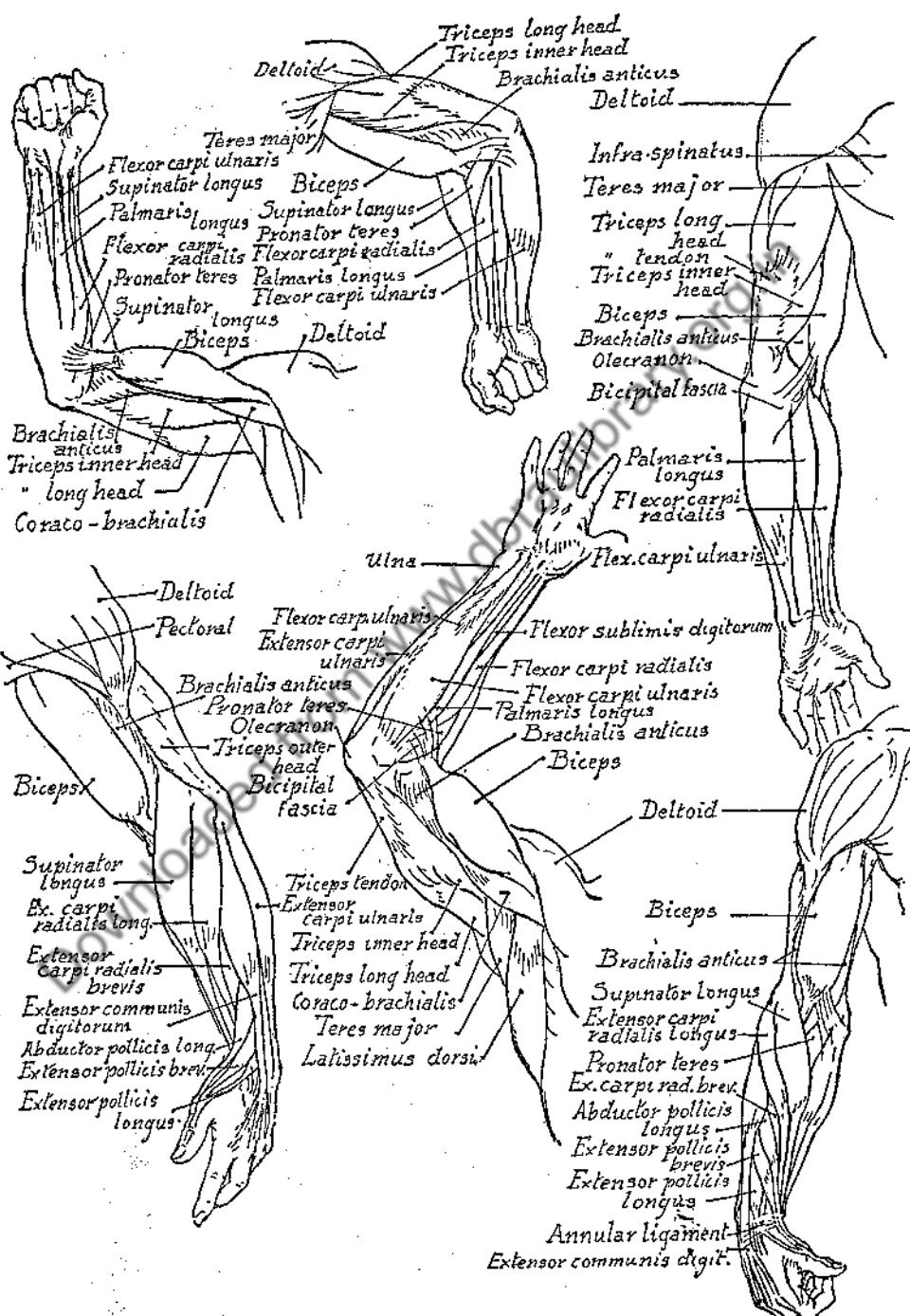


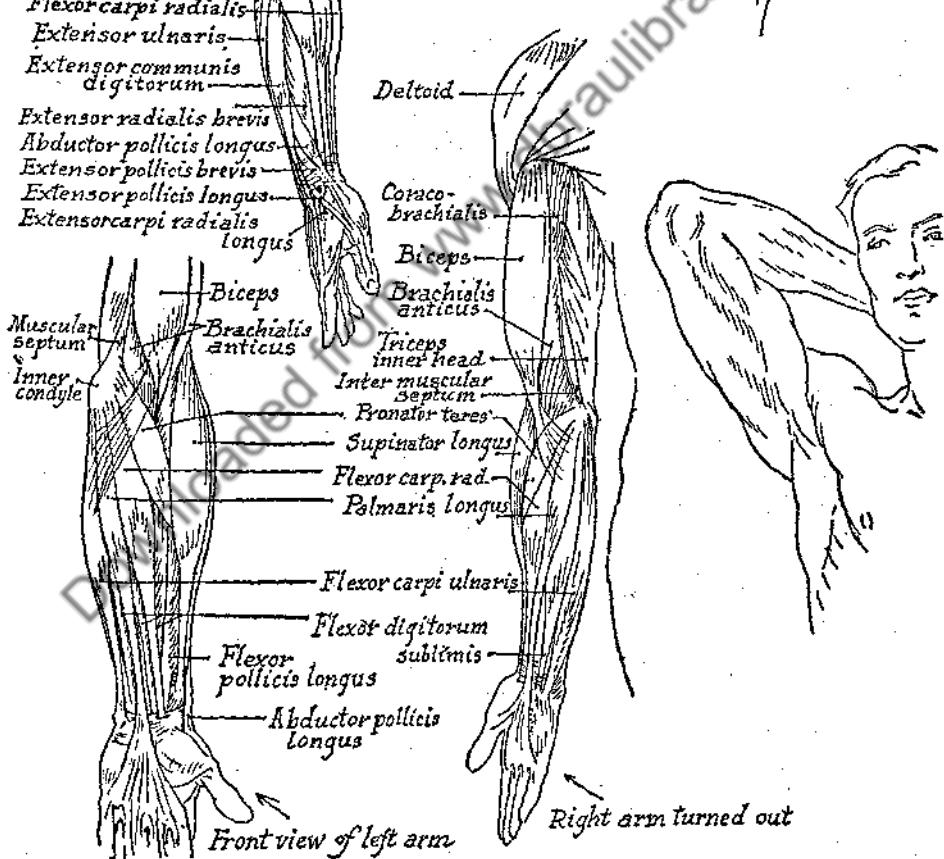
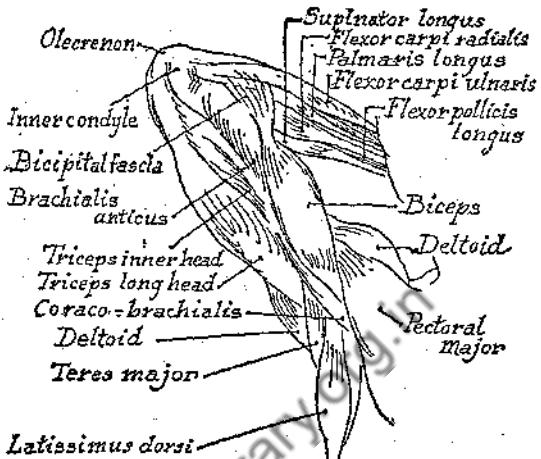
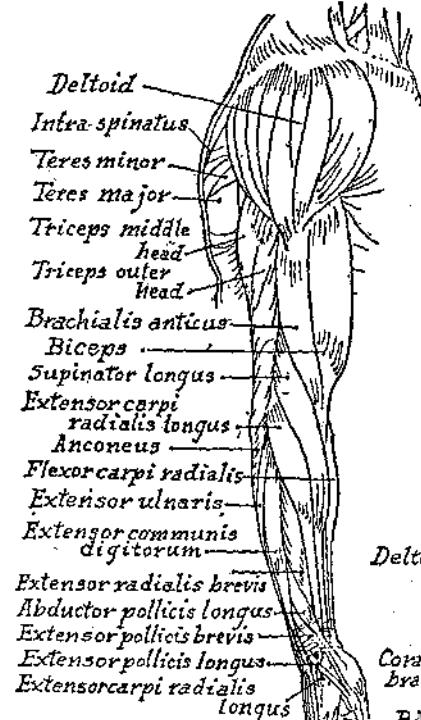


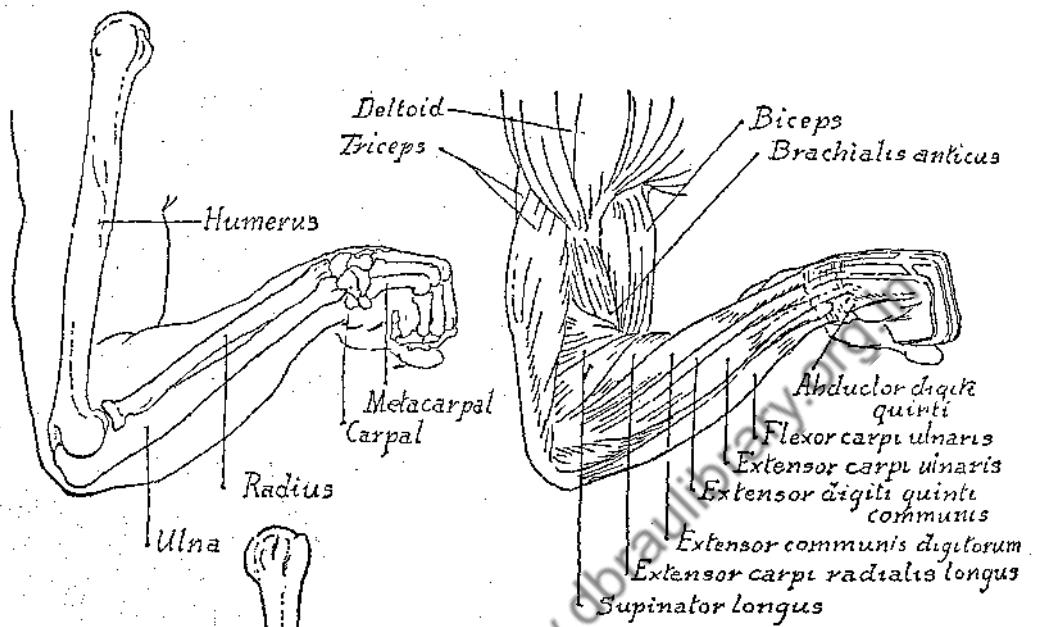
Muscle Attachments



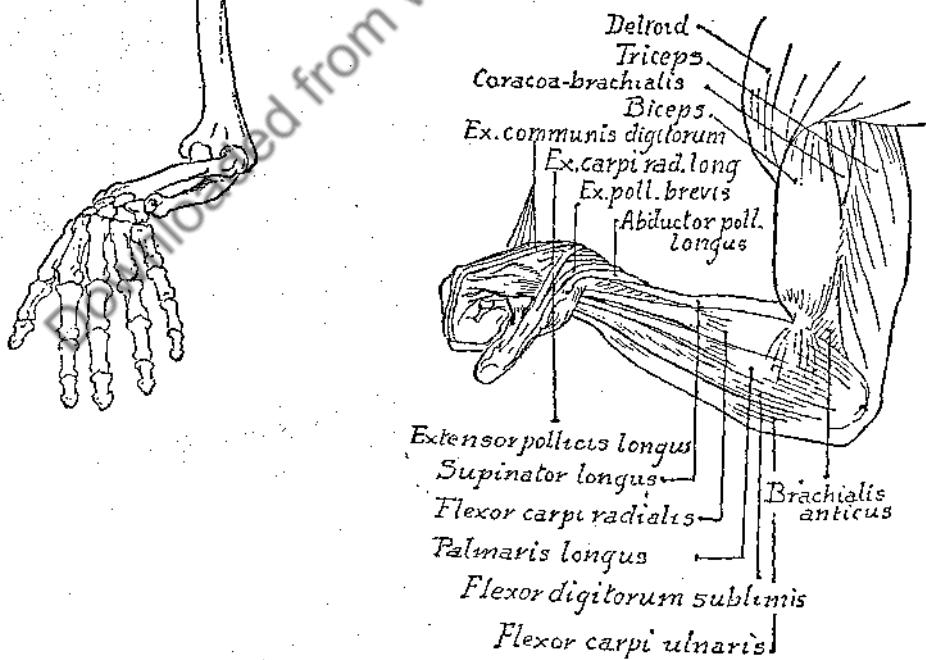
**Surface Muscles
Dorsal side of Arm**



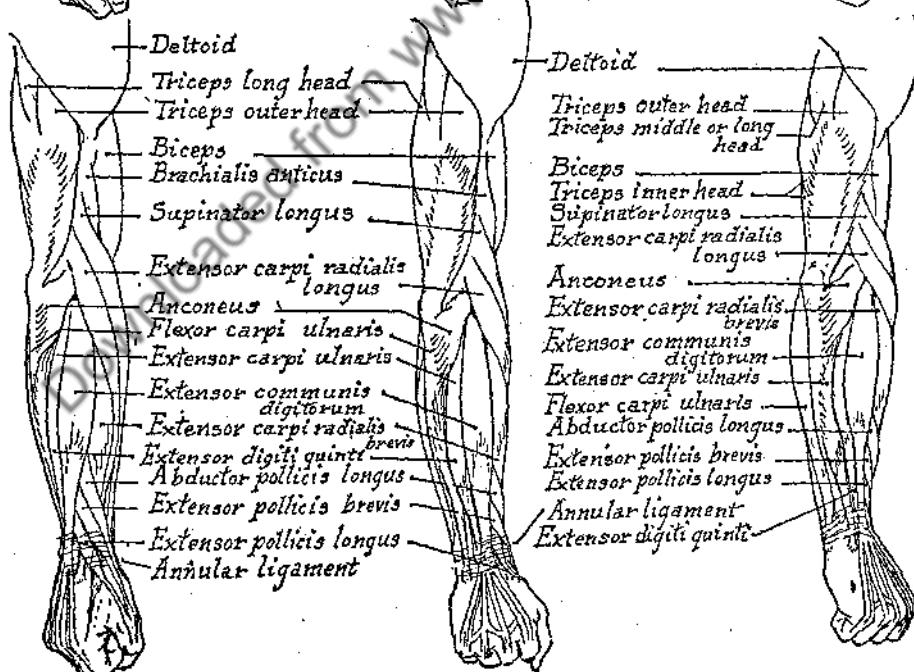
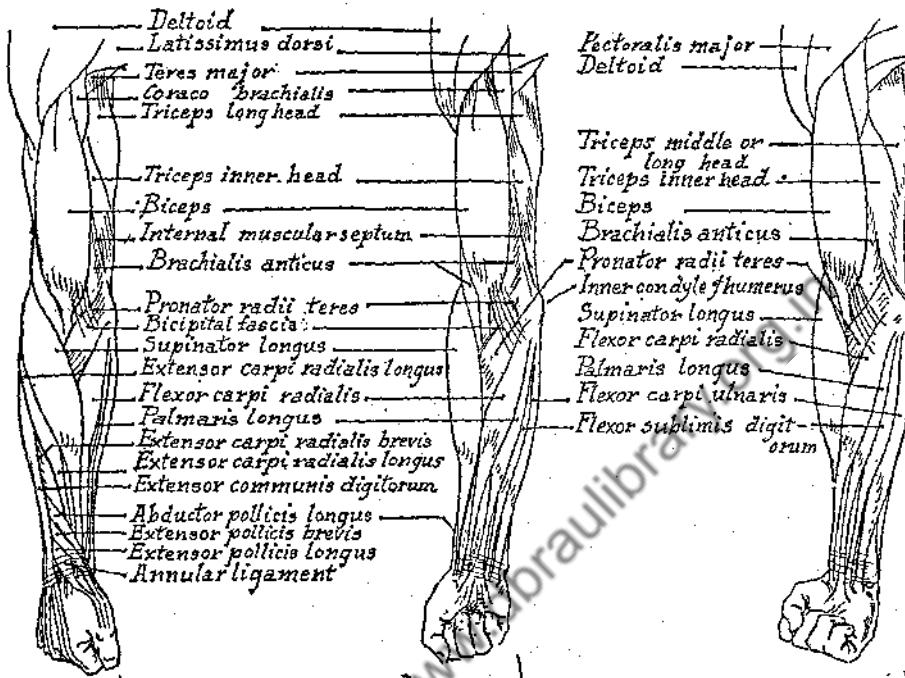


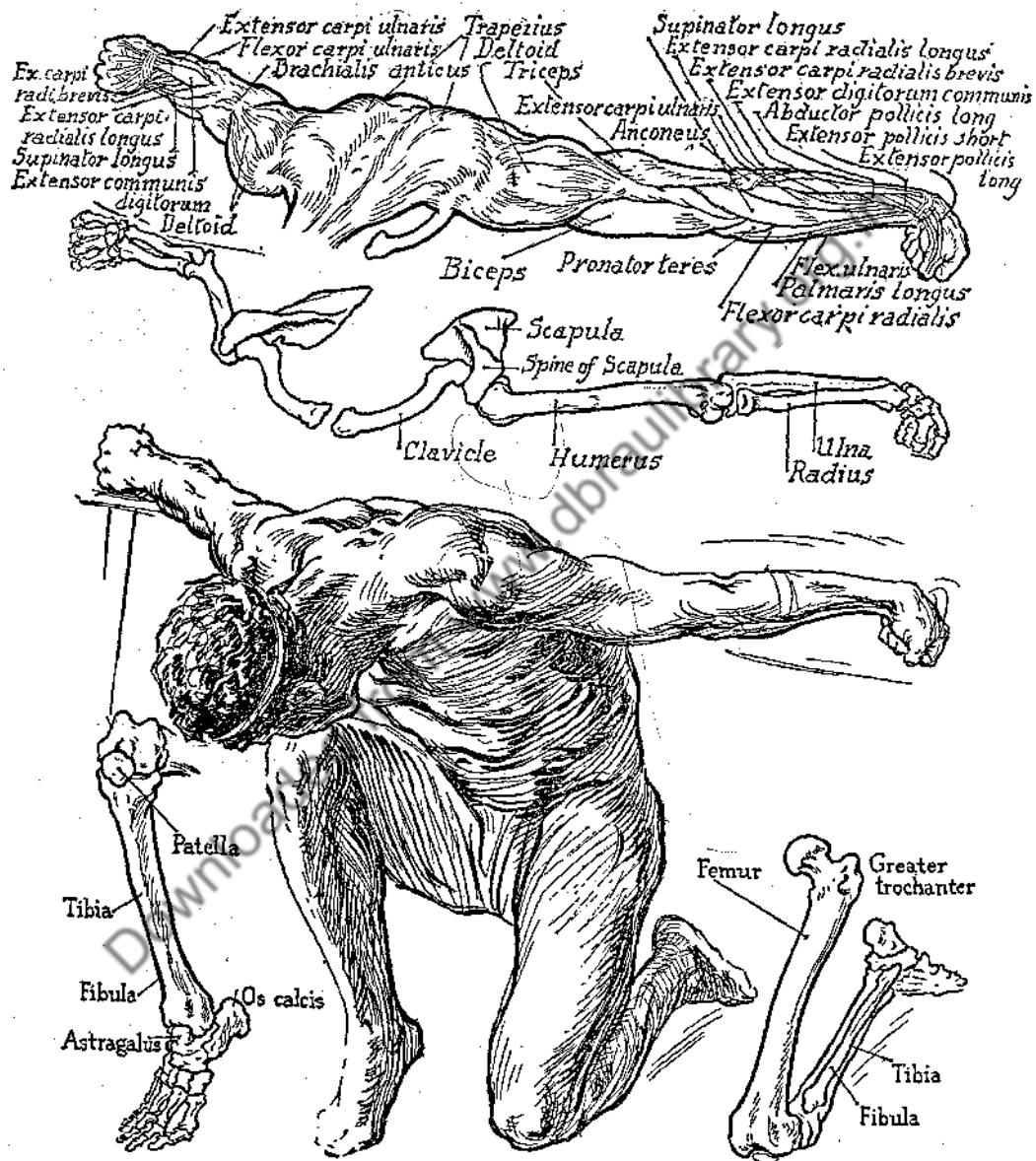


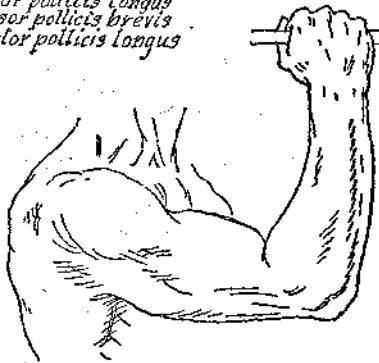
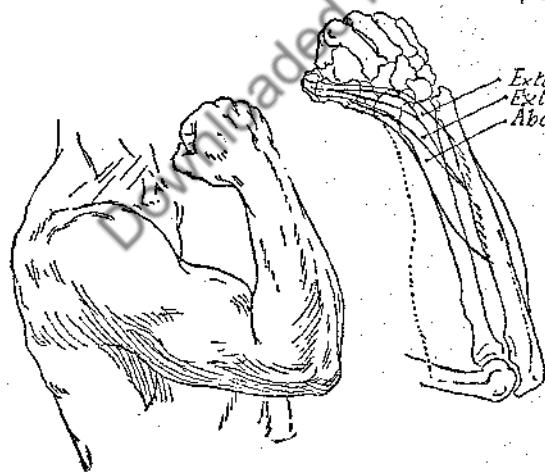
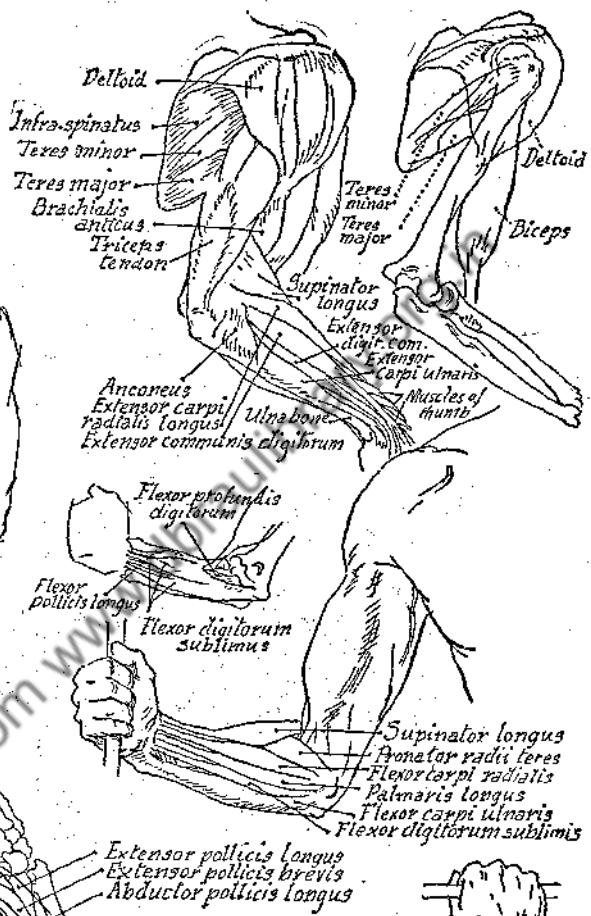
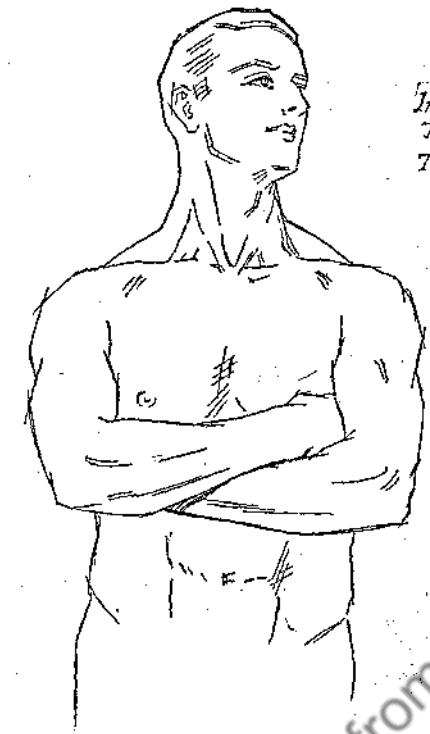
Outer View of Right Arm

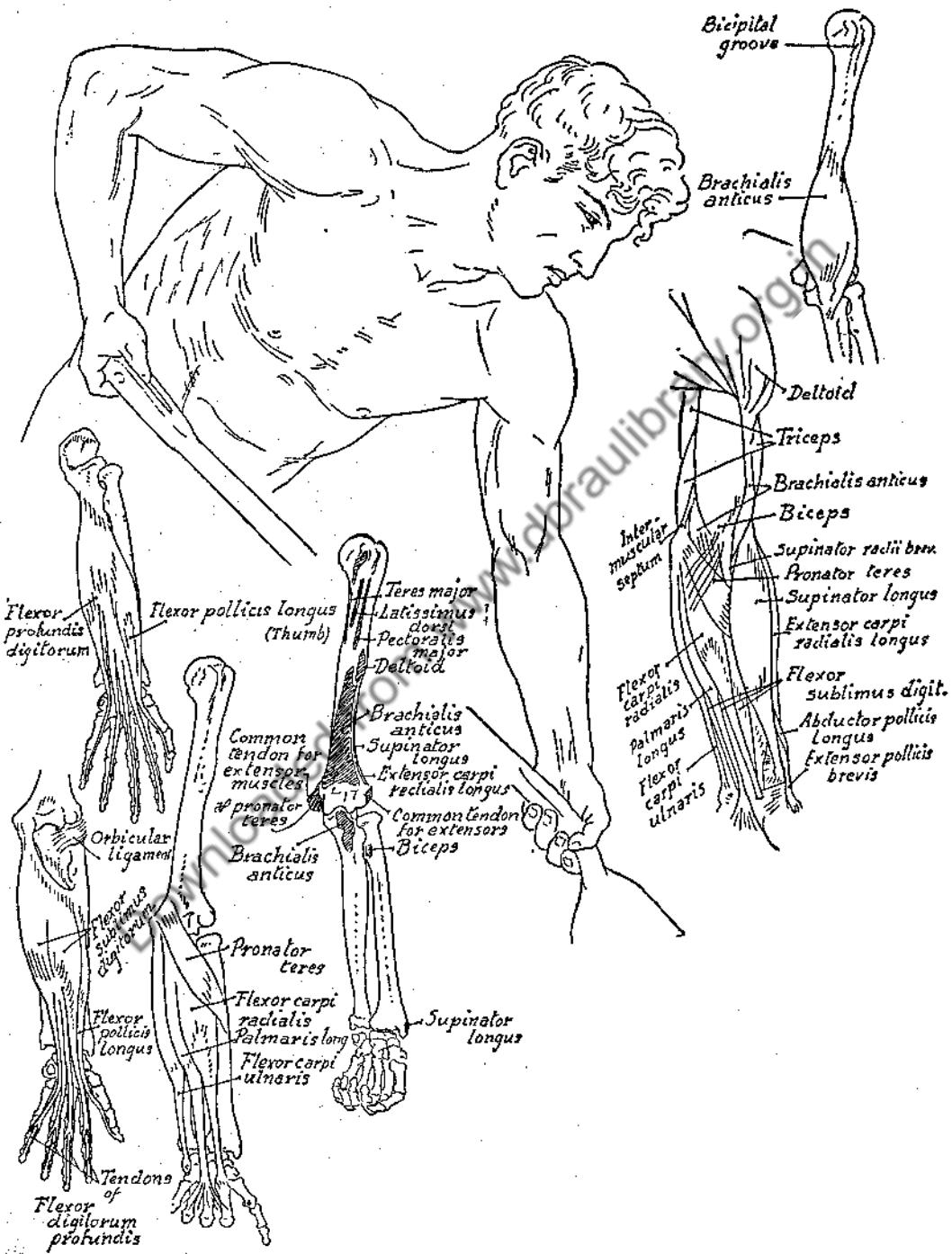


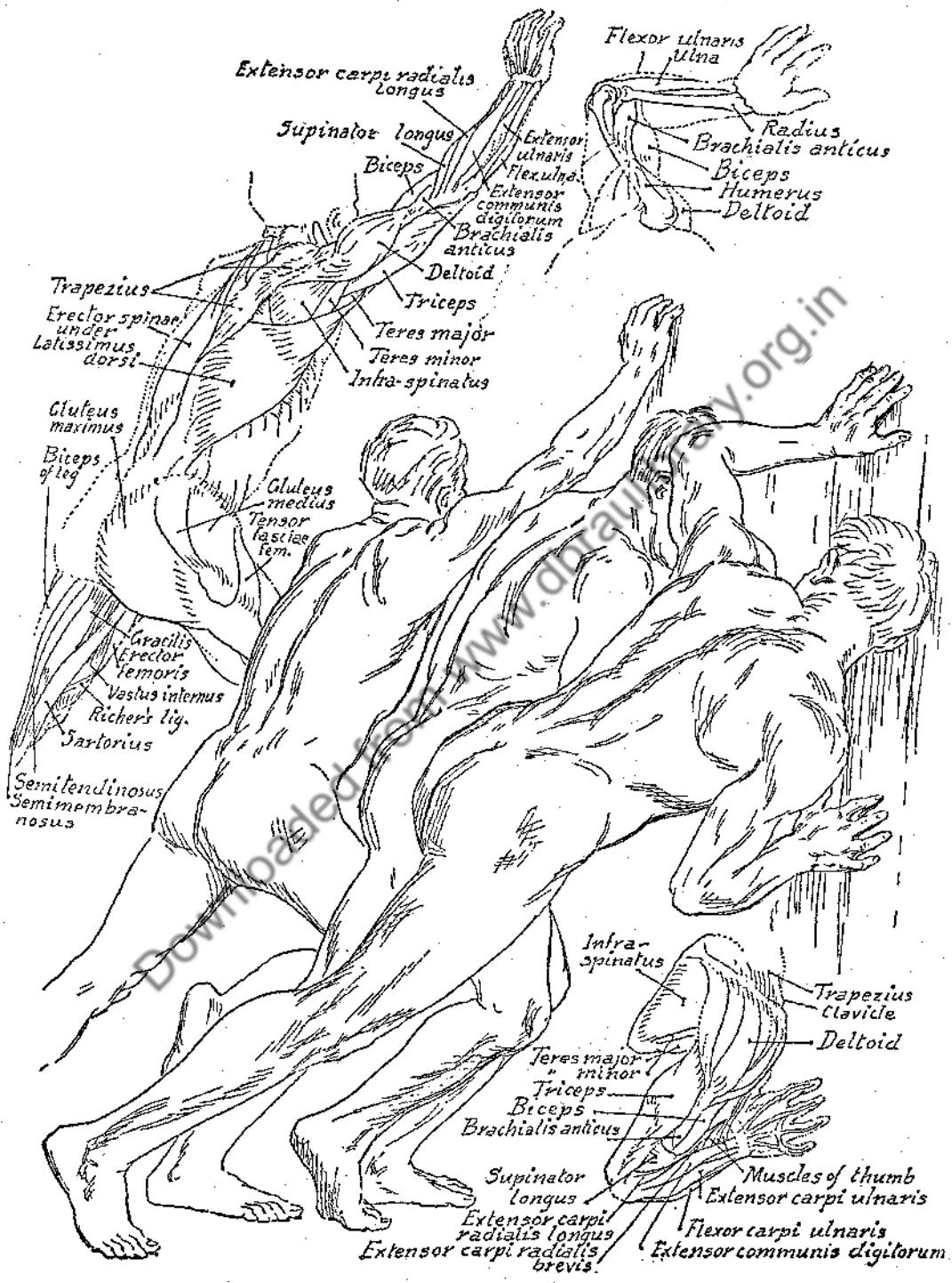
Inner view











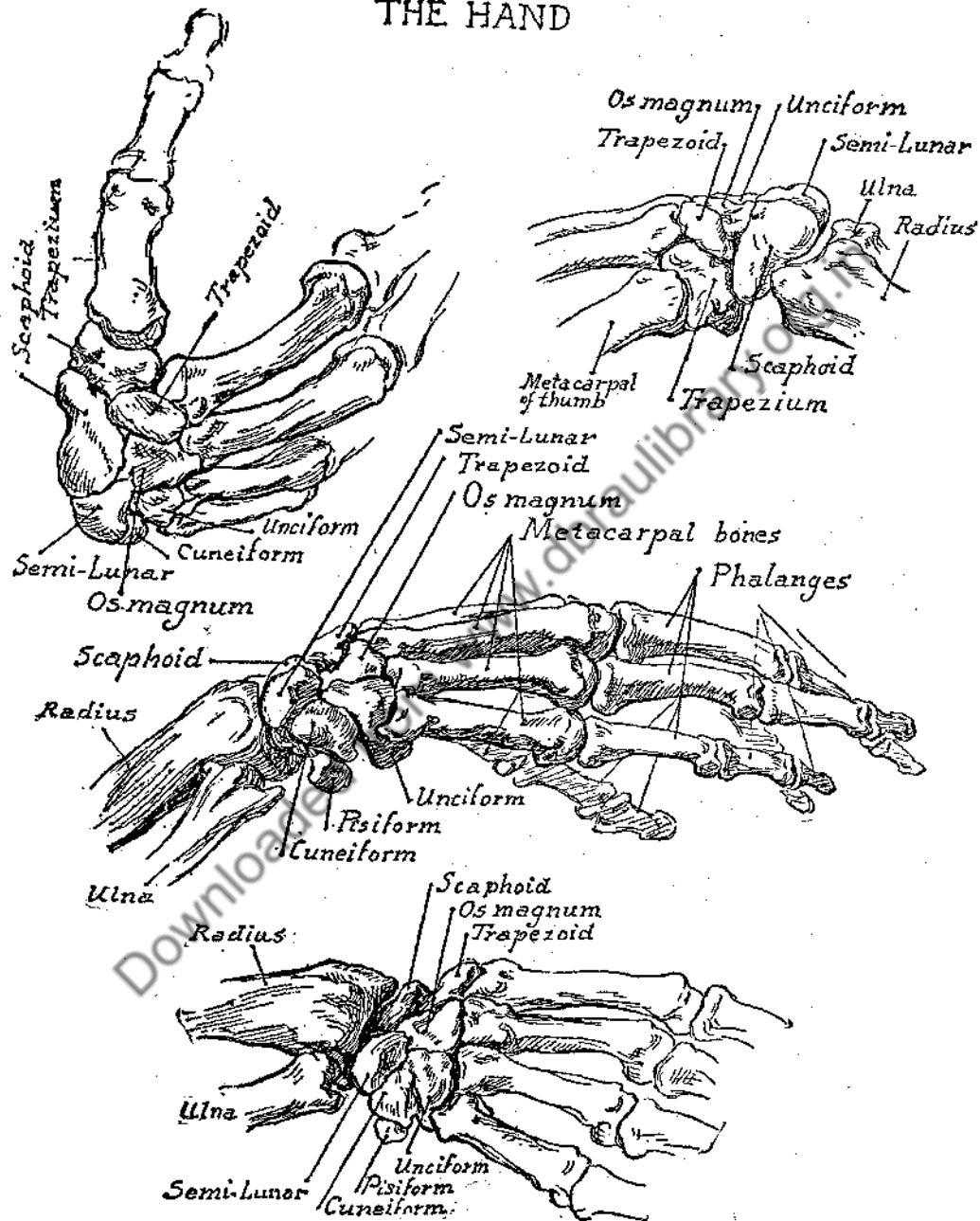


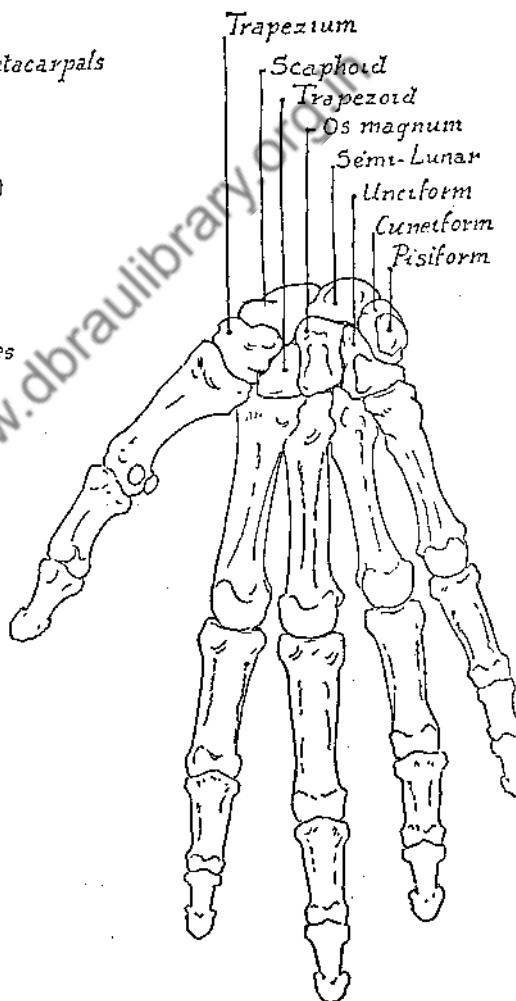
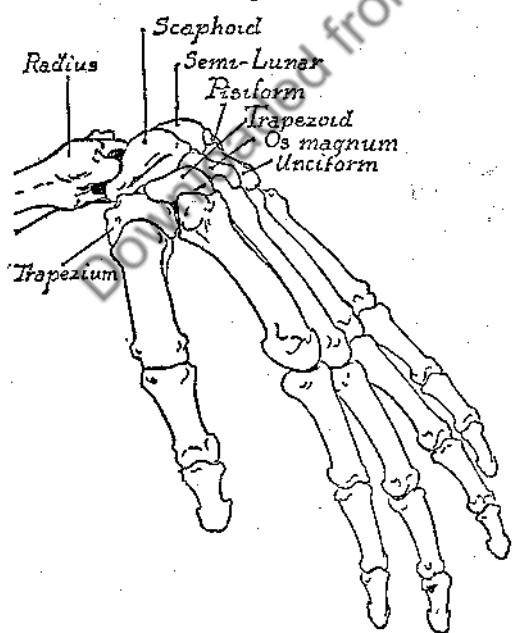
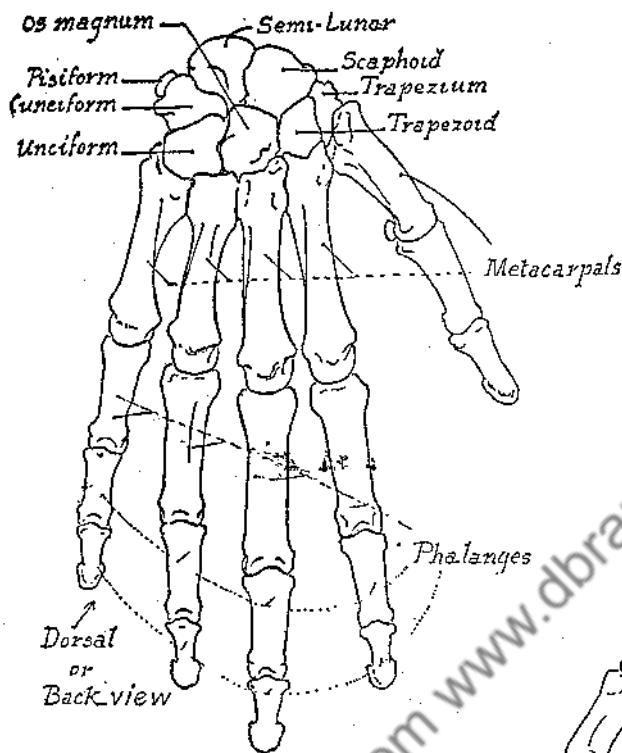
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PART SIX

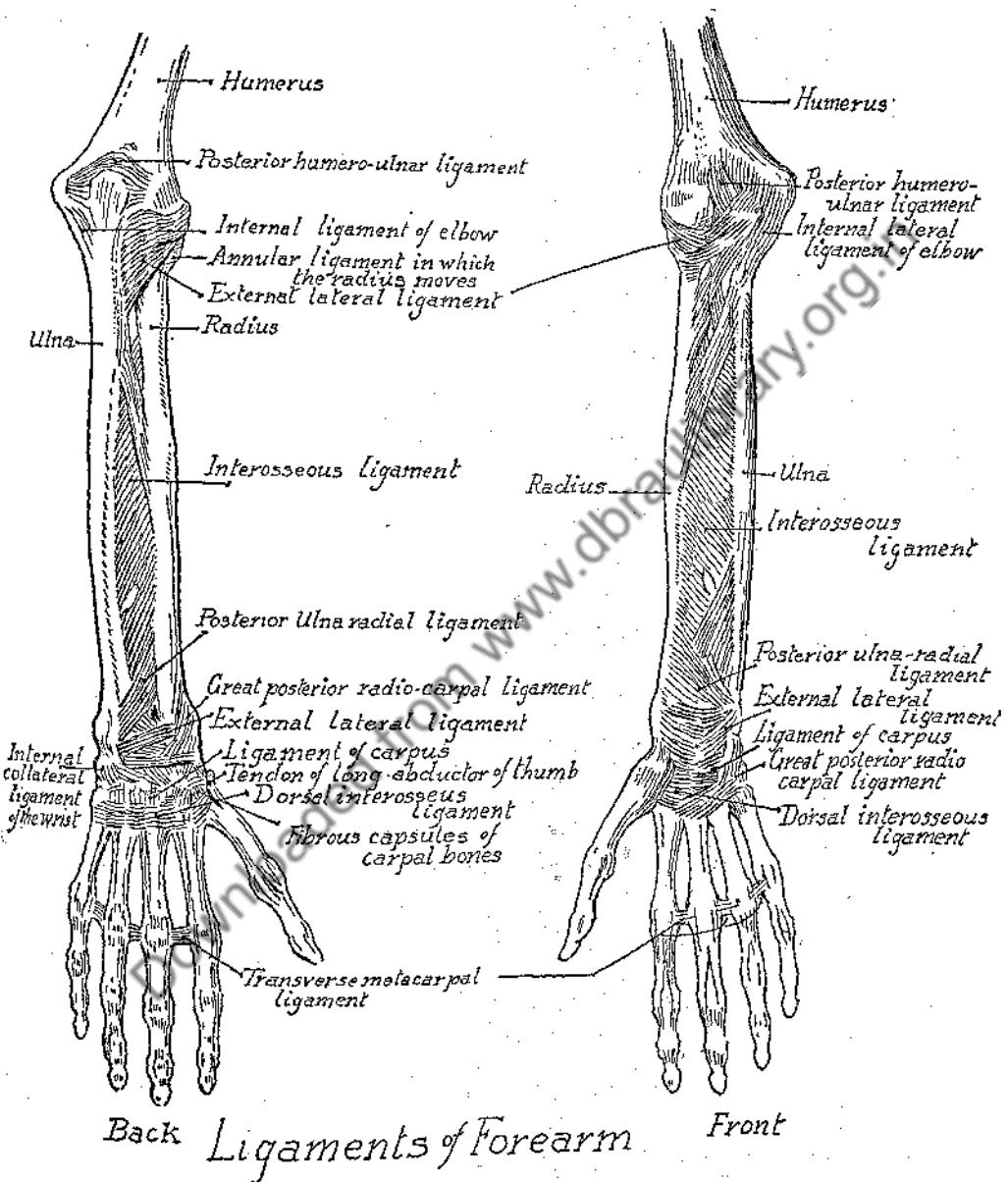
THE HAND

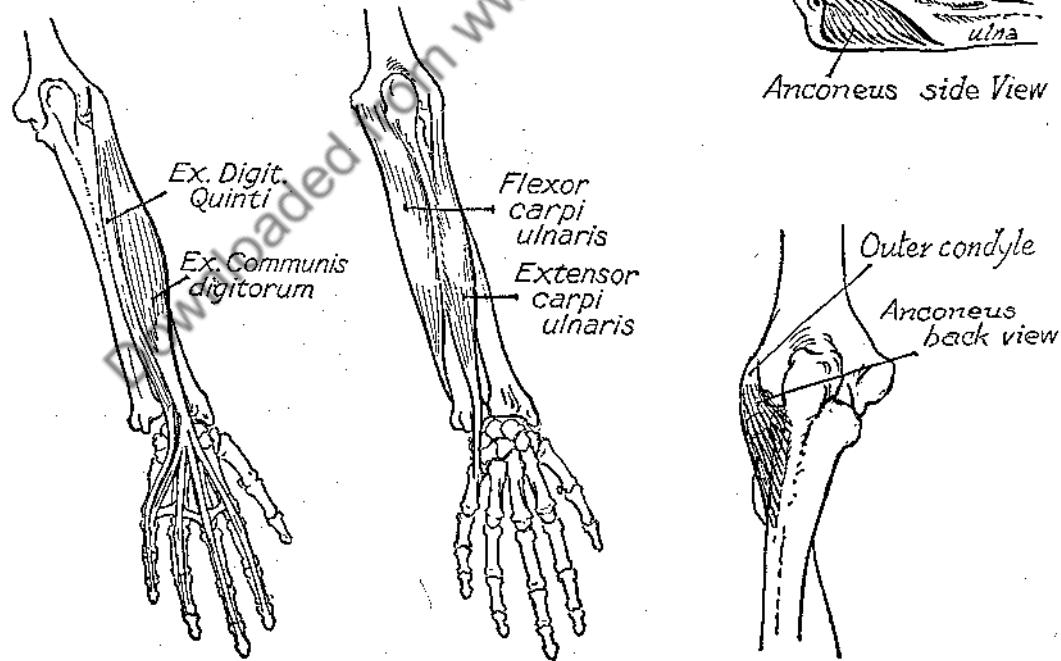
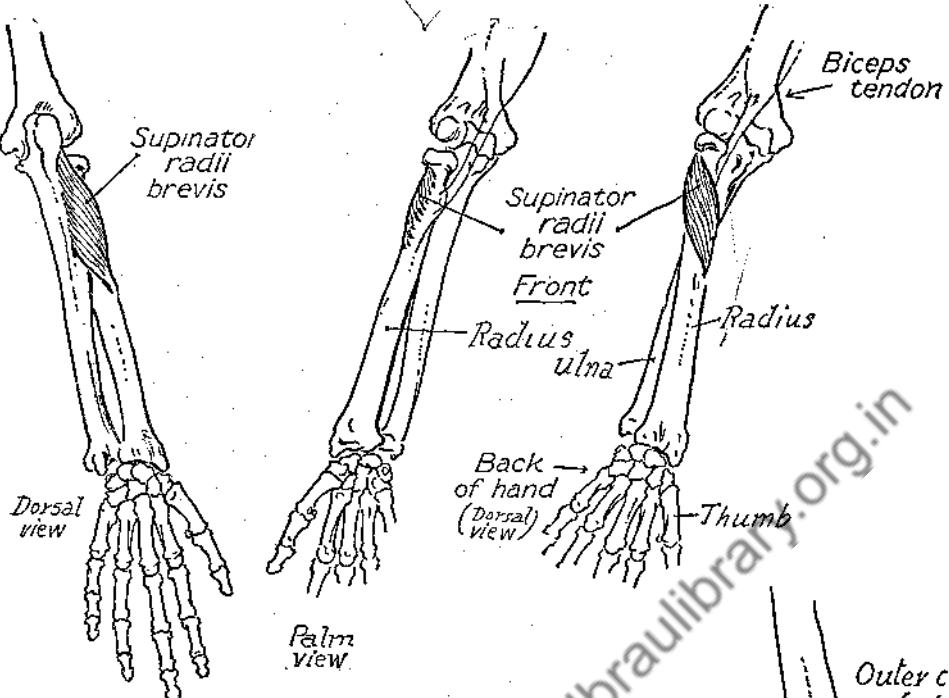
THE HAND

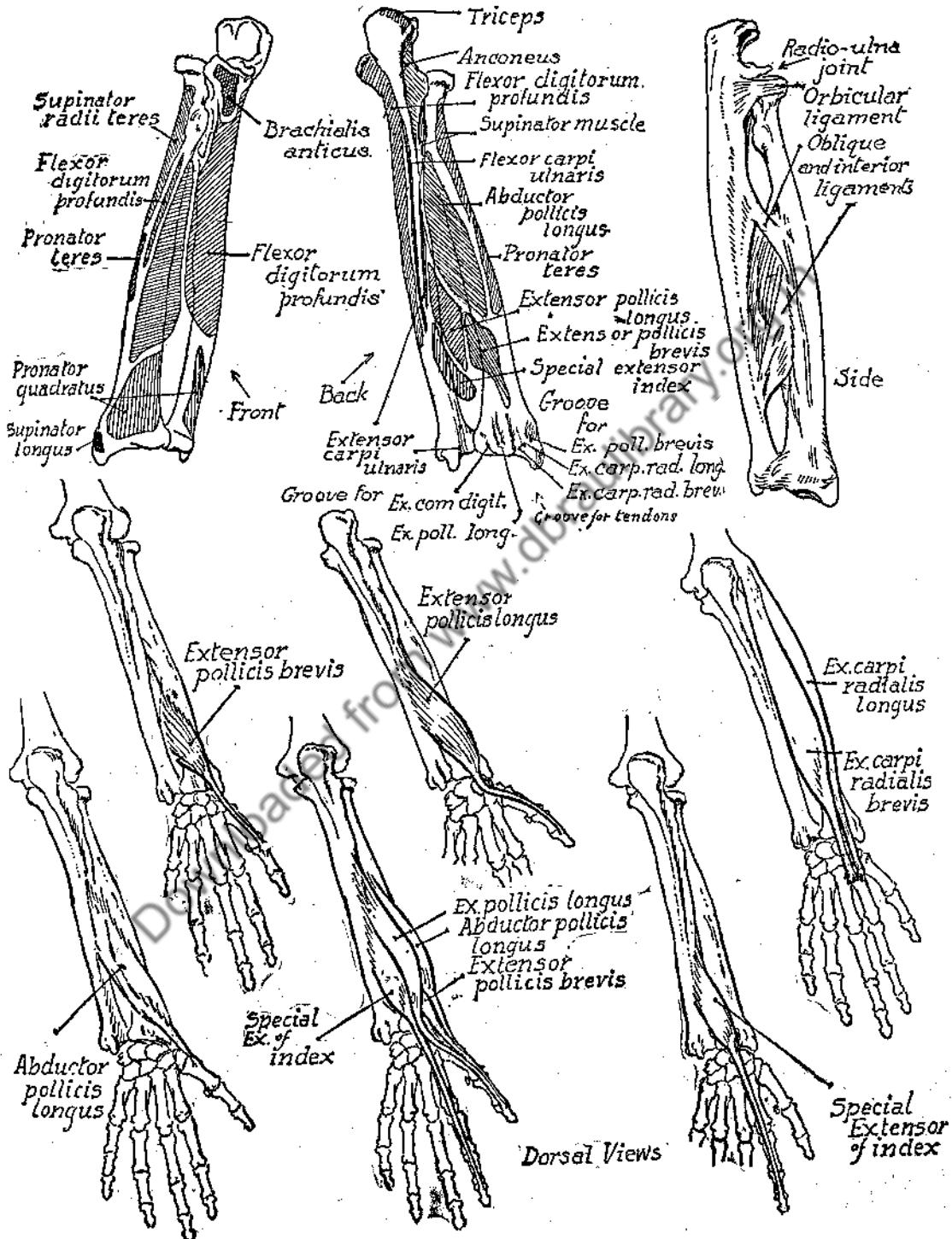


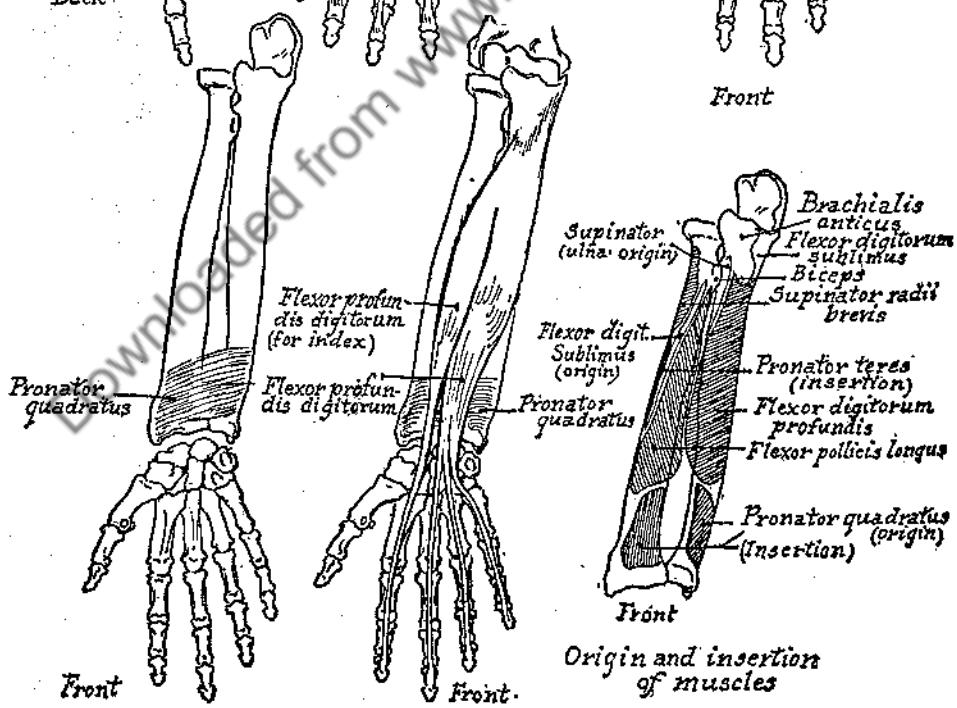
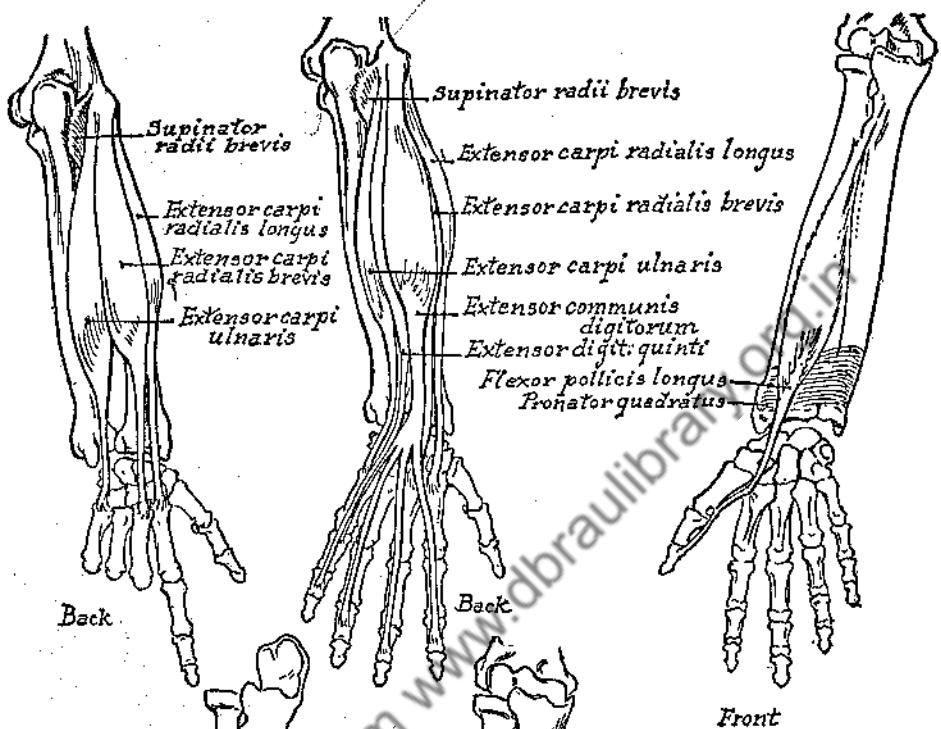


Palm view

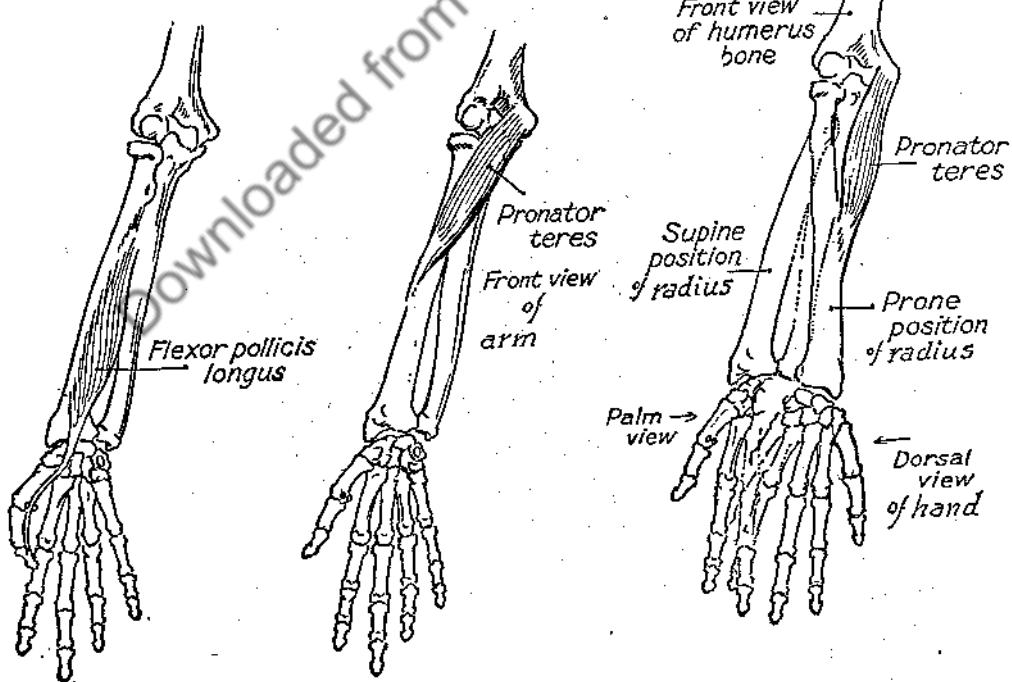
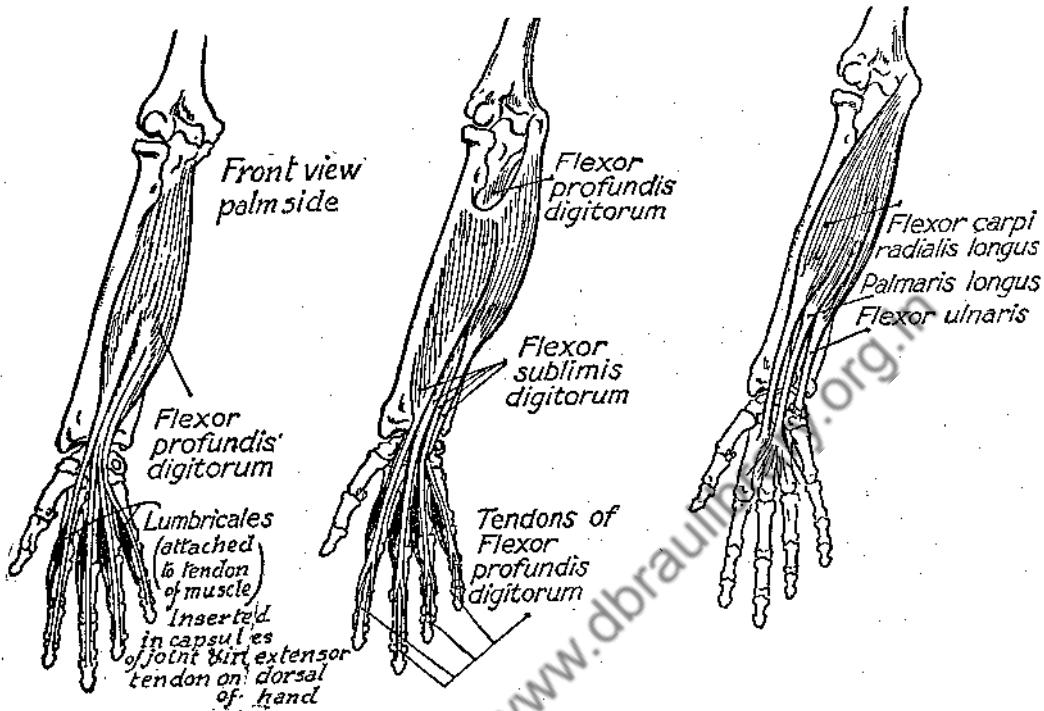


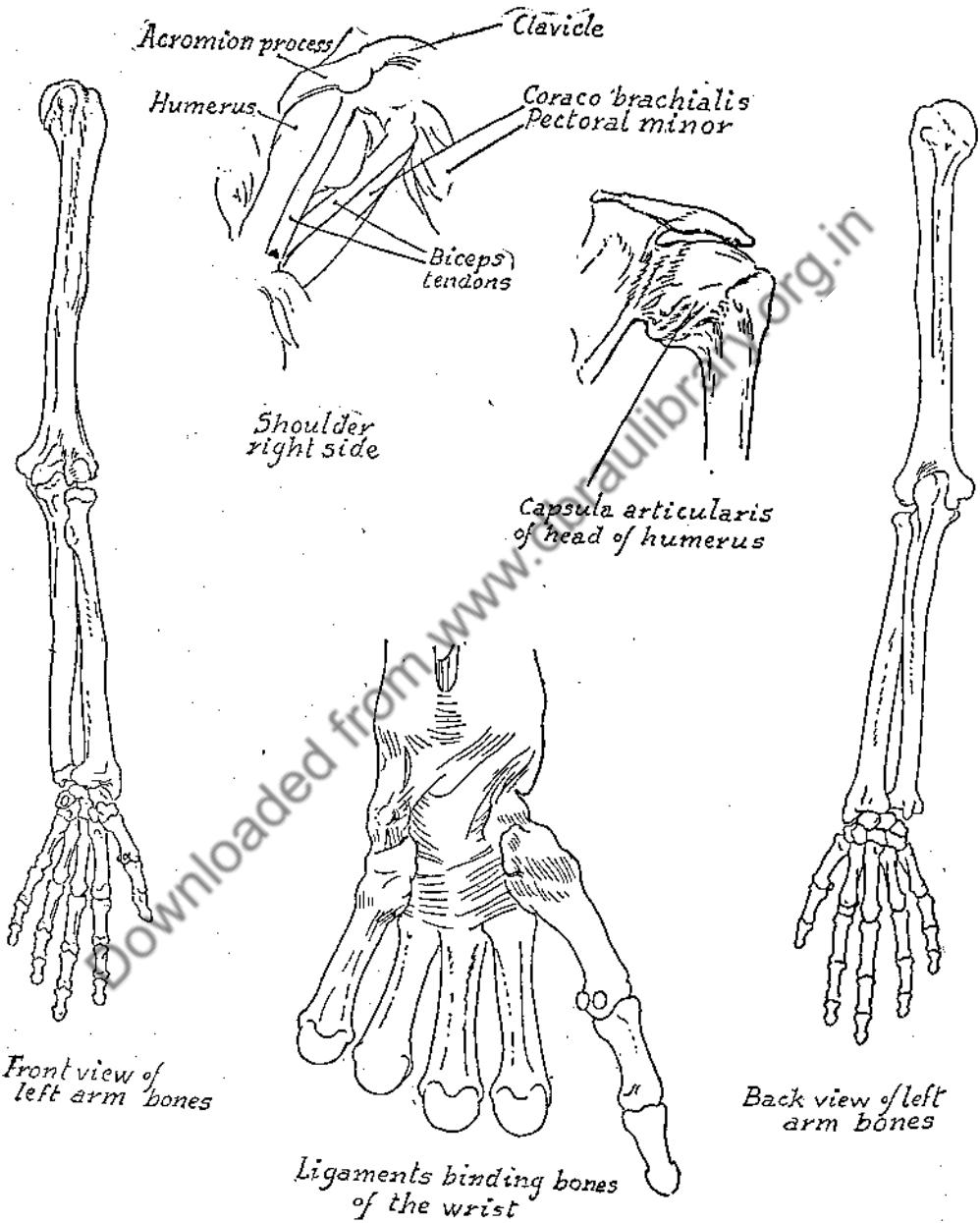


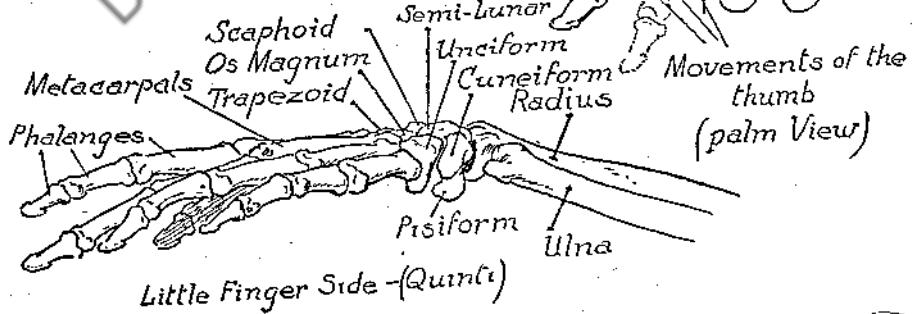
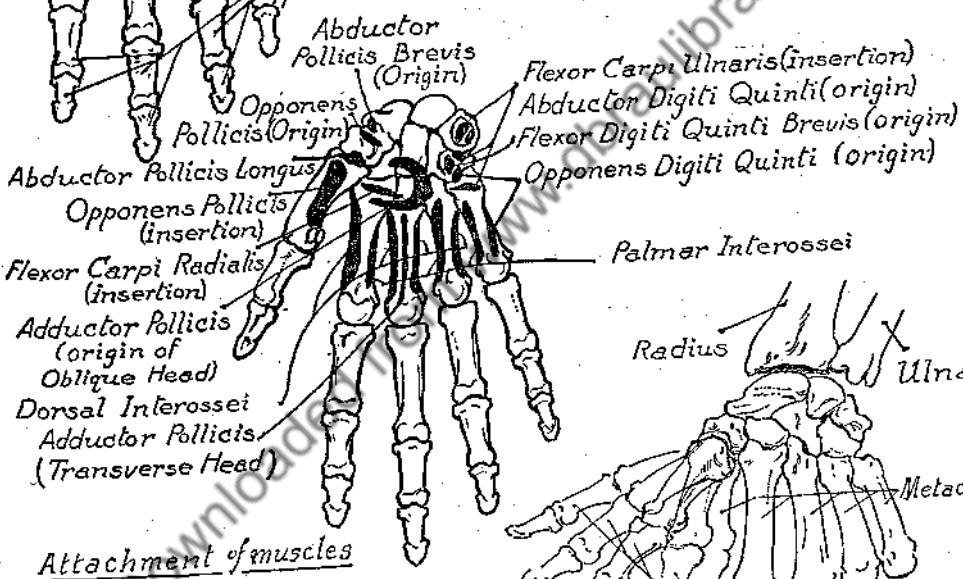
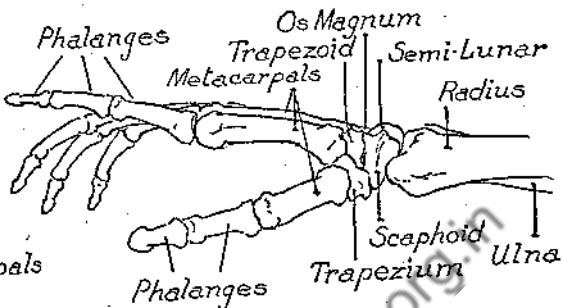
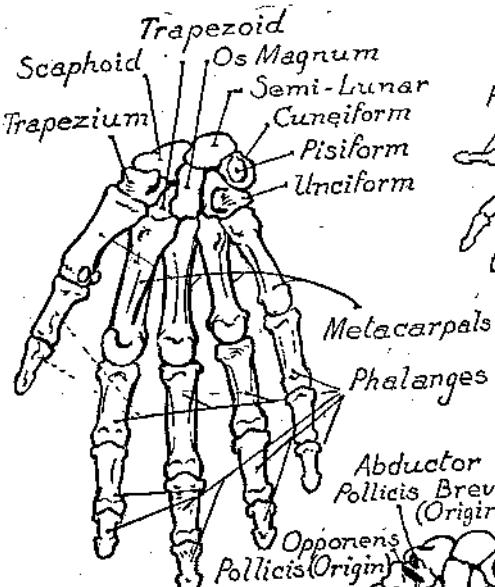




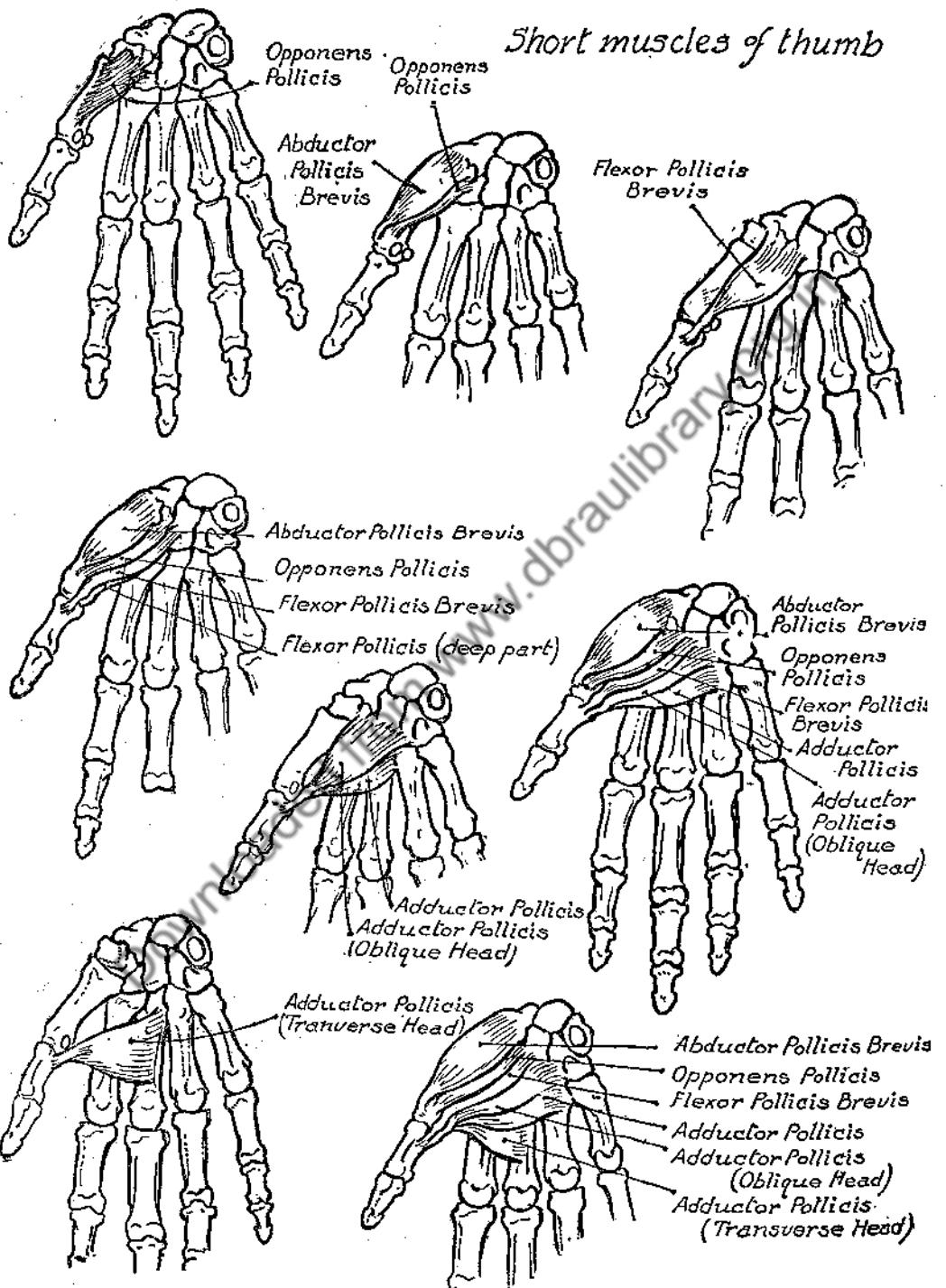
*Origin and insertion
of muscles*

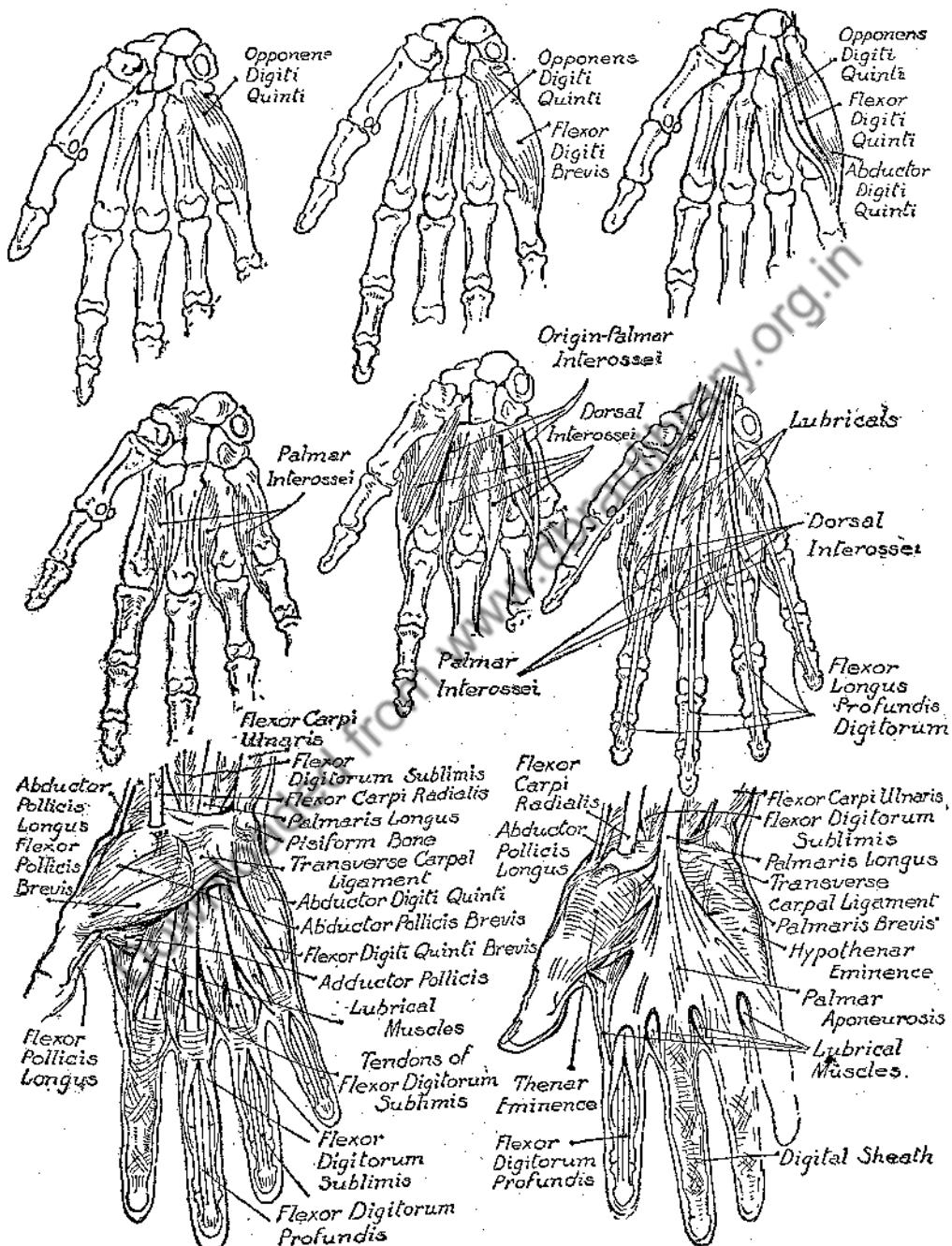


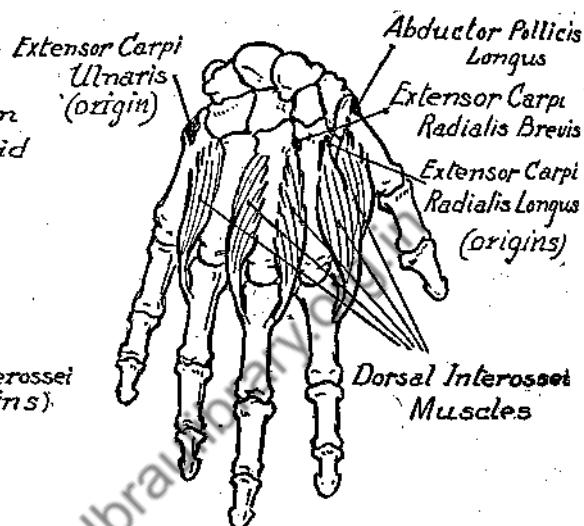
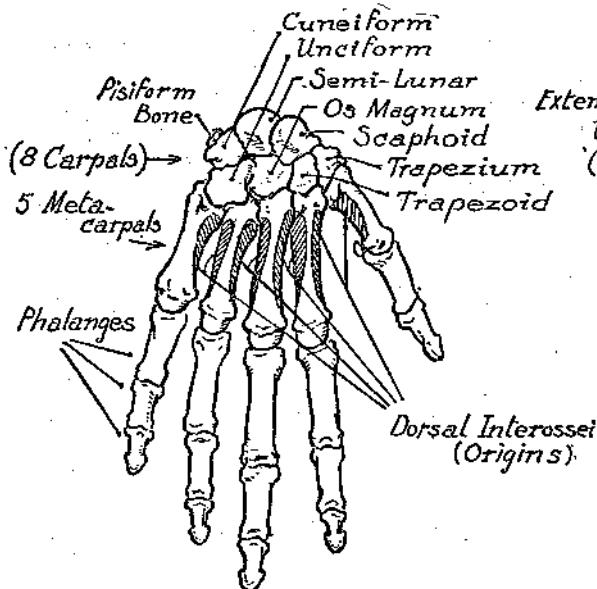




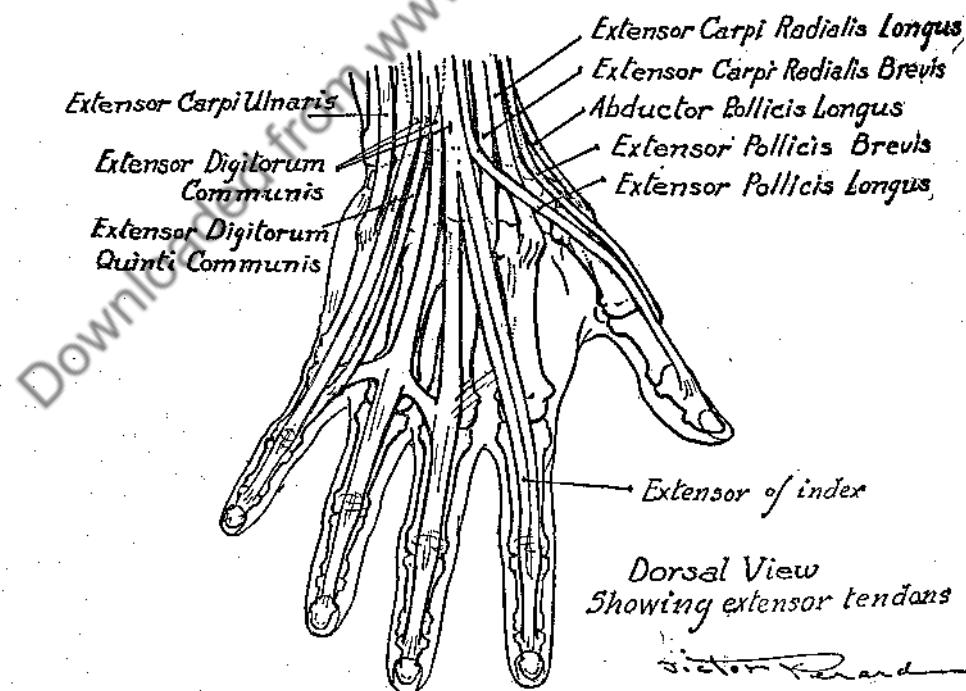
Short muscles of thumb

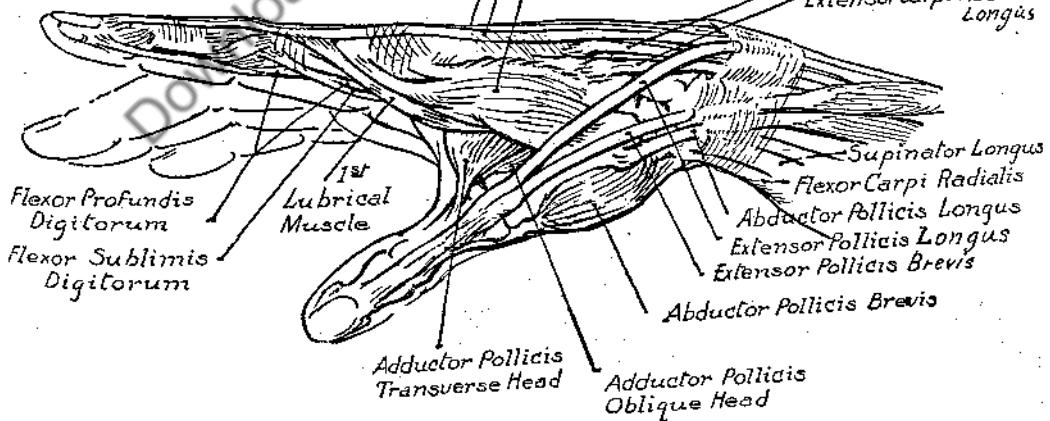
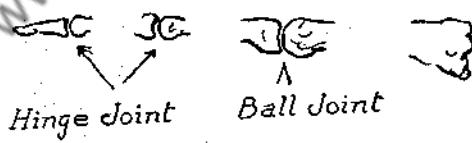
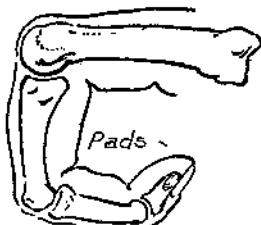
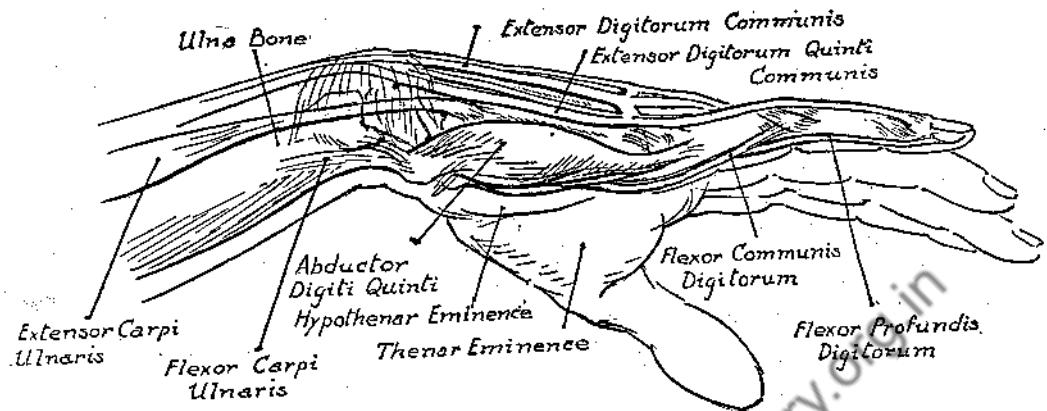


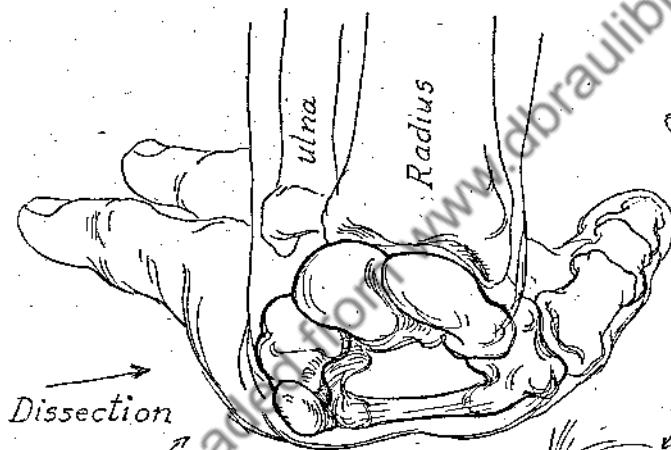




Dorsal View (back)



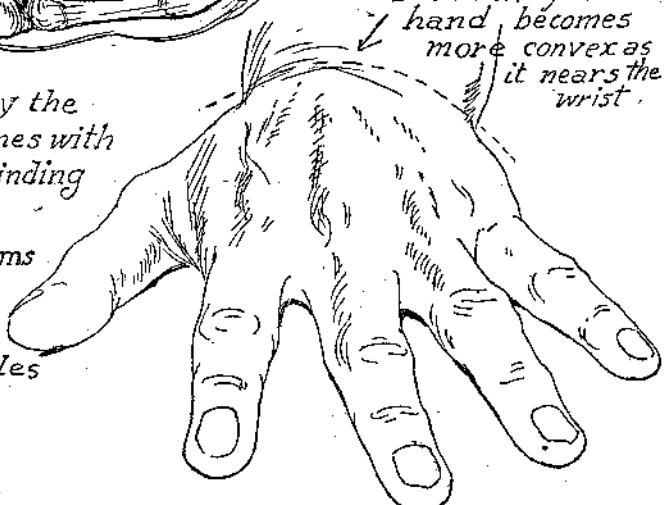




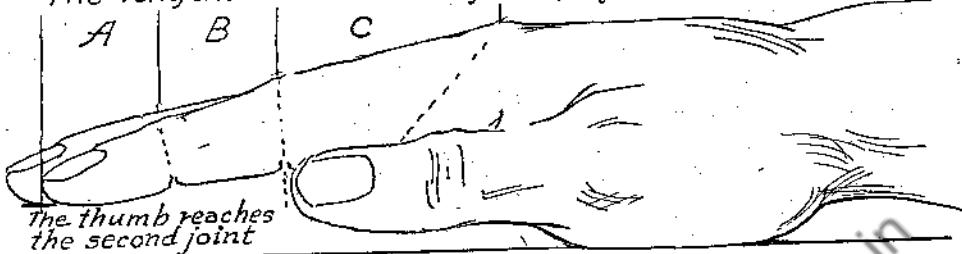
The arch formed by the group of wrist bones with the ligament binding the two hook like processes. This forms a canal through which the tendons of the flexor muscles pass.

*Flexor tendons
passing under the
arch of the wrist
bones.*

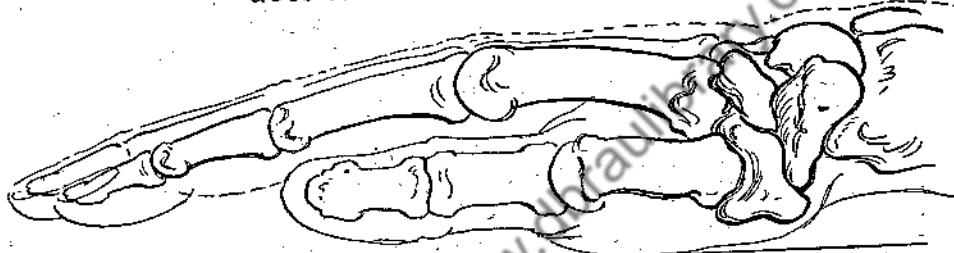
The back of the hand becomes more convex as it nears the wrist.



The lengths of A and B together, equal the length of C



When the hand is resting on a flat surface, the wrist does not come in contact with that surface.

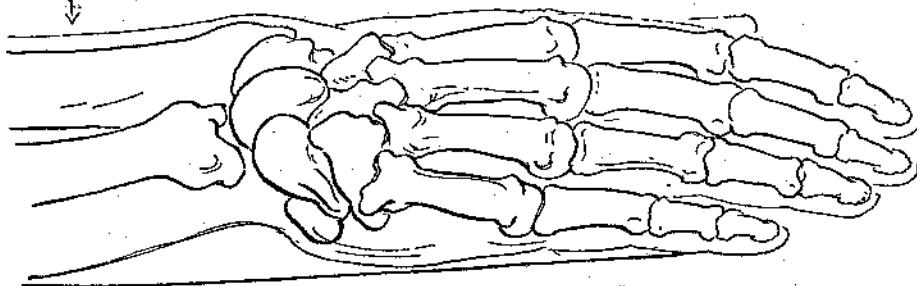


The wrist bones are grouped far into the wrist forming the arch of the wrist.

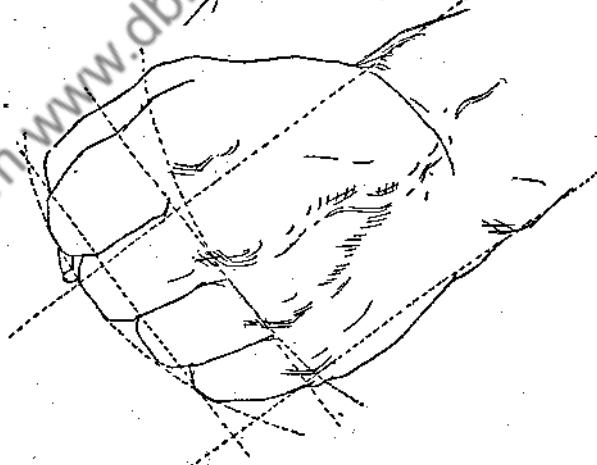
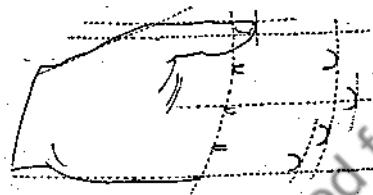
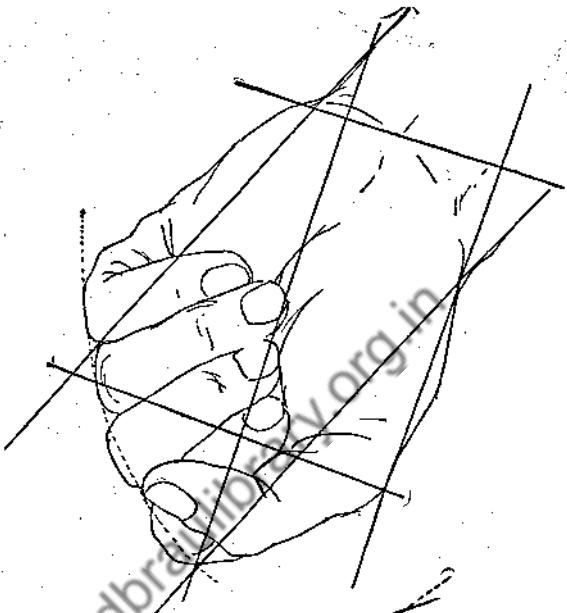
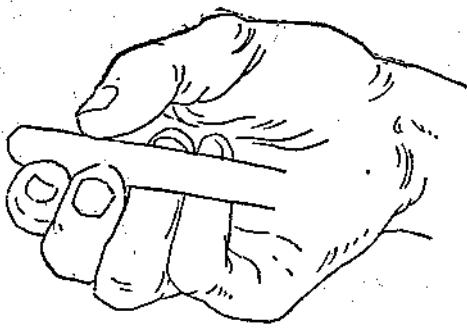


Woman's hand

Relative positions of the bones from the little finger side
when the hand is resting on a flat surface.

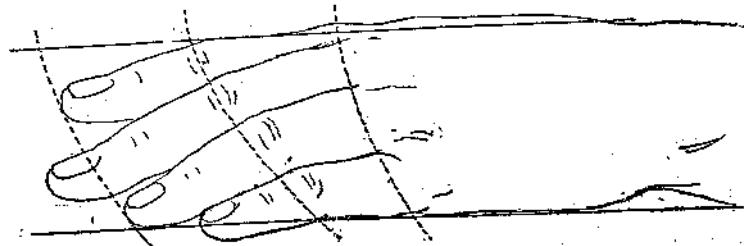


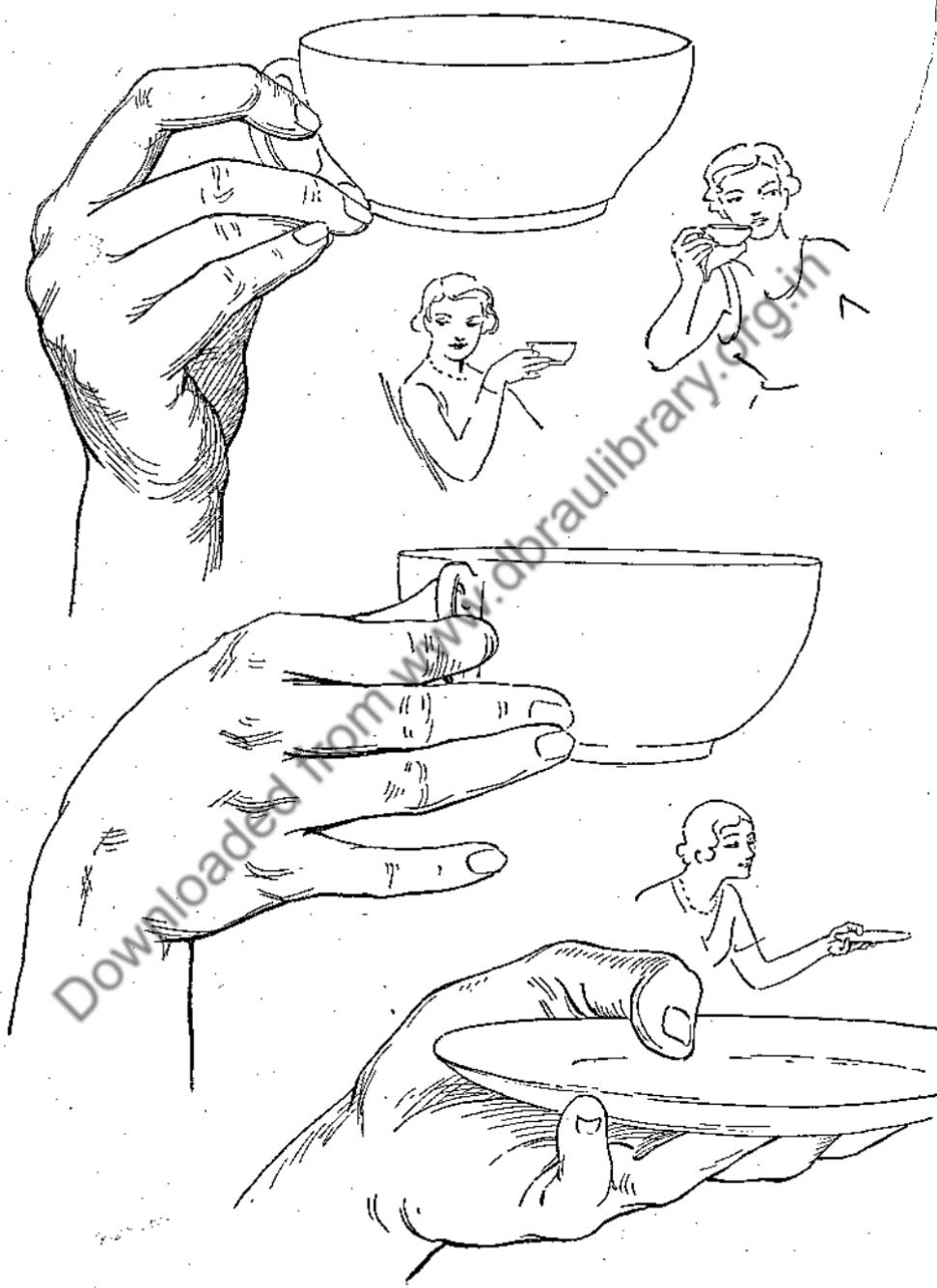
*Studies of
hands.
Method of
blocking*



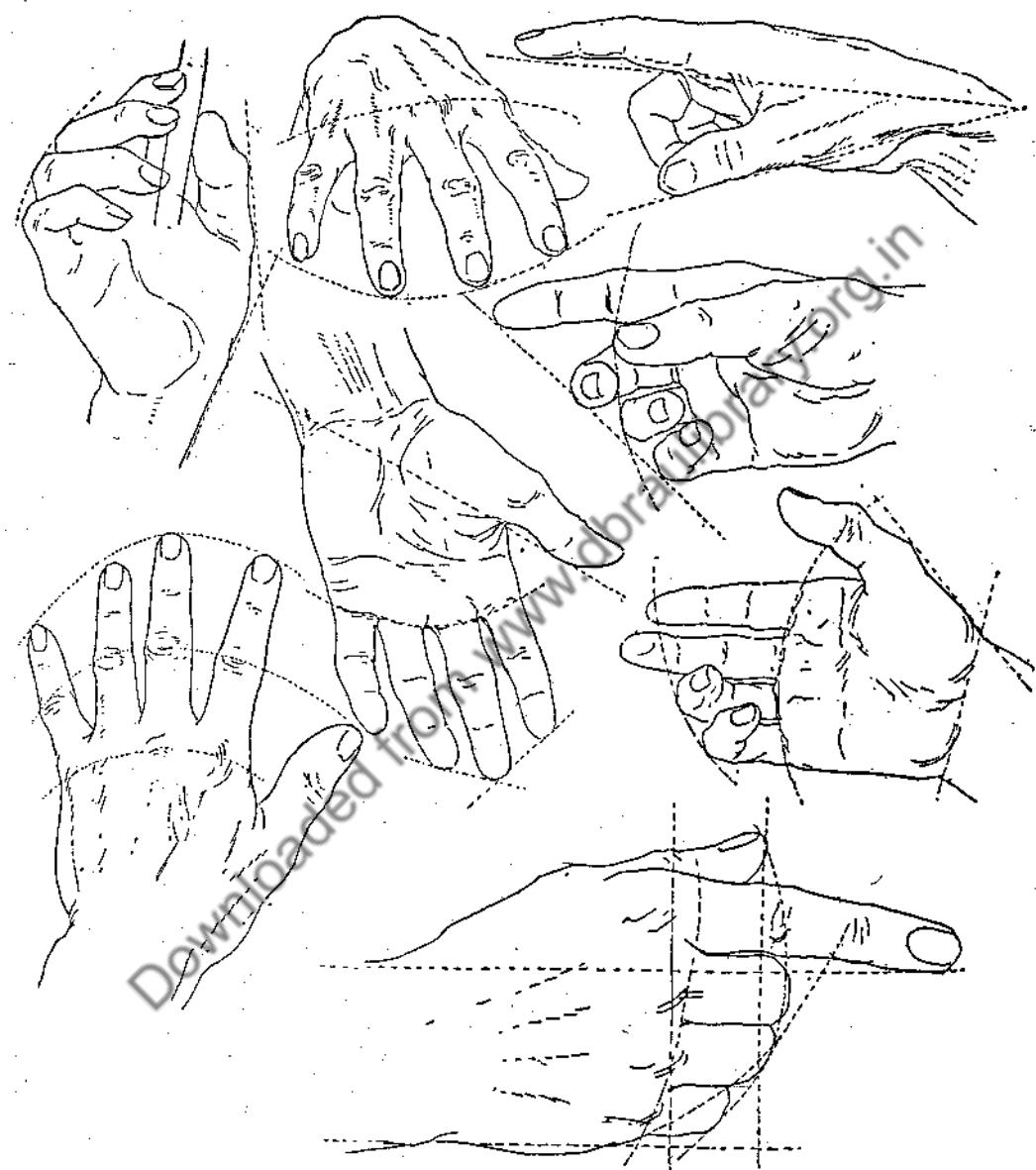
Showing the use of imaginary lines
to obtain proportion

Disha Pandey

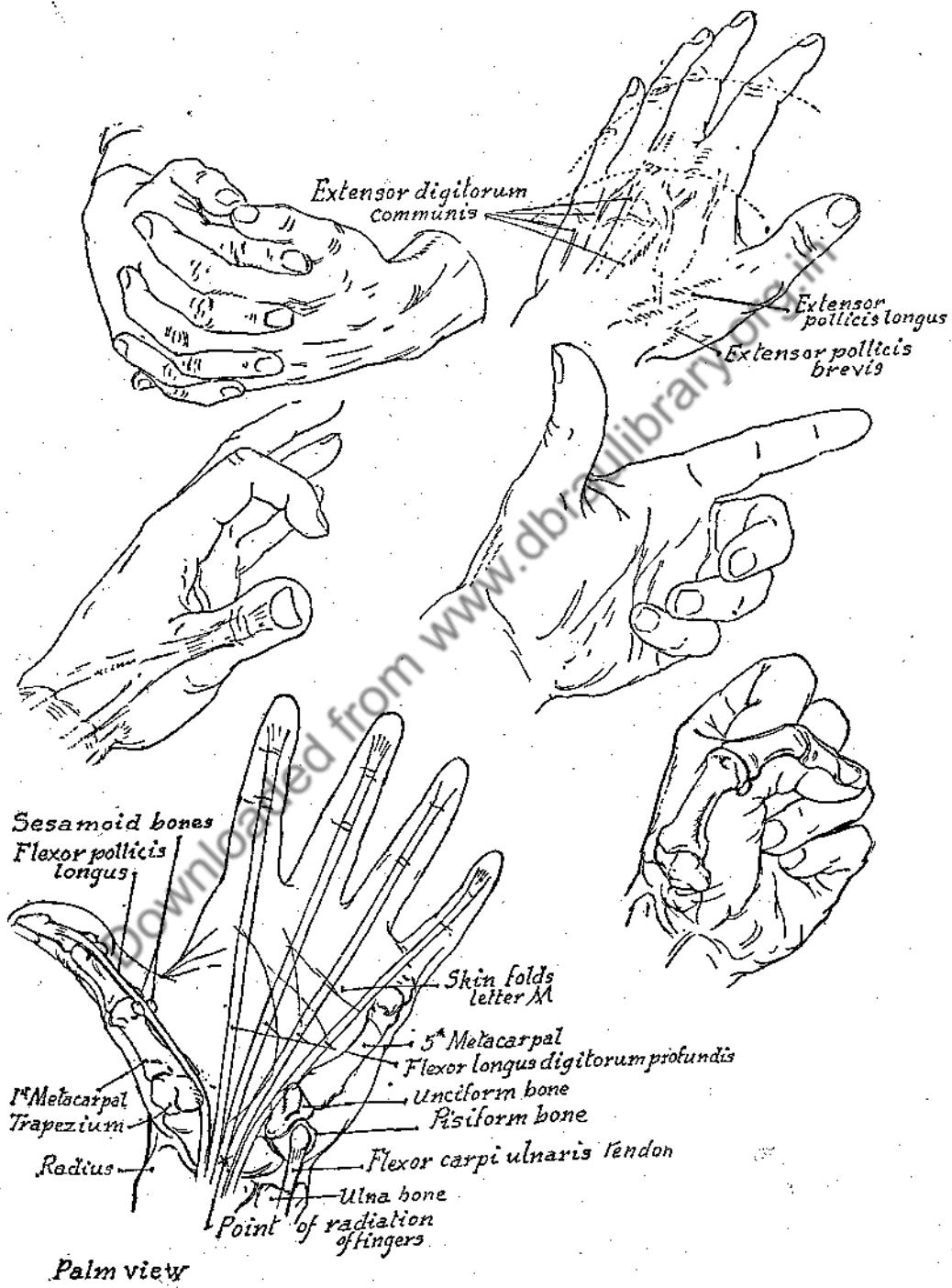


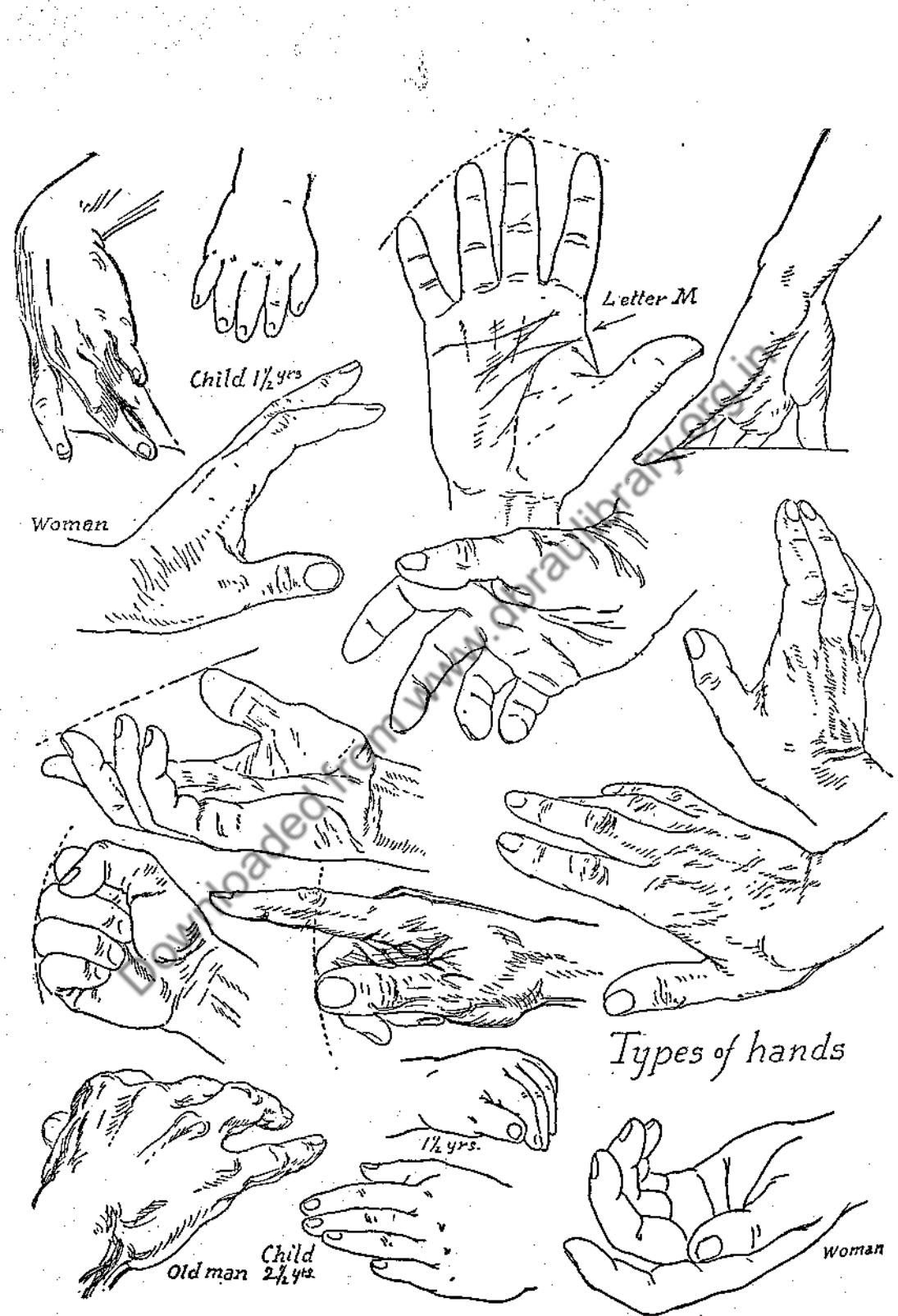


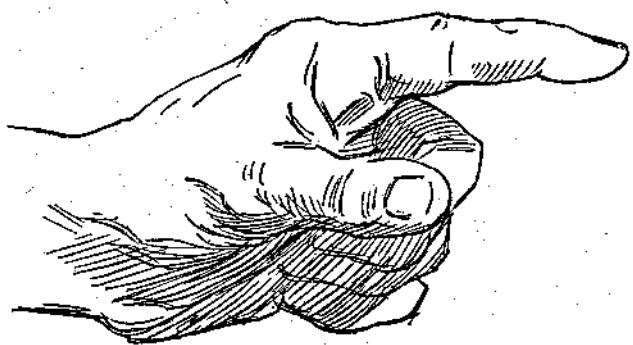
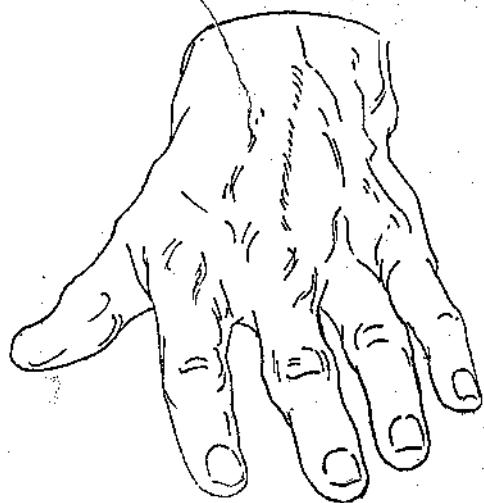


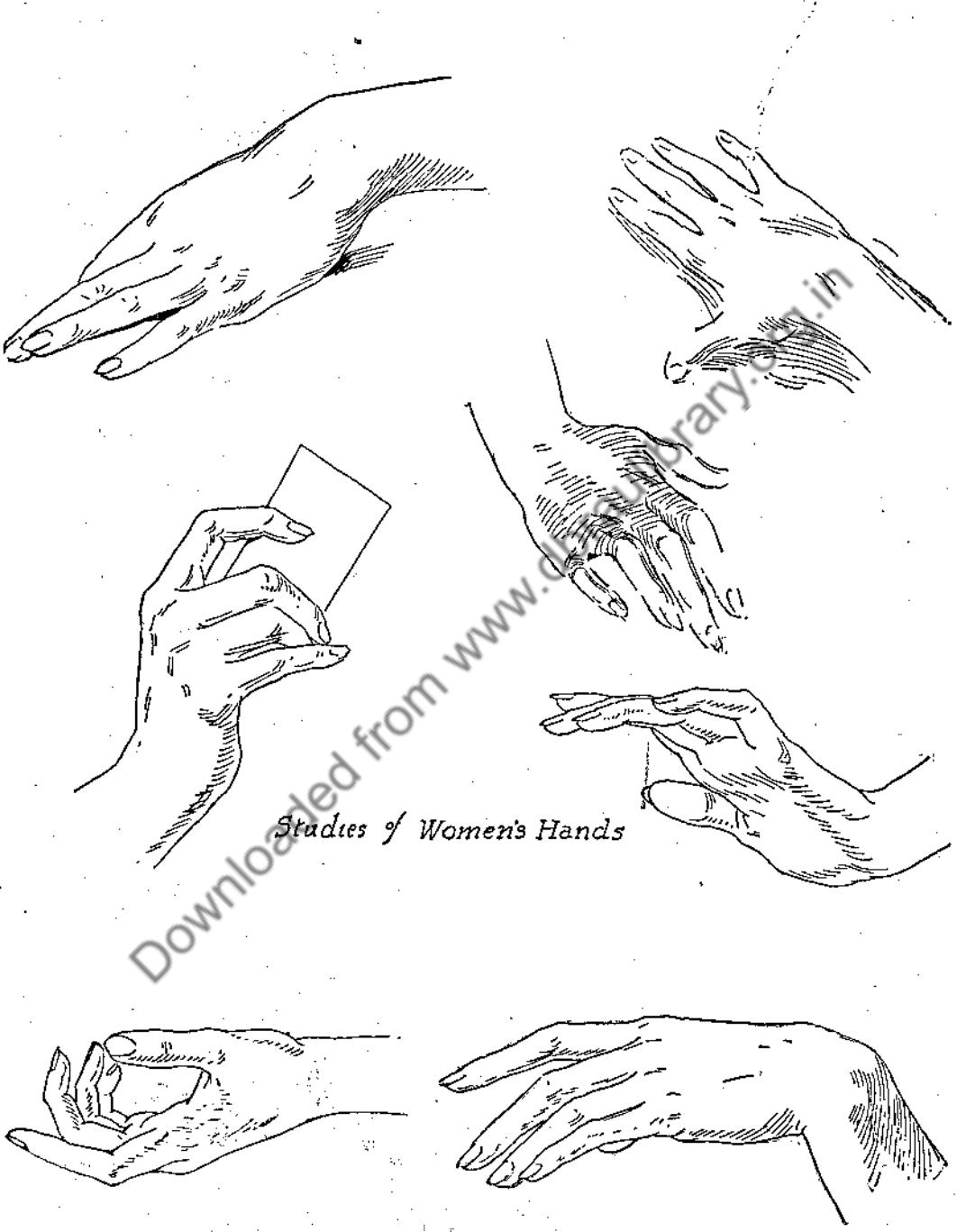


*Studies of hands with use of imaginary lines
for proportion.*





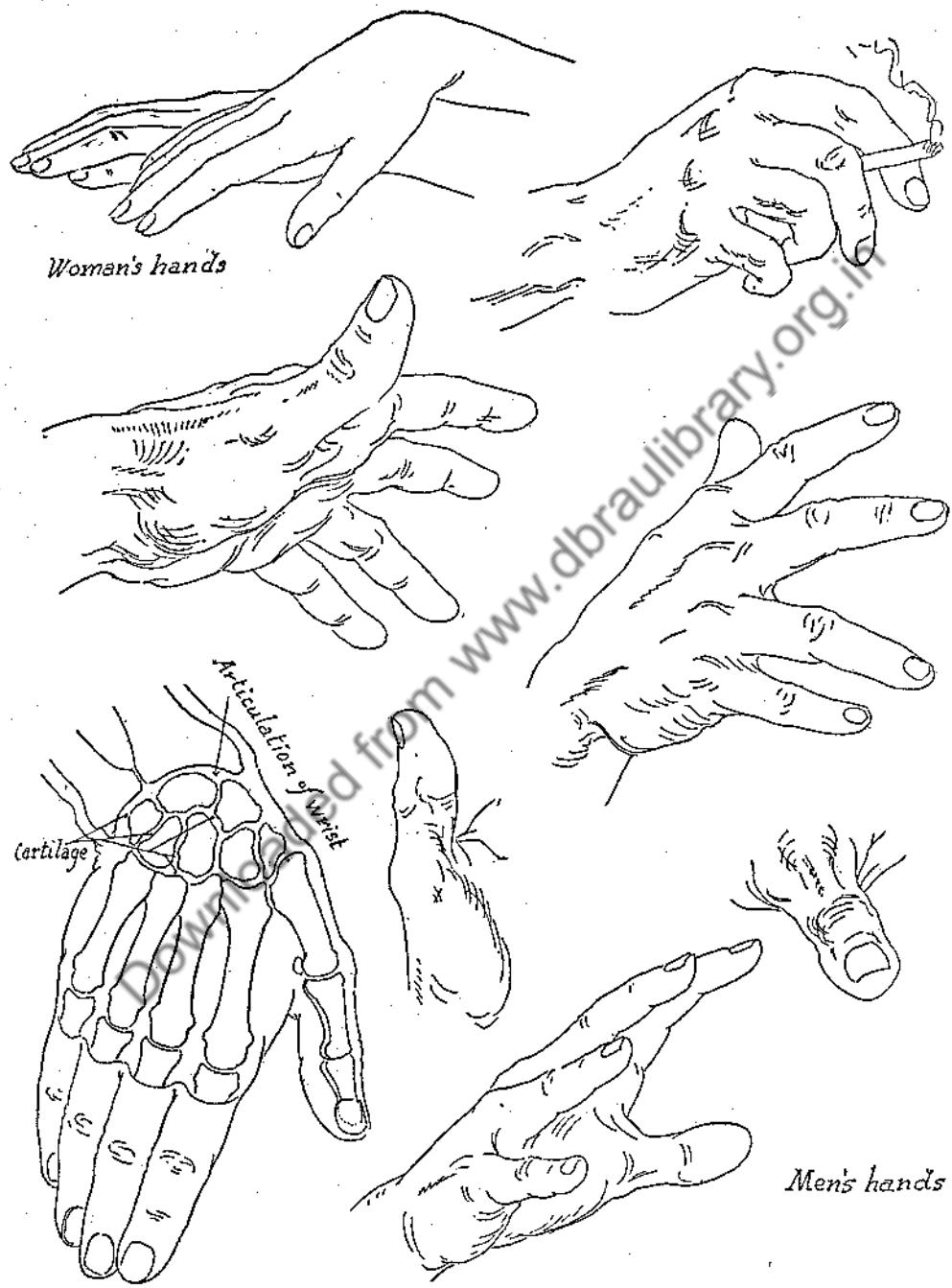


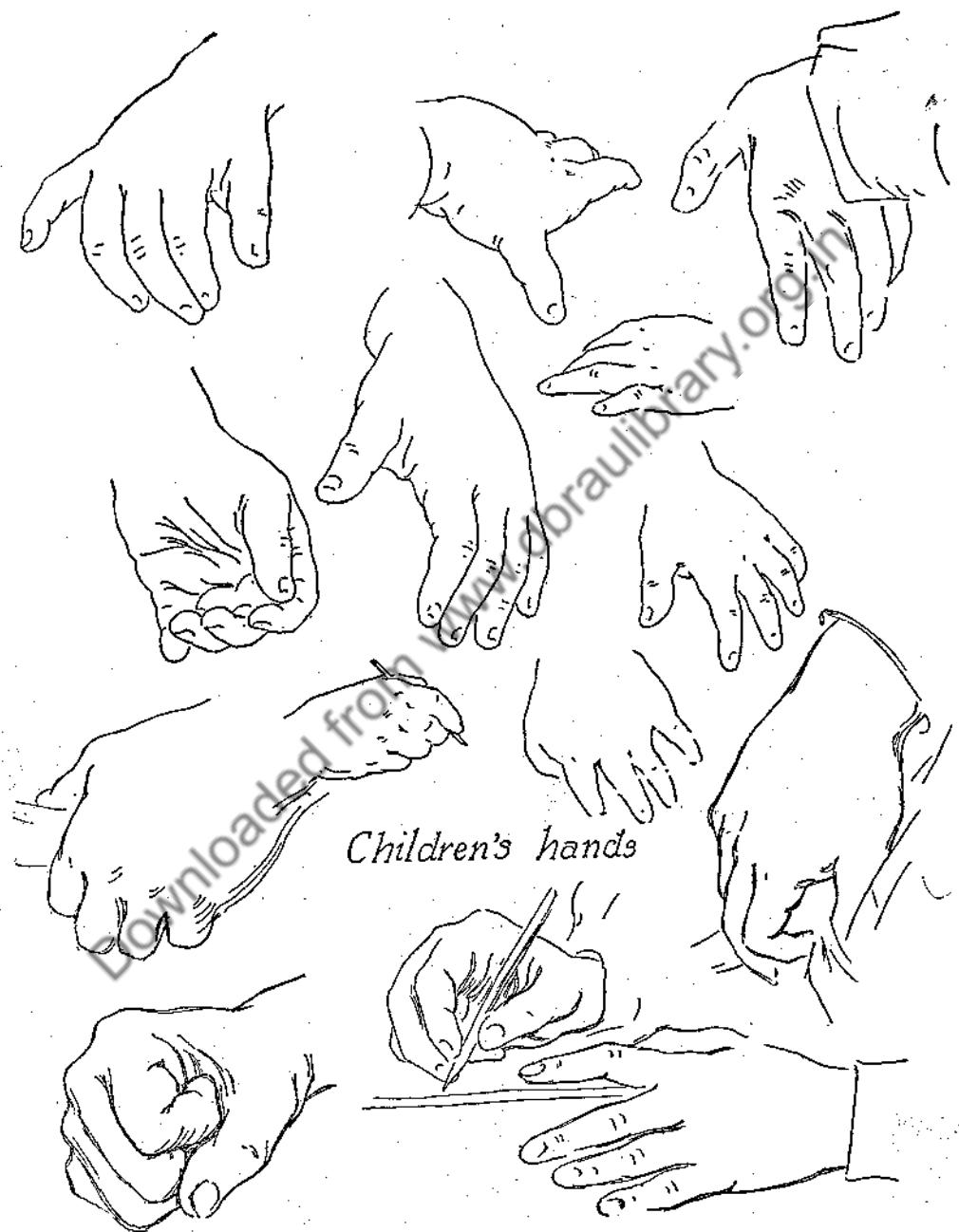




Women's hands

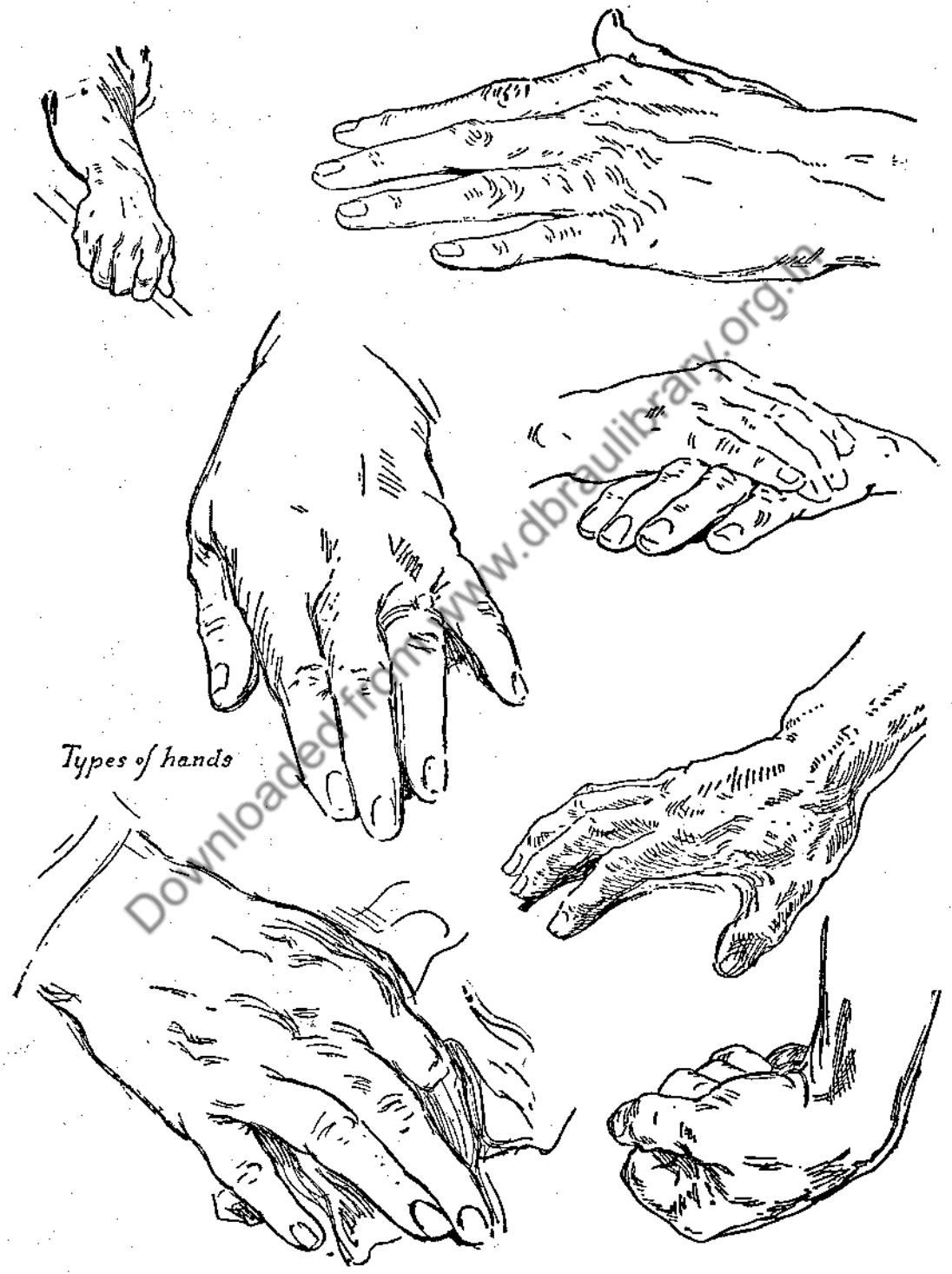
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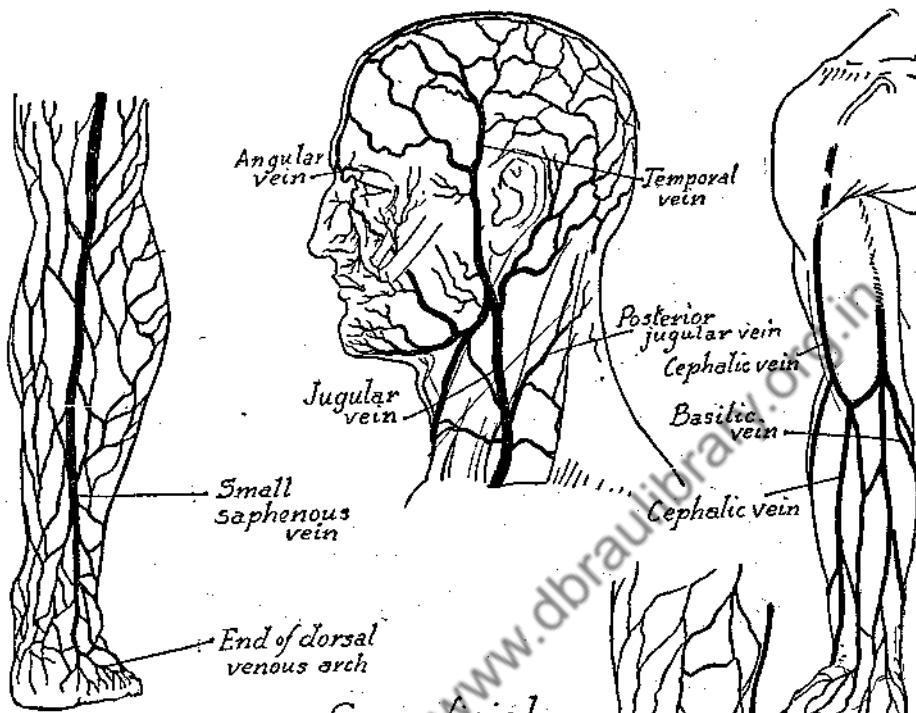


Children's hands

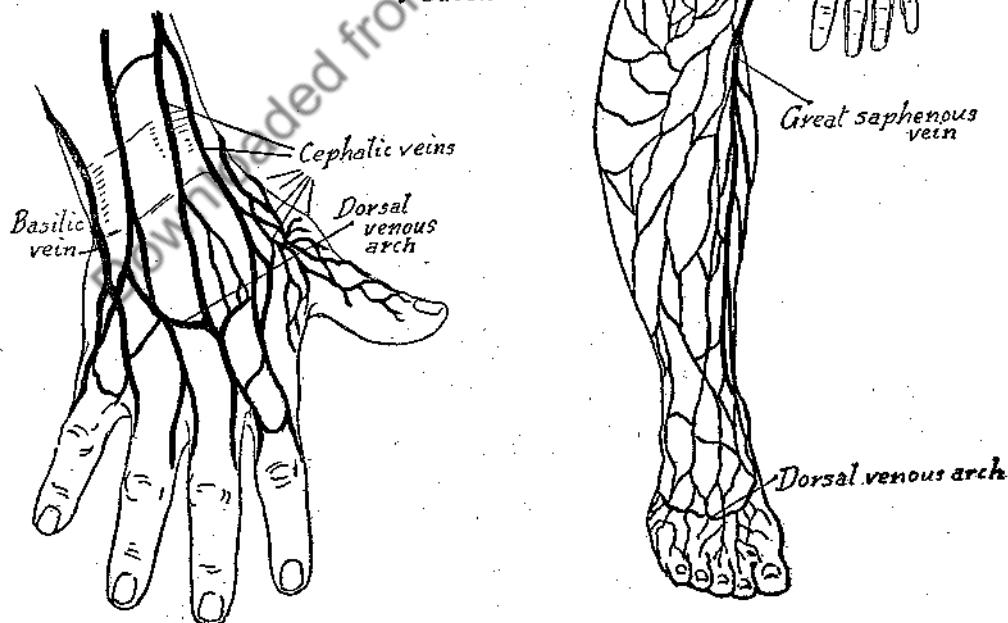
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Types of hands

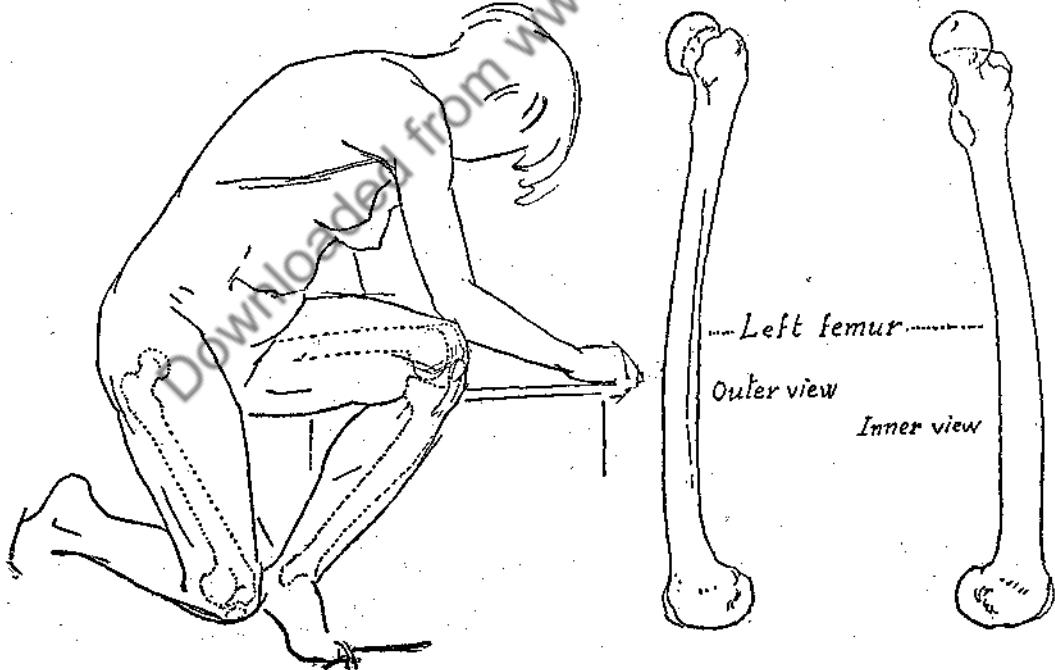
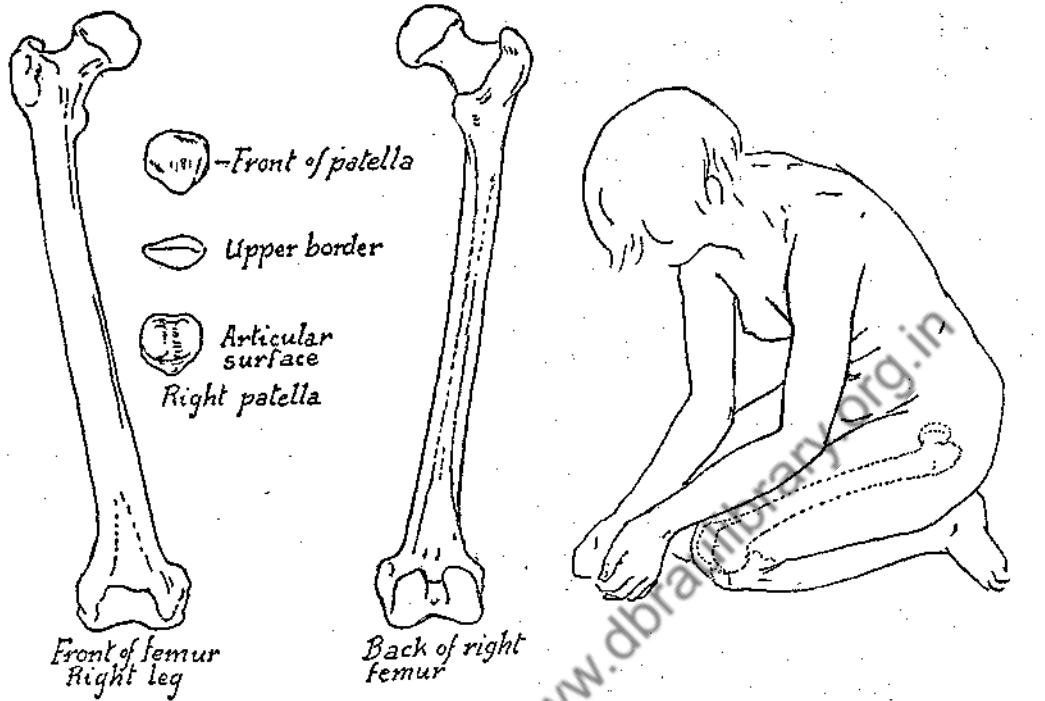


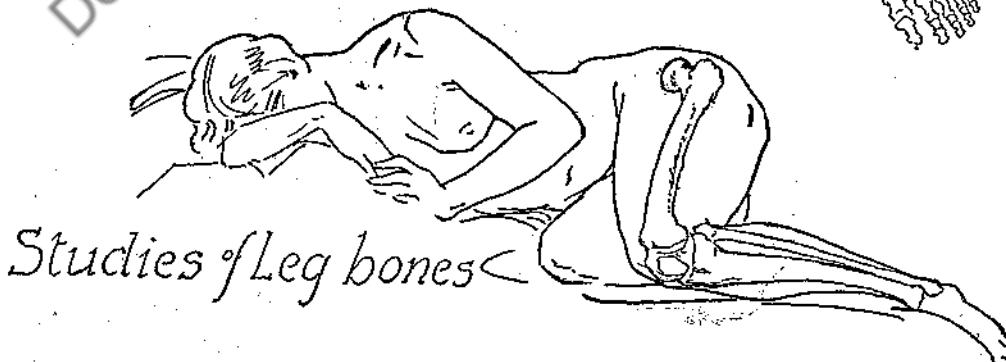
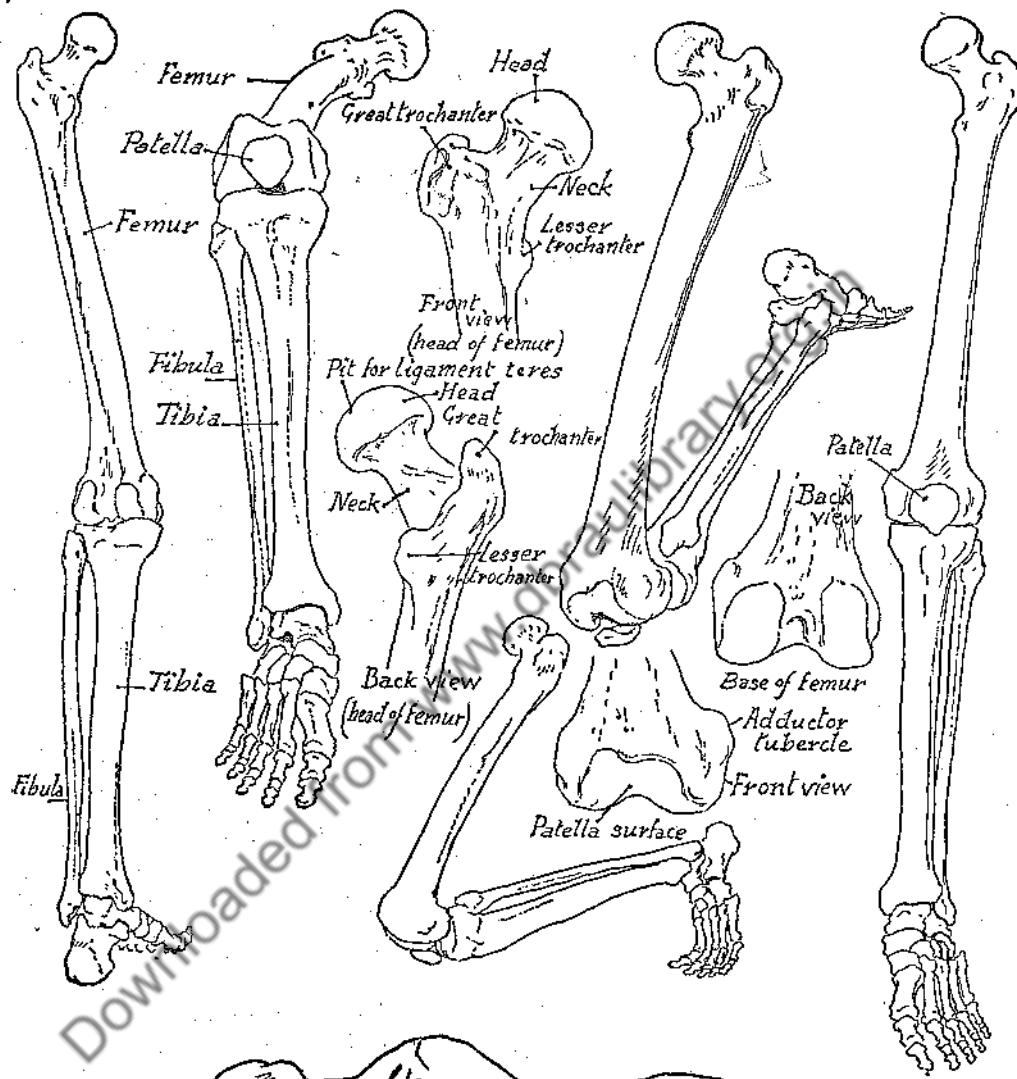
Superficial veins





PART SEVEN
THE LEG

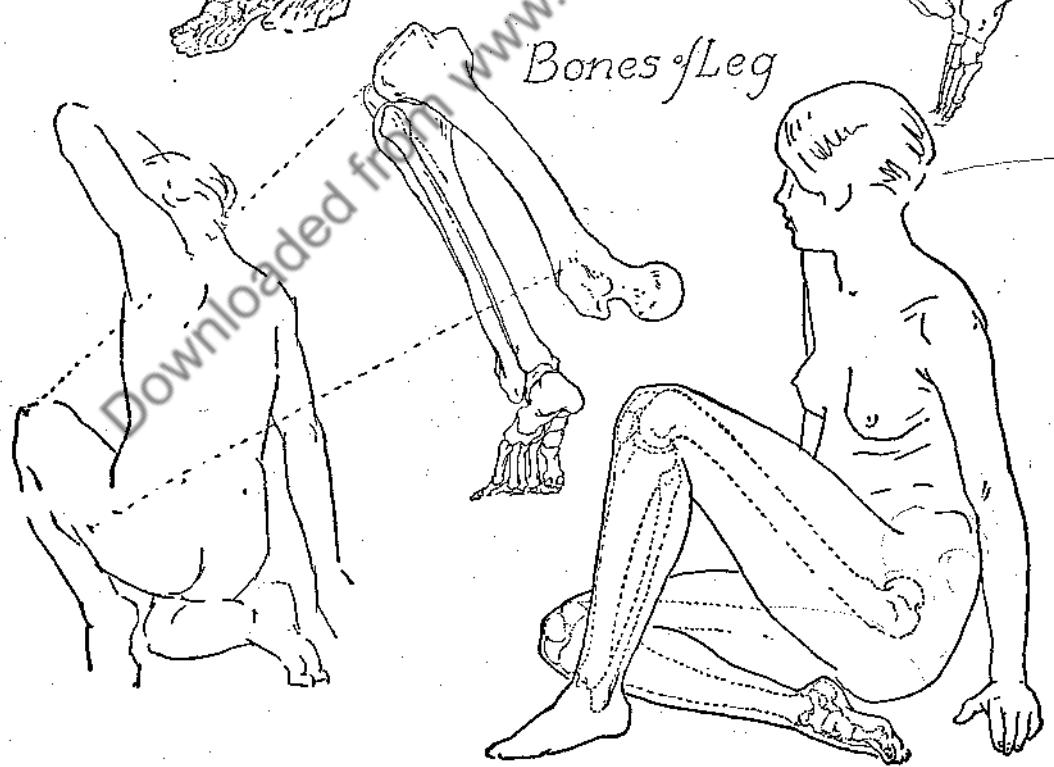




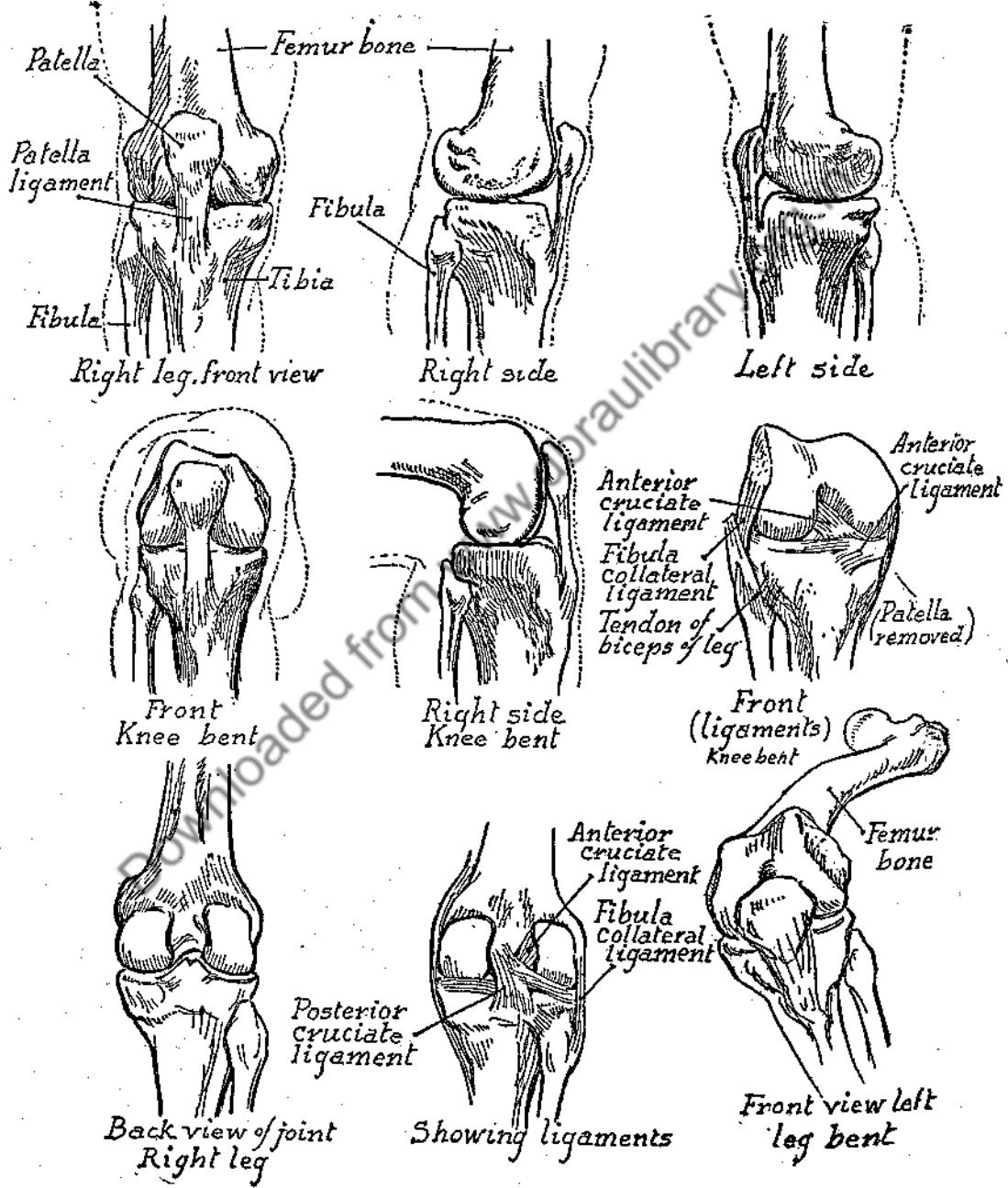
Studies of Leg bones

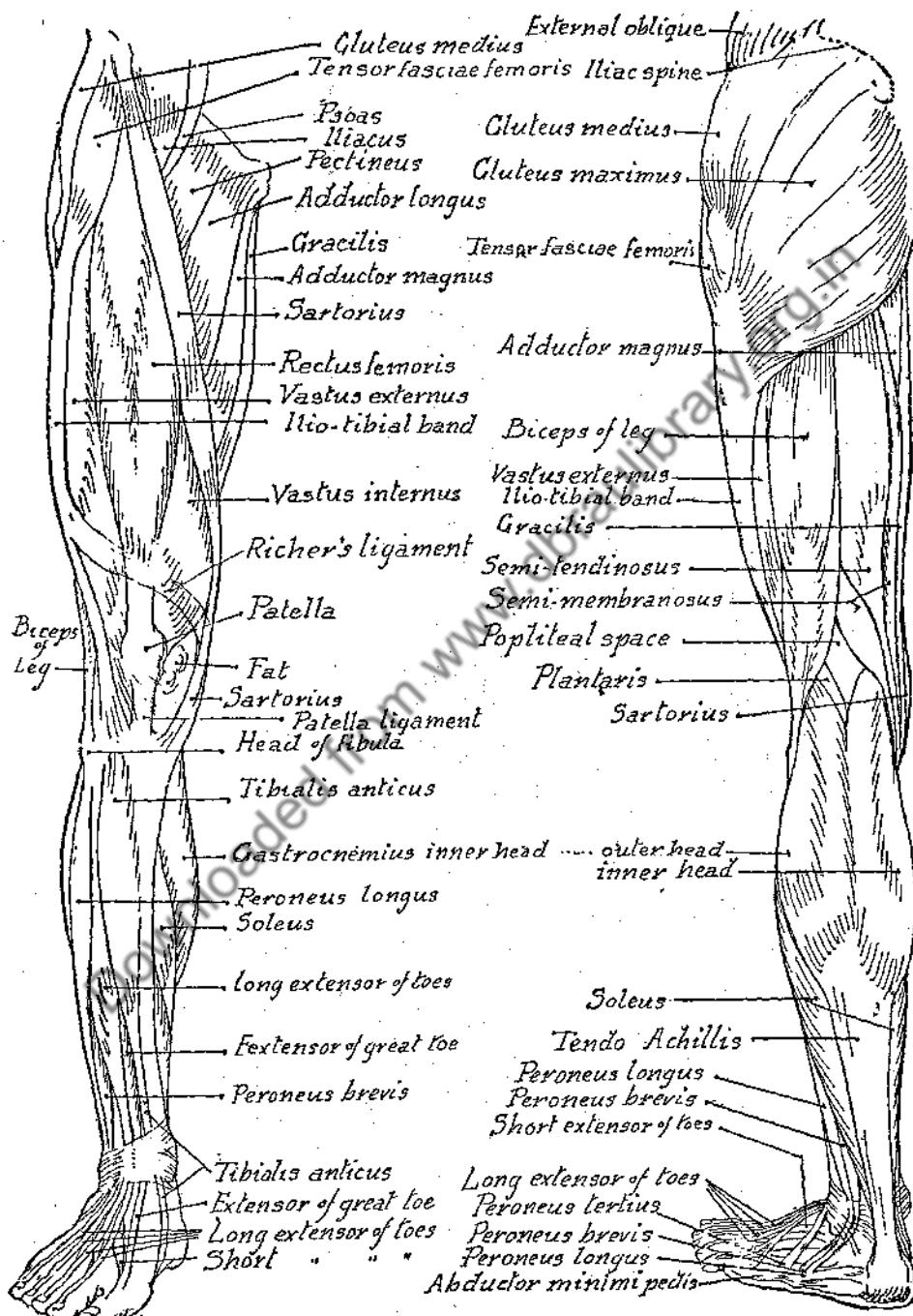


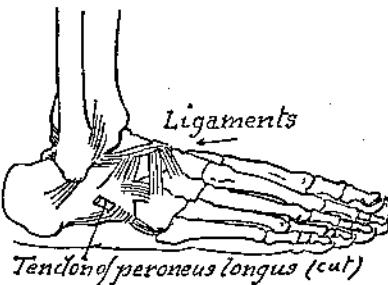
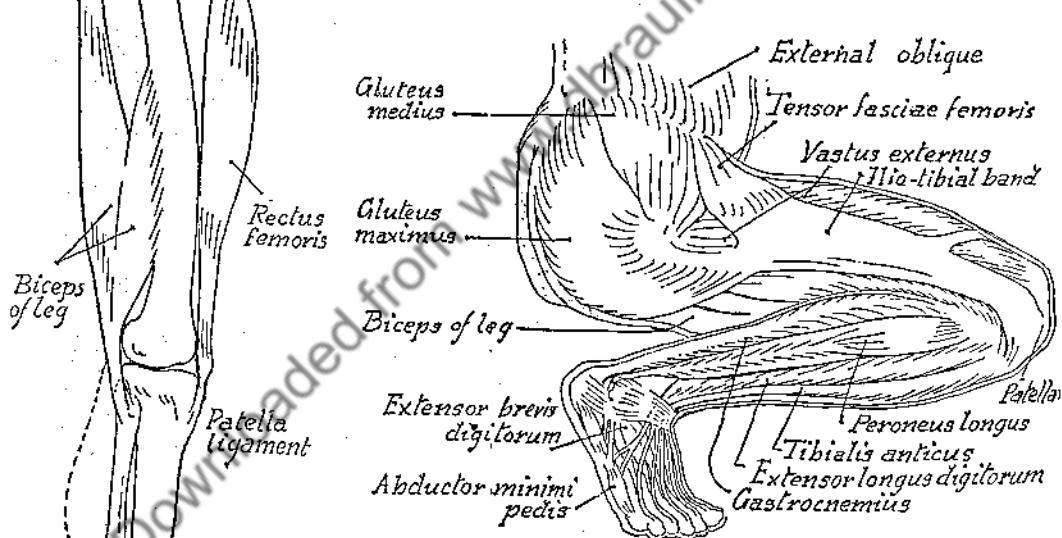
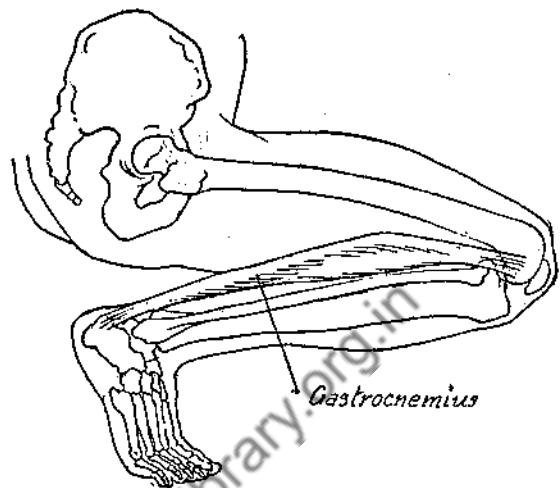
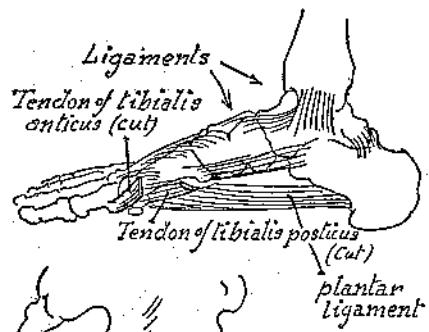
Bones of Leg

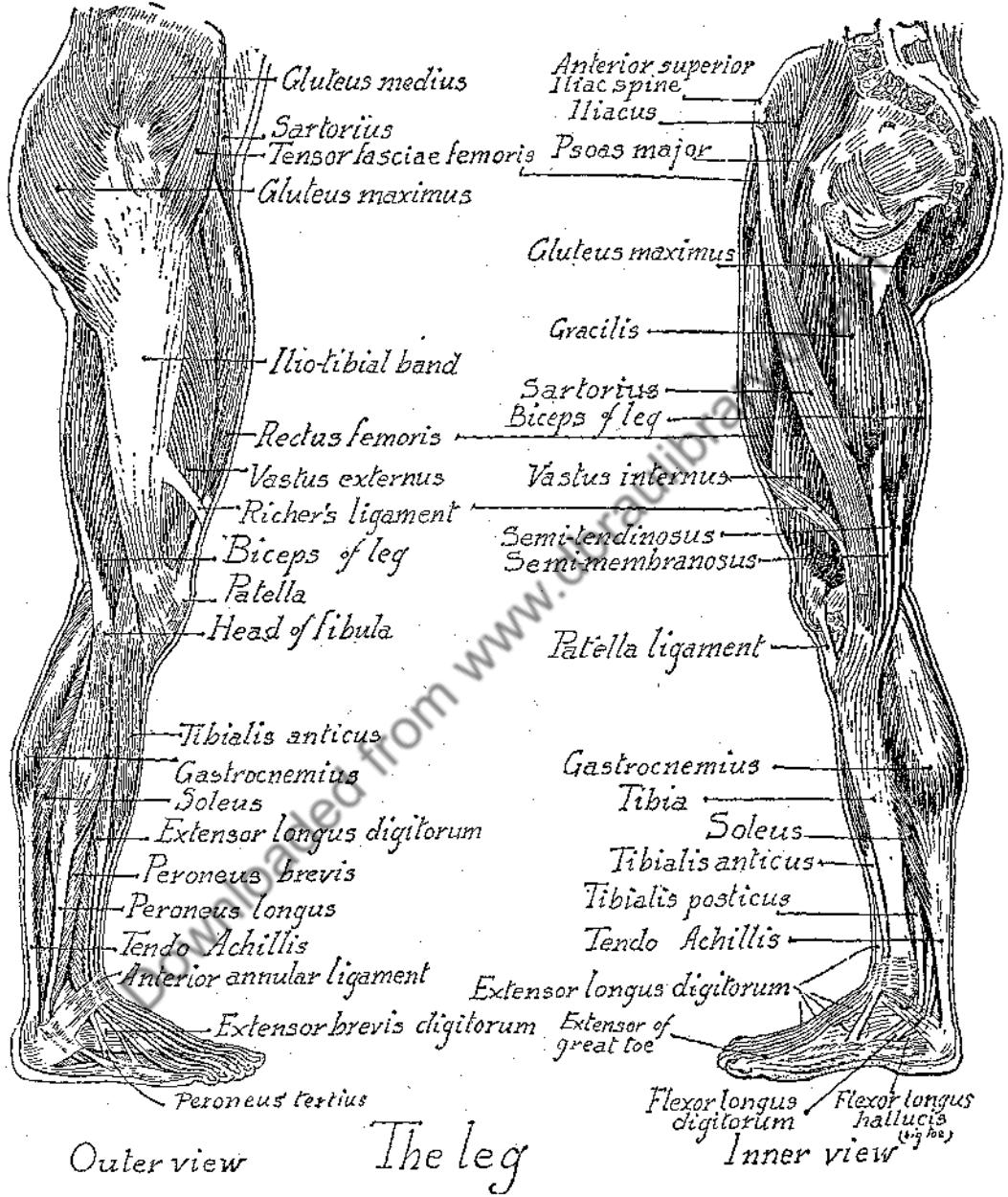


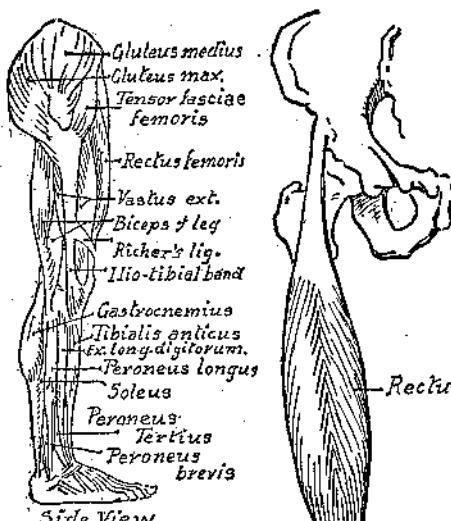
The Knee Joint





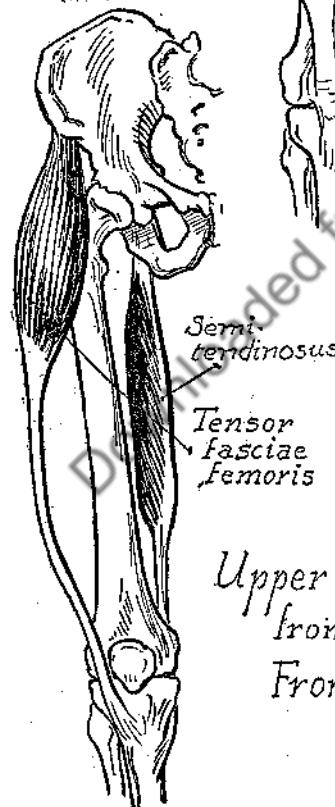




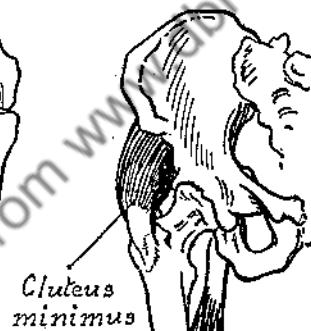


Side View

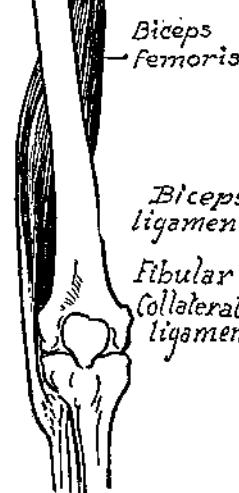
Rectus Femoris



Upper - leg
from the
Front



Gluteus
minimus



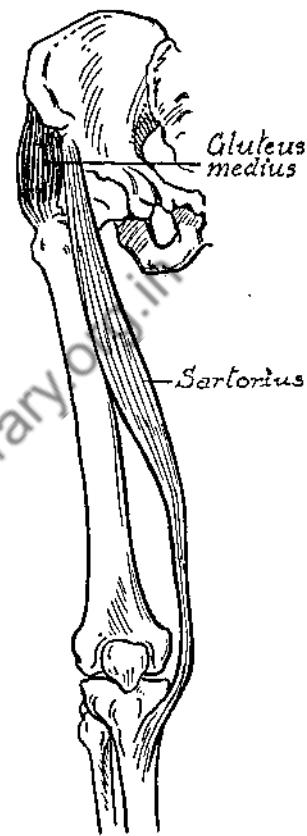
Biceps
ligament

Fibular
Collateral
ligament

Anterior
cruciate
ligament

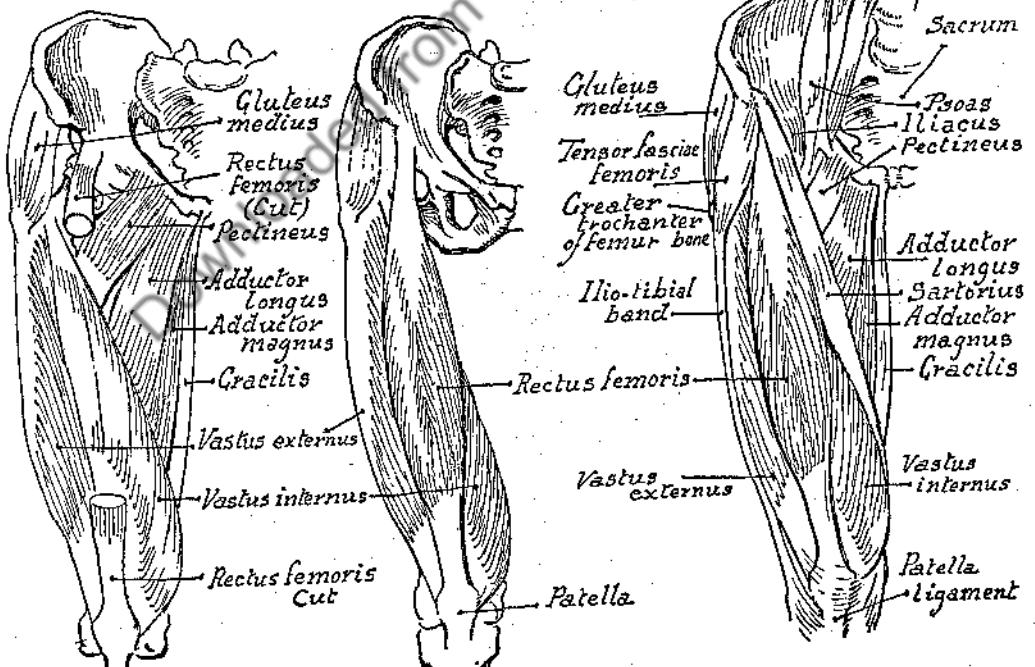
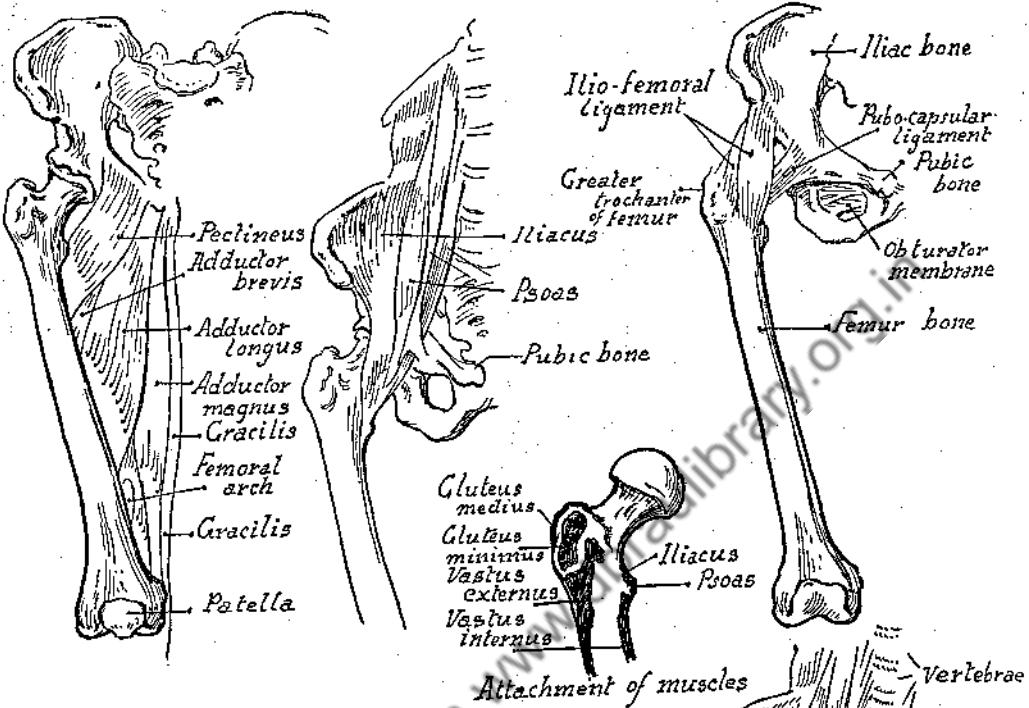
Tibial
Collateral
ligament

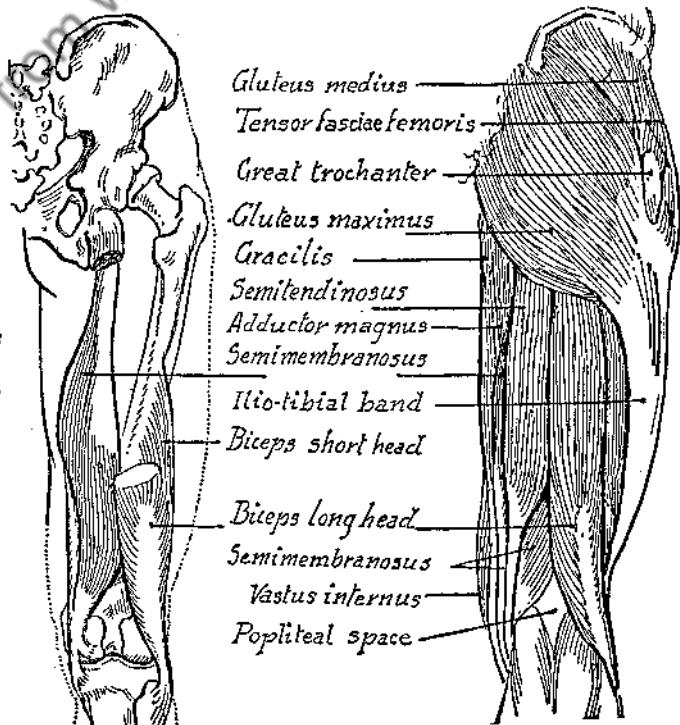
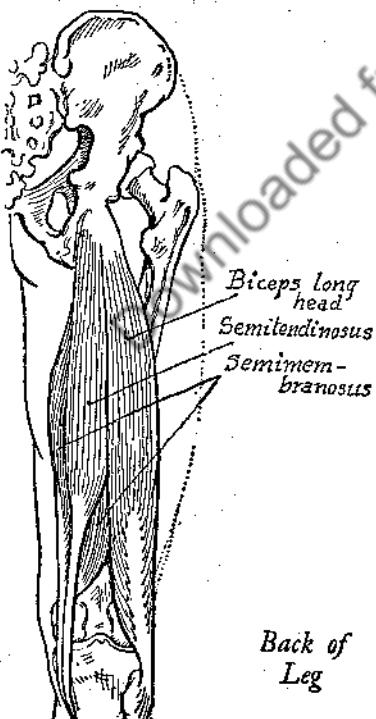
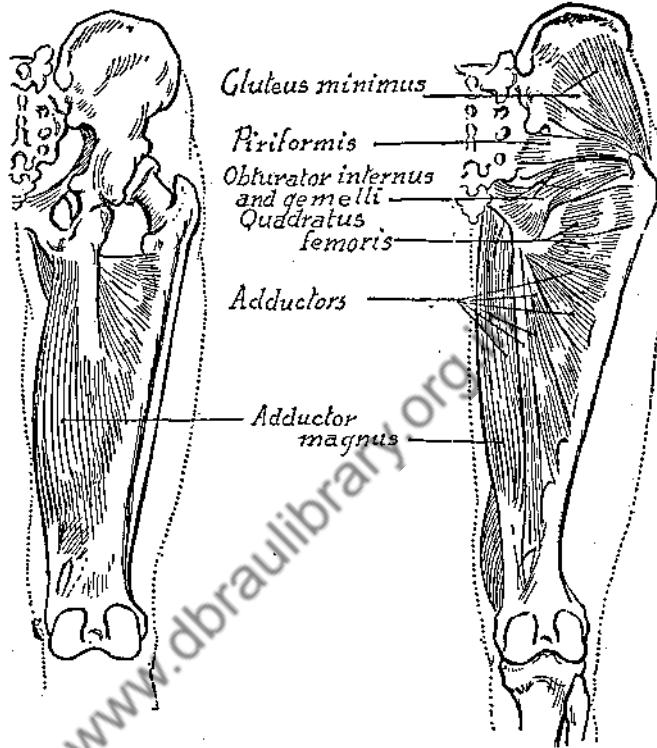
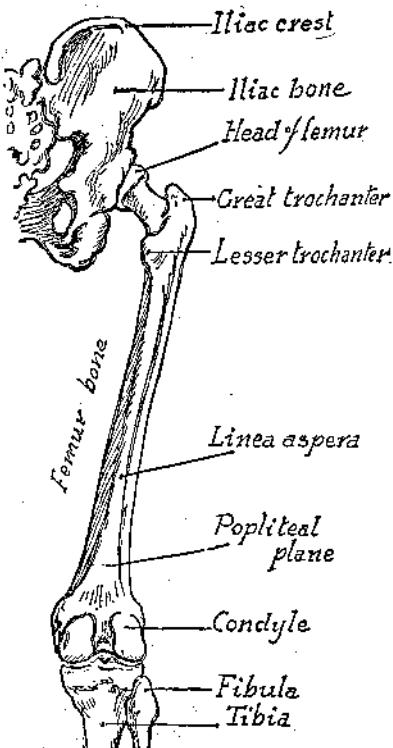
Patella
(thrown)
down

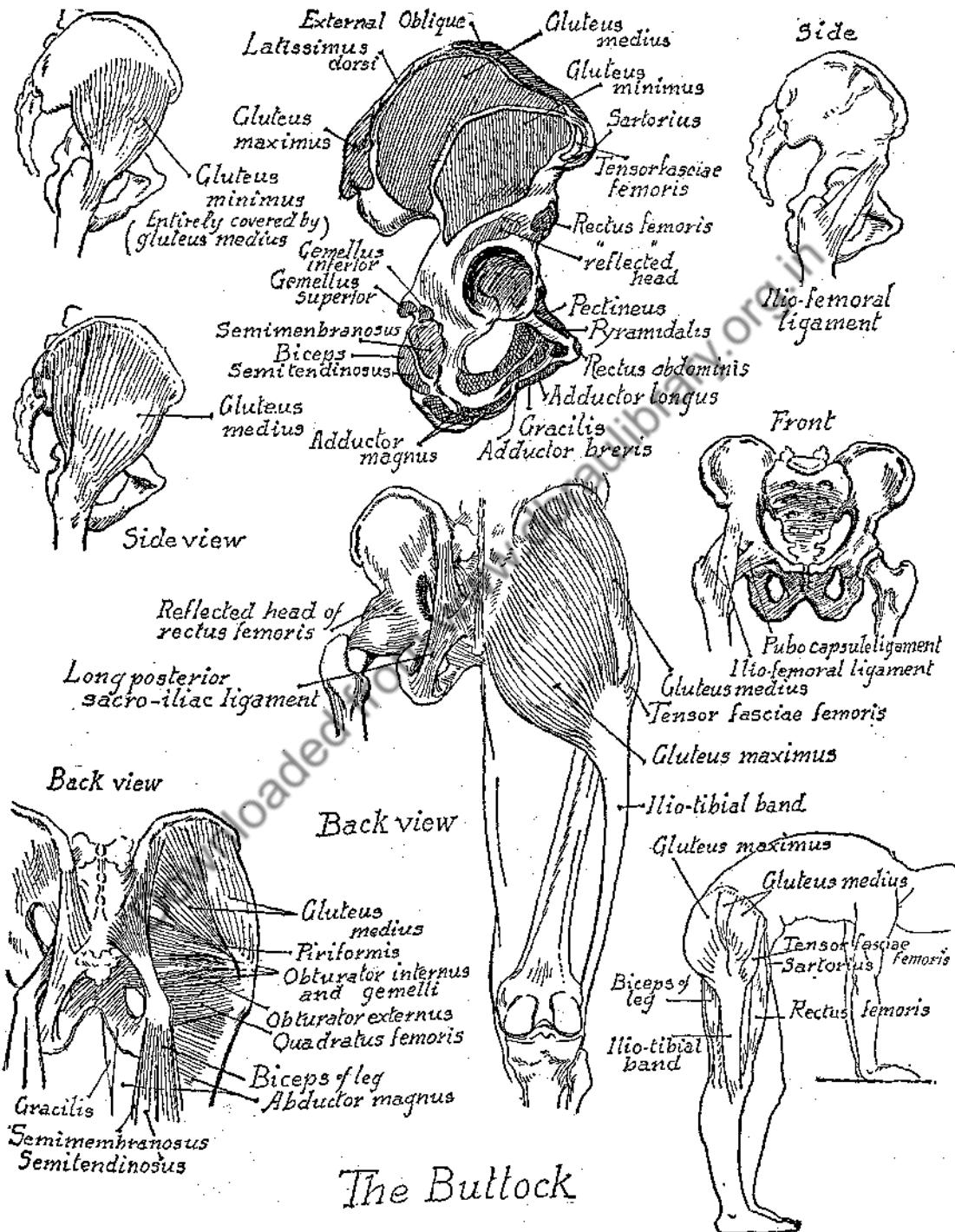


Gluteus
medius

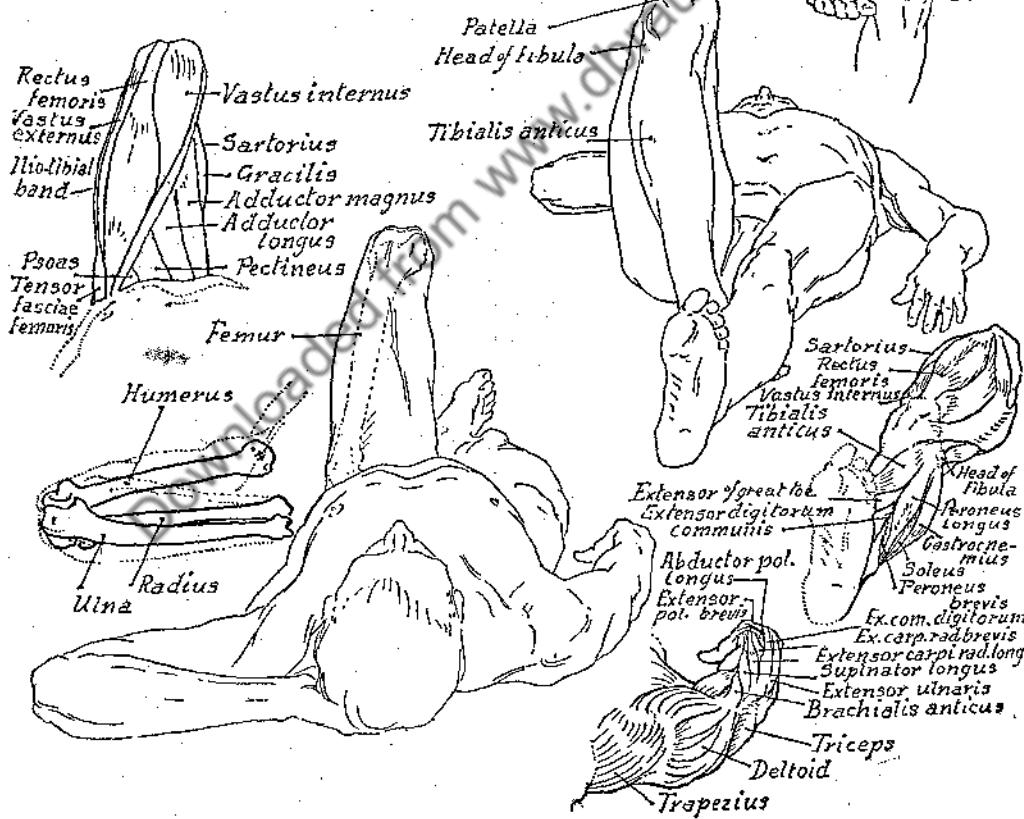
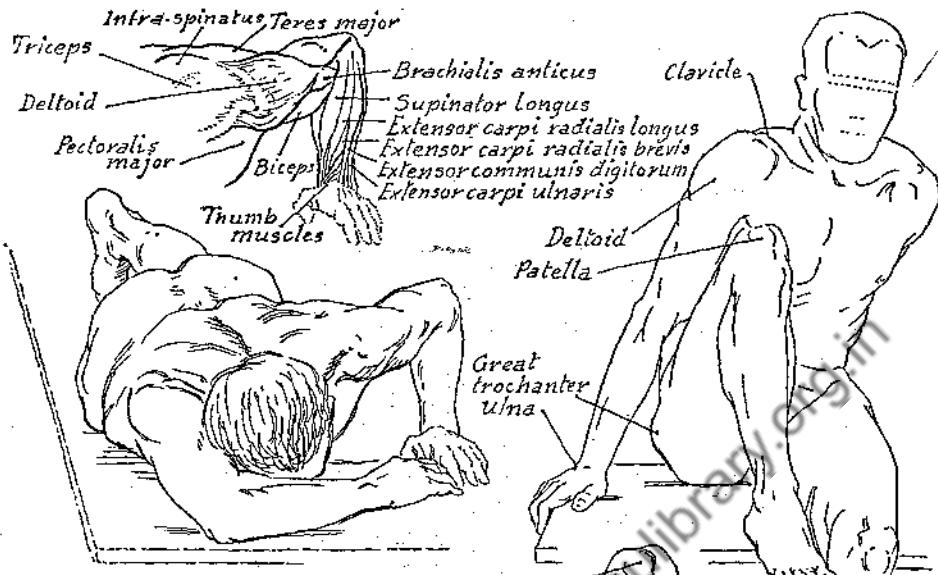
Sartorius

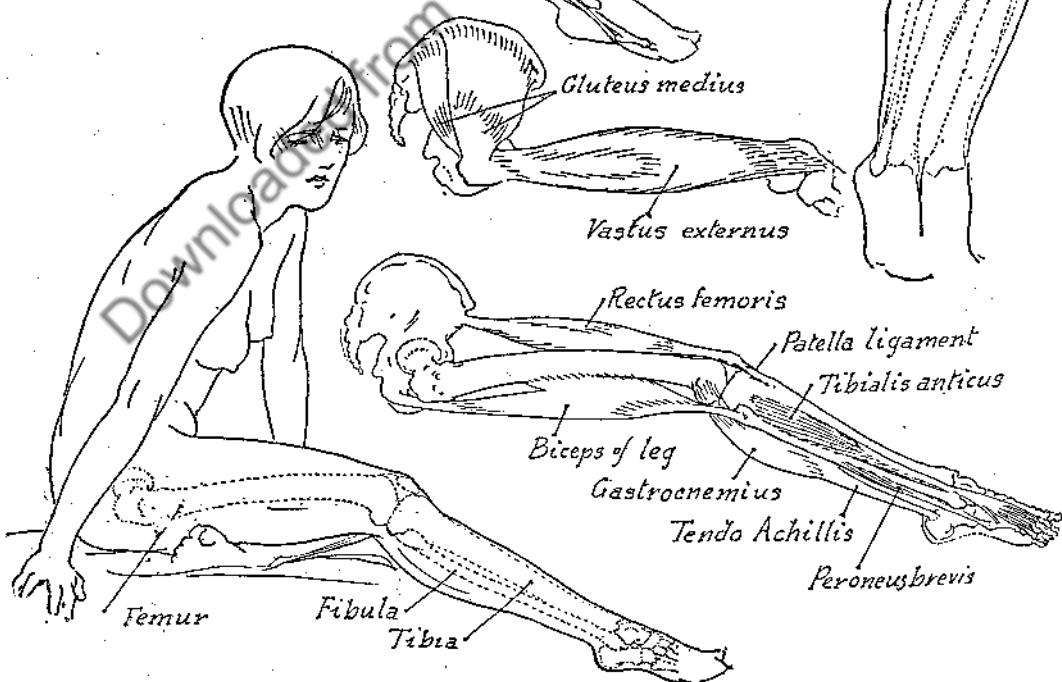
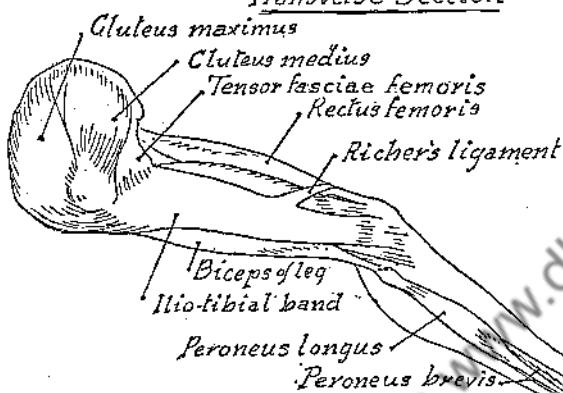
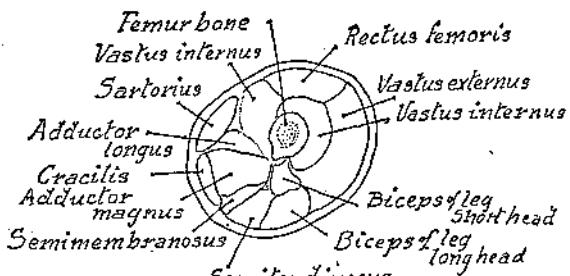


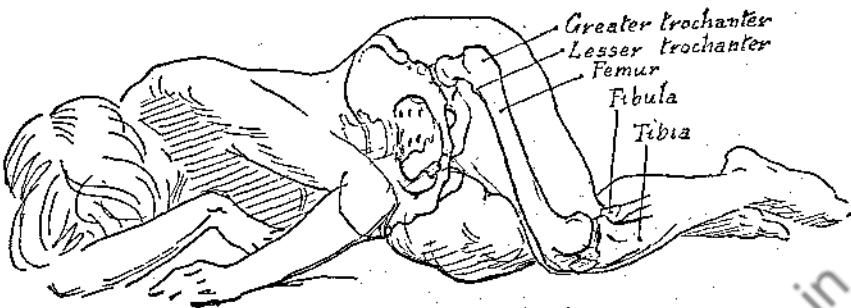




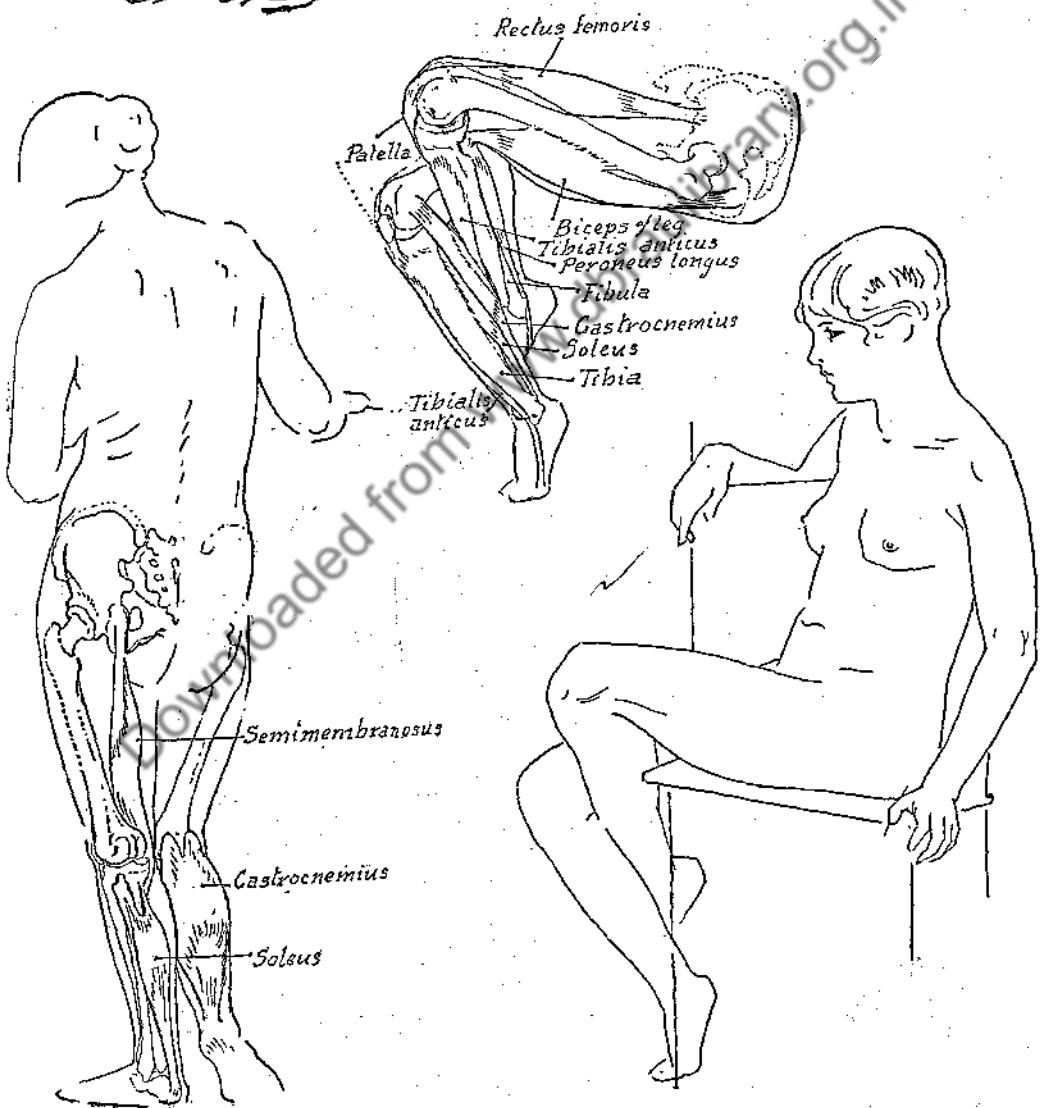




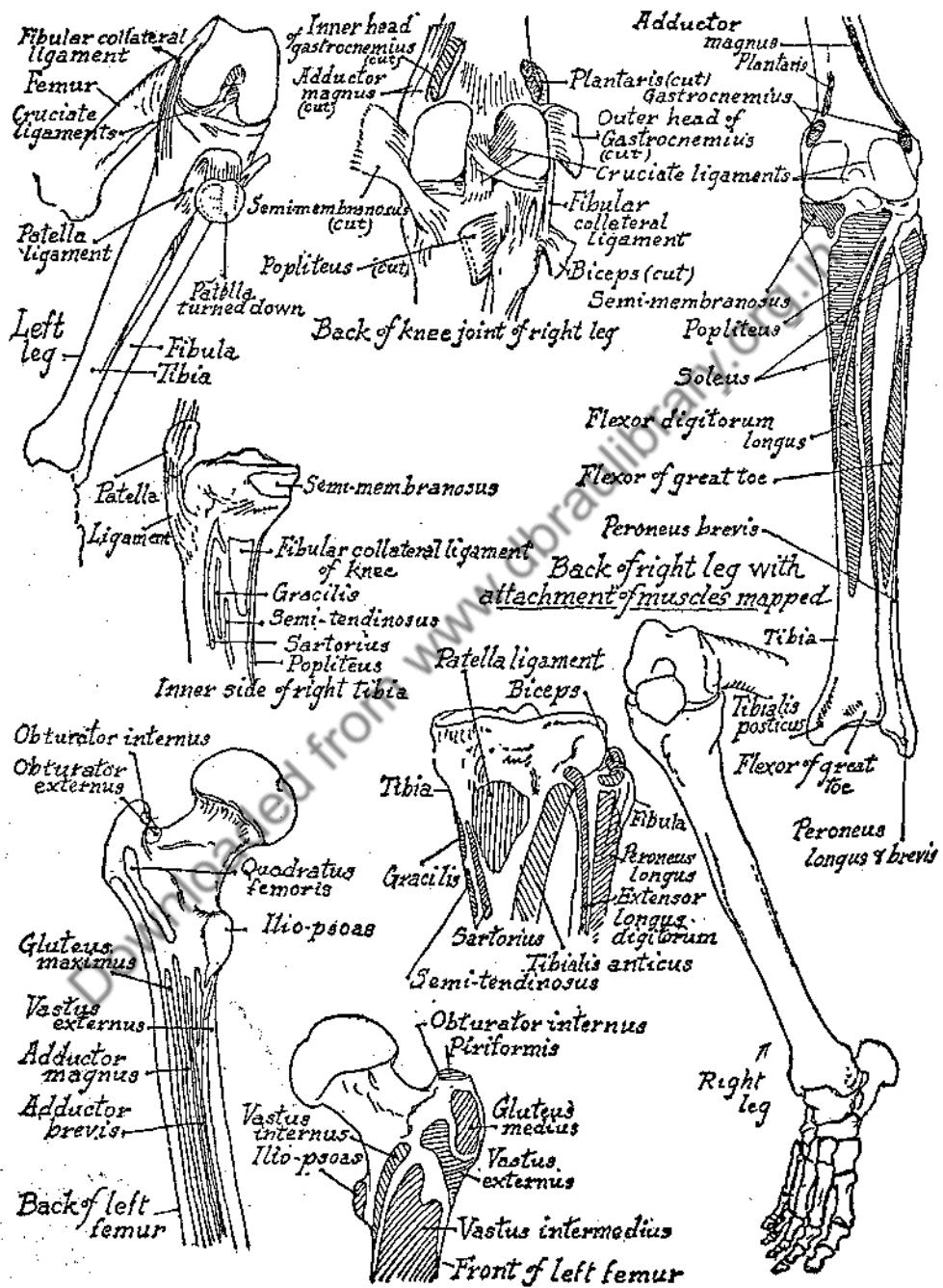


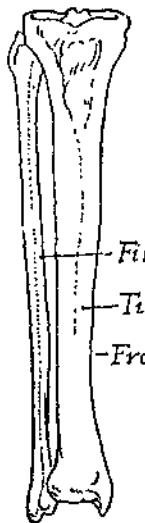


Rectus femoris



Downloaded from
www.EasyEngineering.net

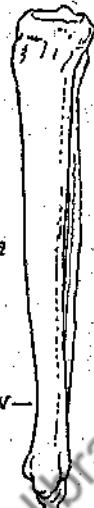




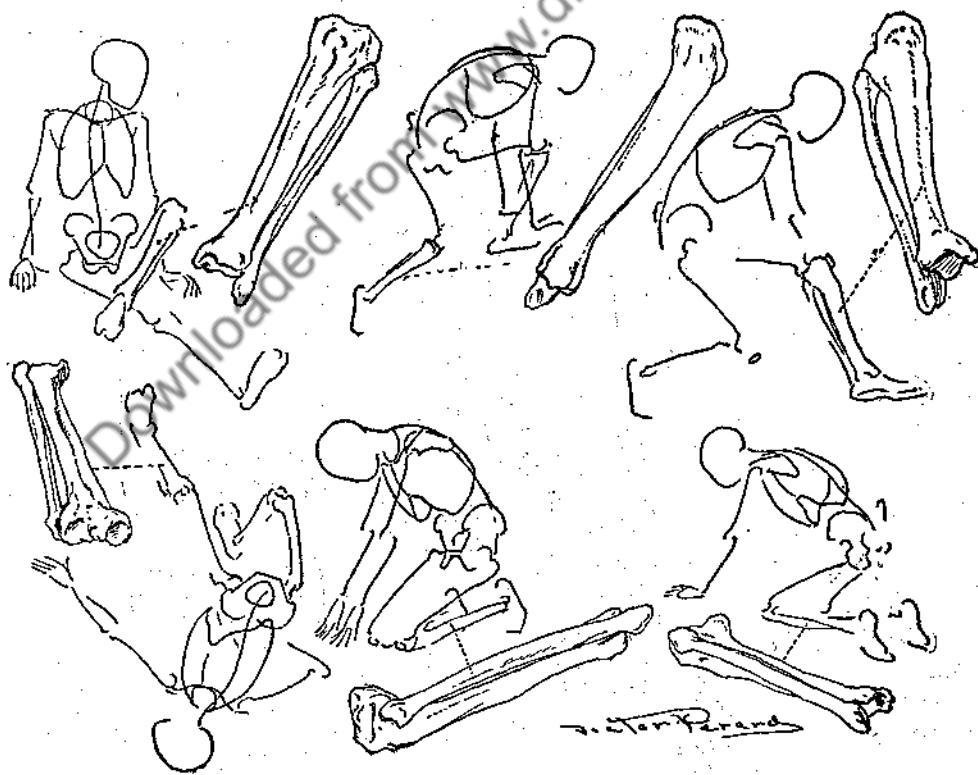
Fibula
Tibia
Front view



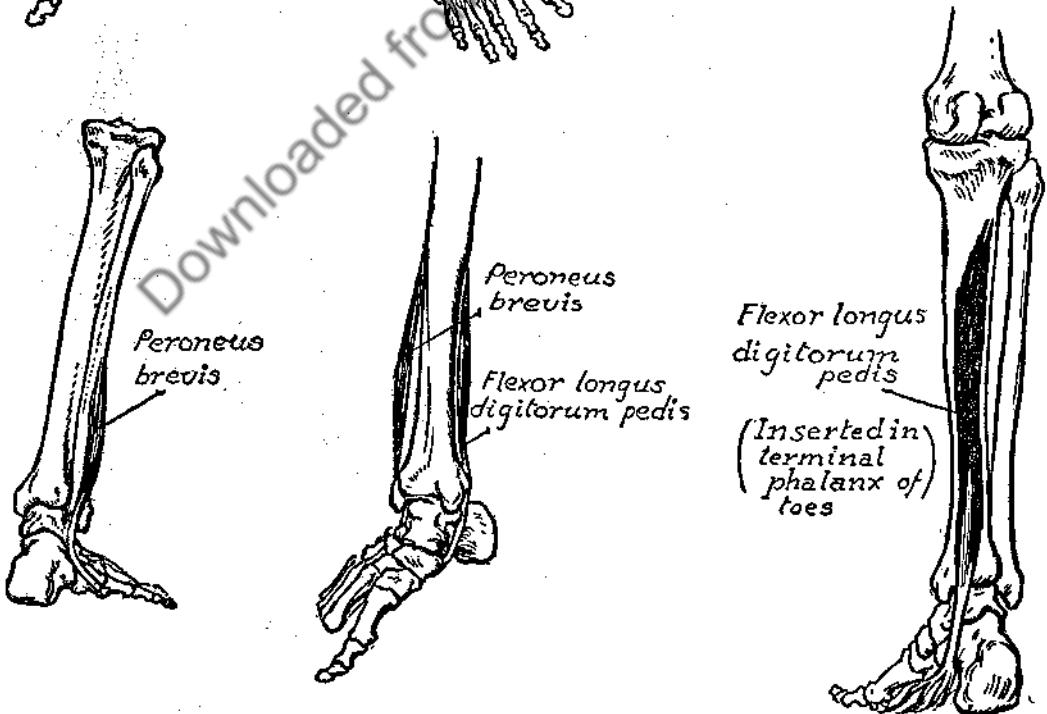
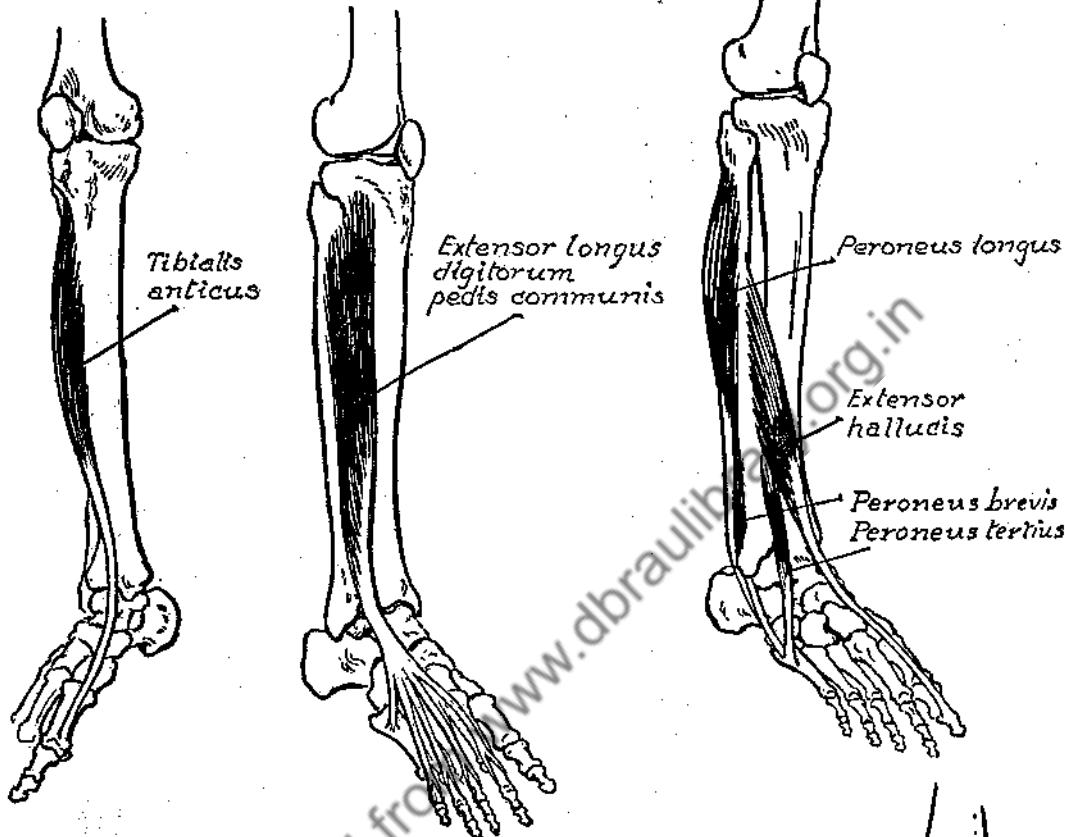
Tibia and Fibula
Right leg
Outer view
Inner view



Back view

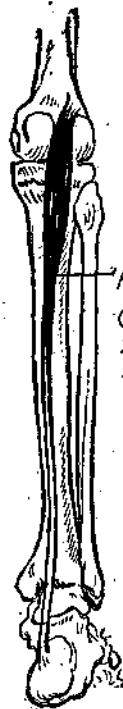


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Tibialis
posticus

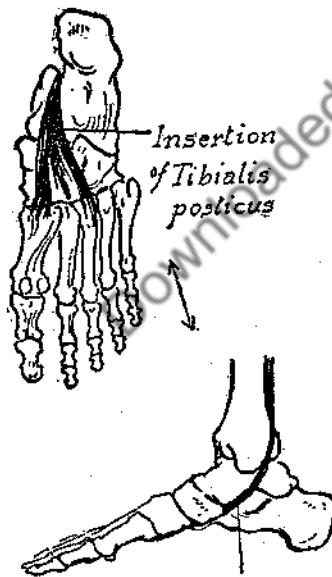


Plantaris
Overlying
the Soleus
muscle.



Soleus
Underlying
Gastrocnemius

Muscles
of the
calf of leg



Insertion
of Tibialis
posticus

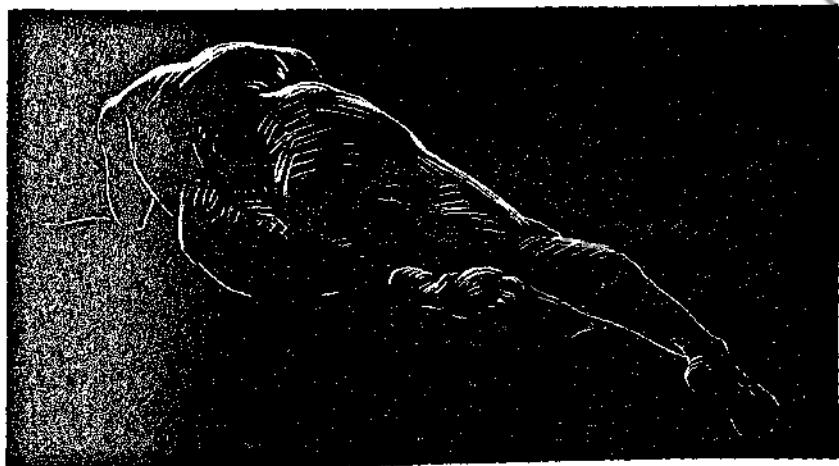
Tibialis posticus



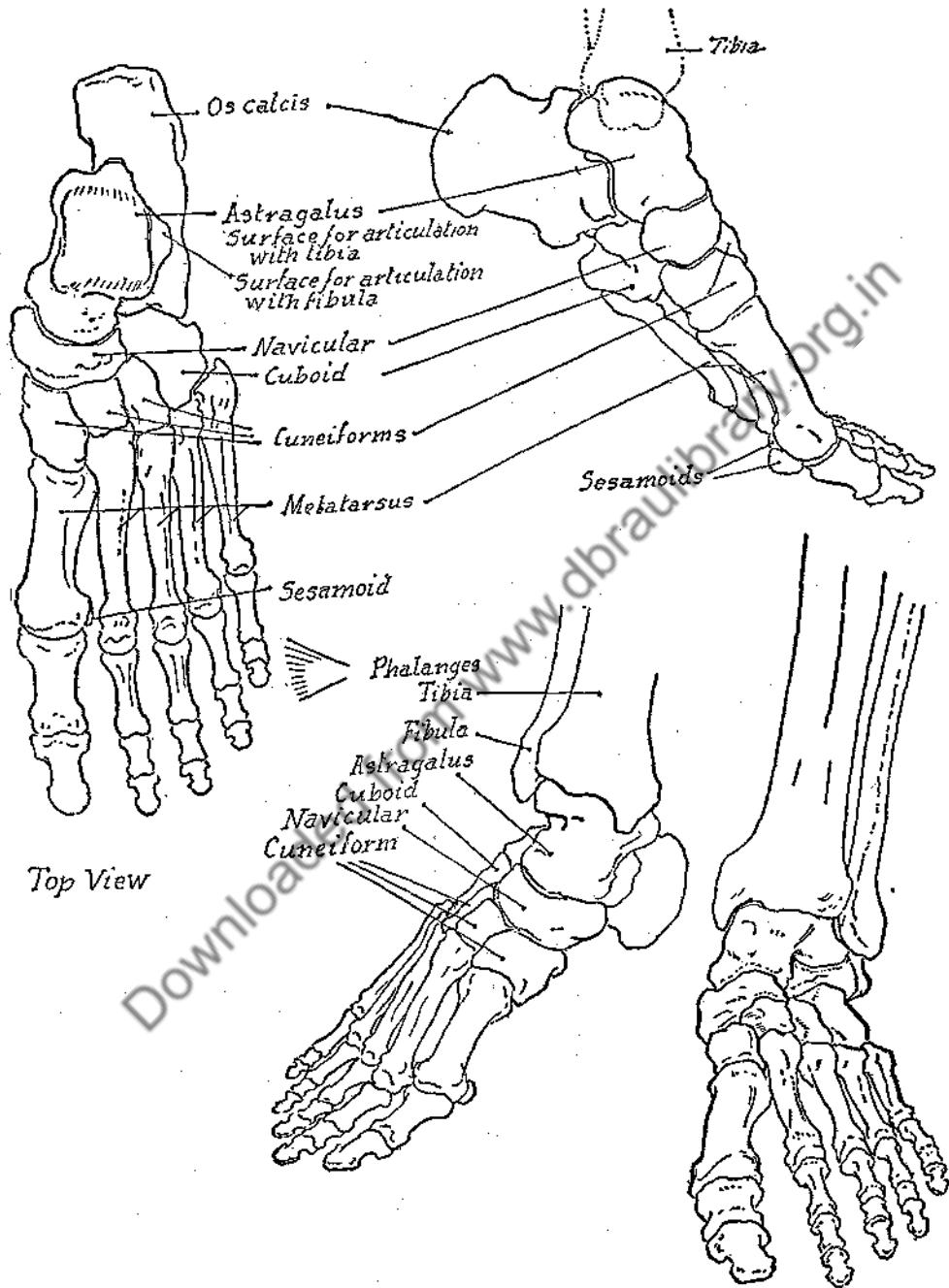
Flexor
hallucis
longus
(big toe)
Insertion
base of
phalanx
of
big toe

Gastrocnemius





Downloaded from
PART EIGHT
THE FOOT



Top View

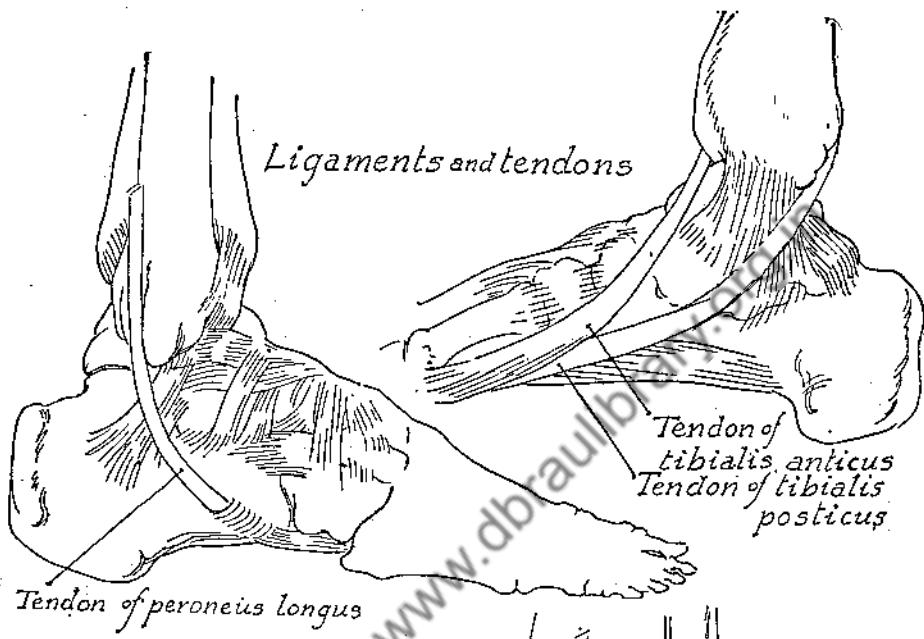


Diagram of the arch of the foot

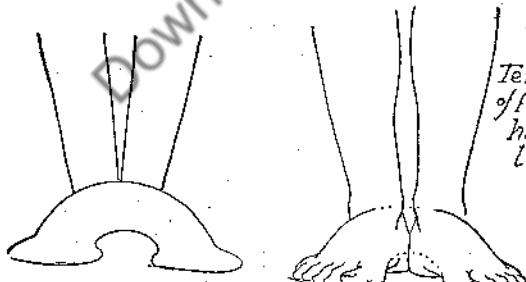
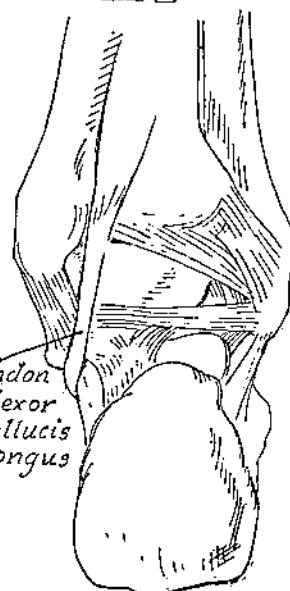
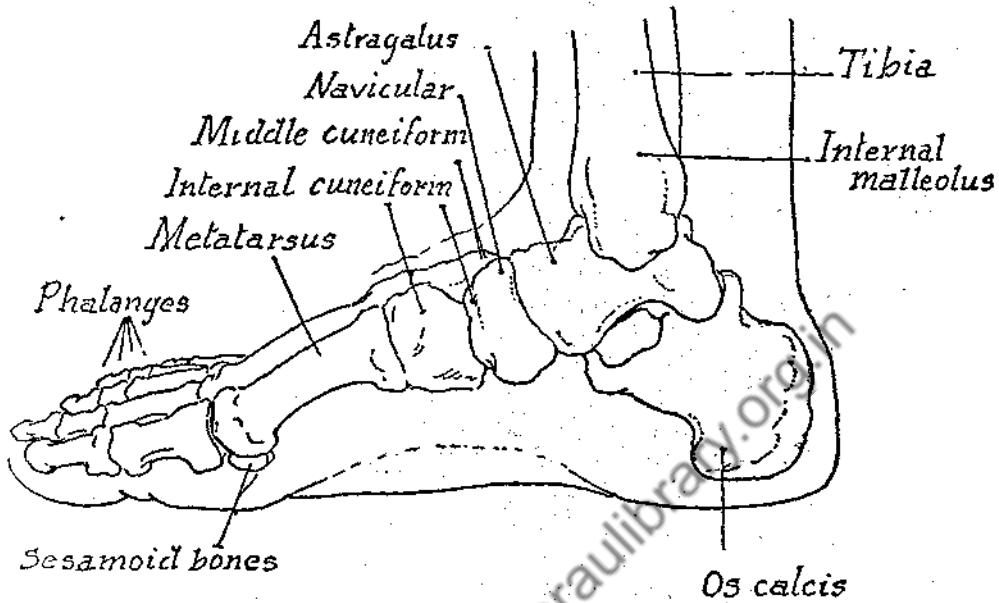
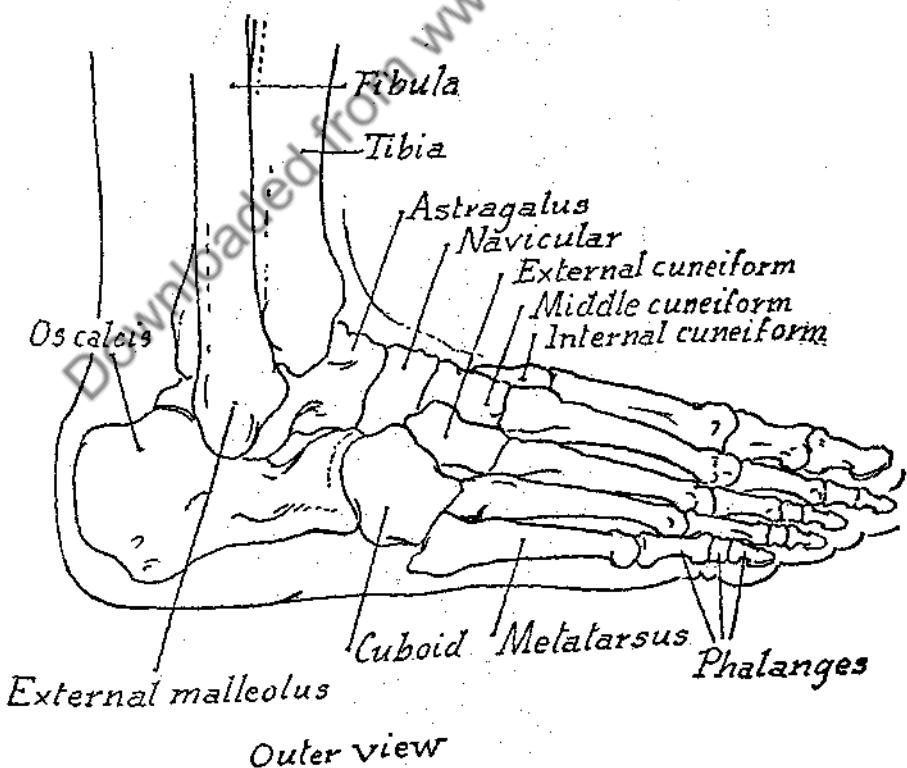


Diagram of the arches of the feet
(The arches of feet act as springs)

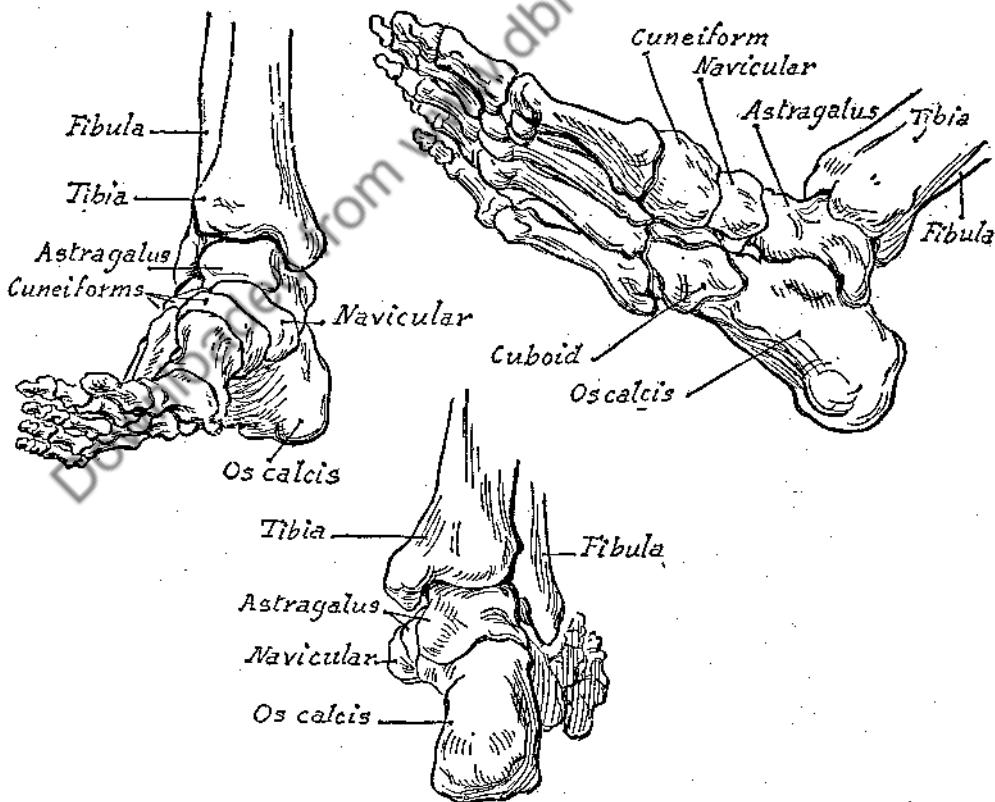
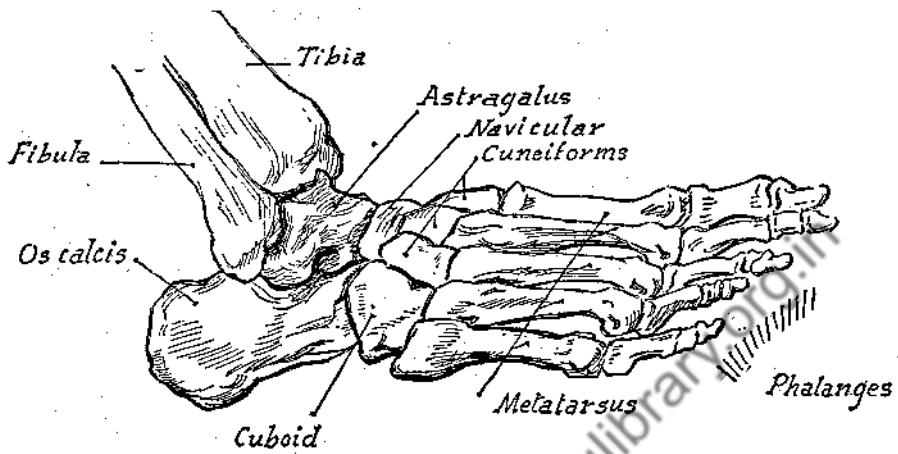


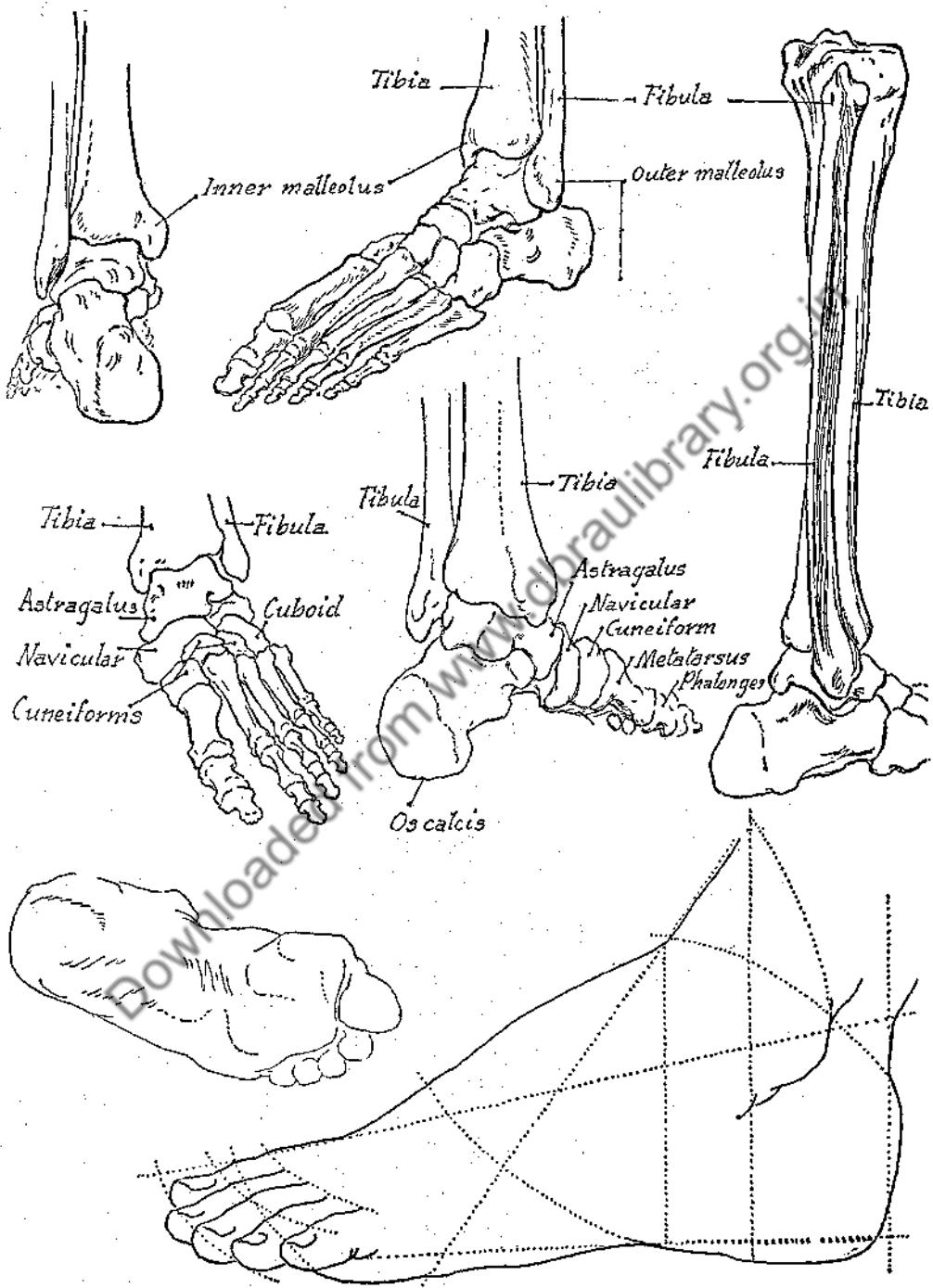


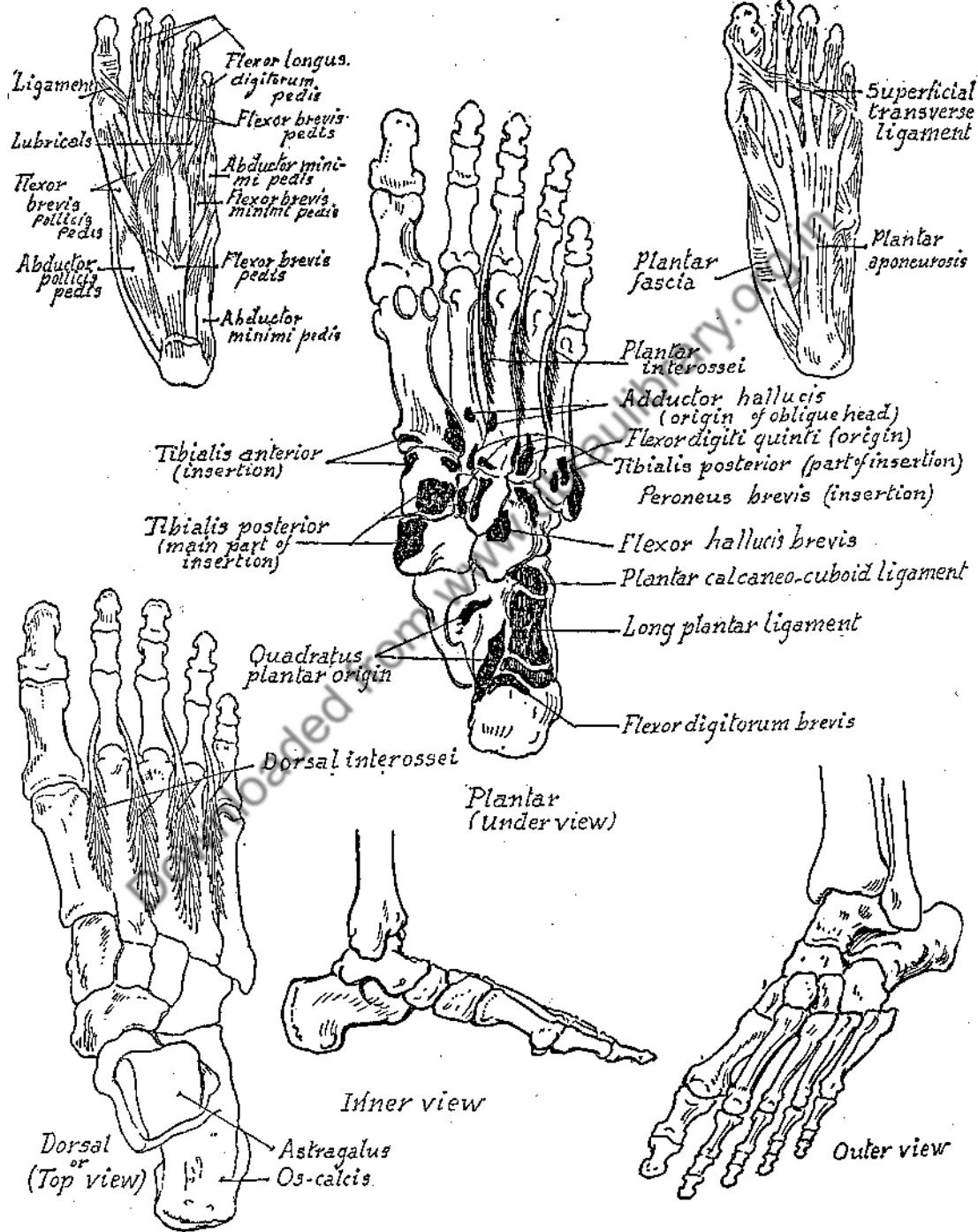
Inner view

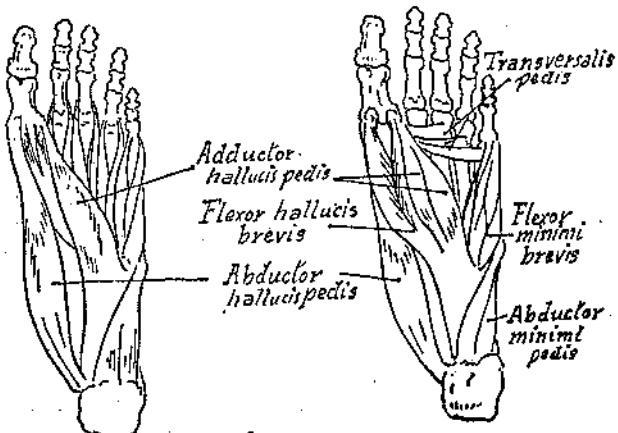
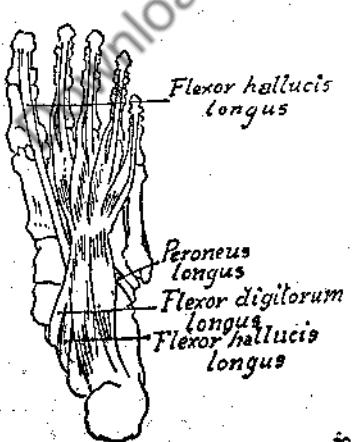
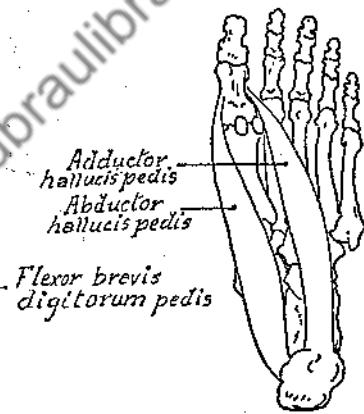
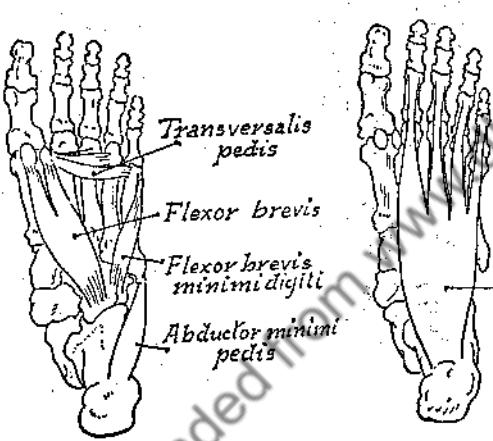
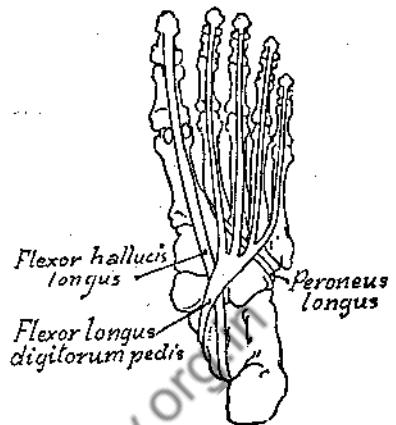
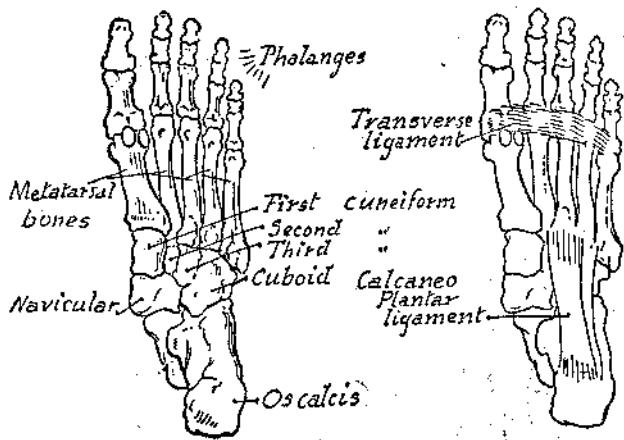


Outer view



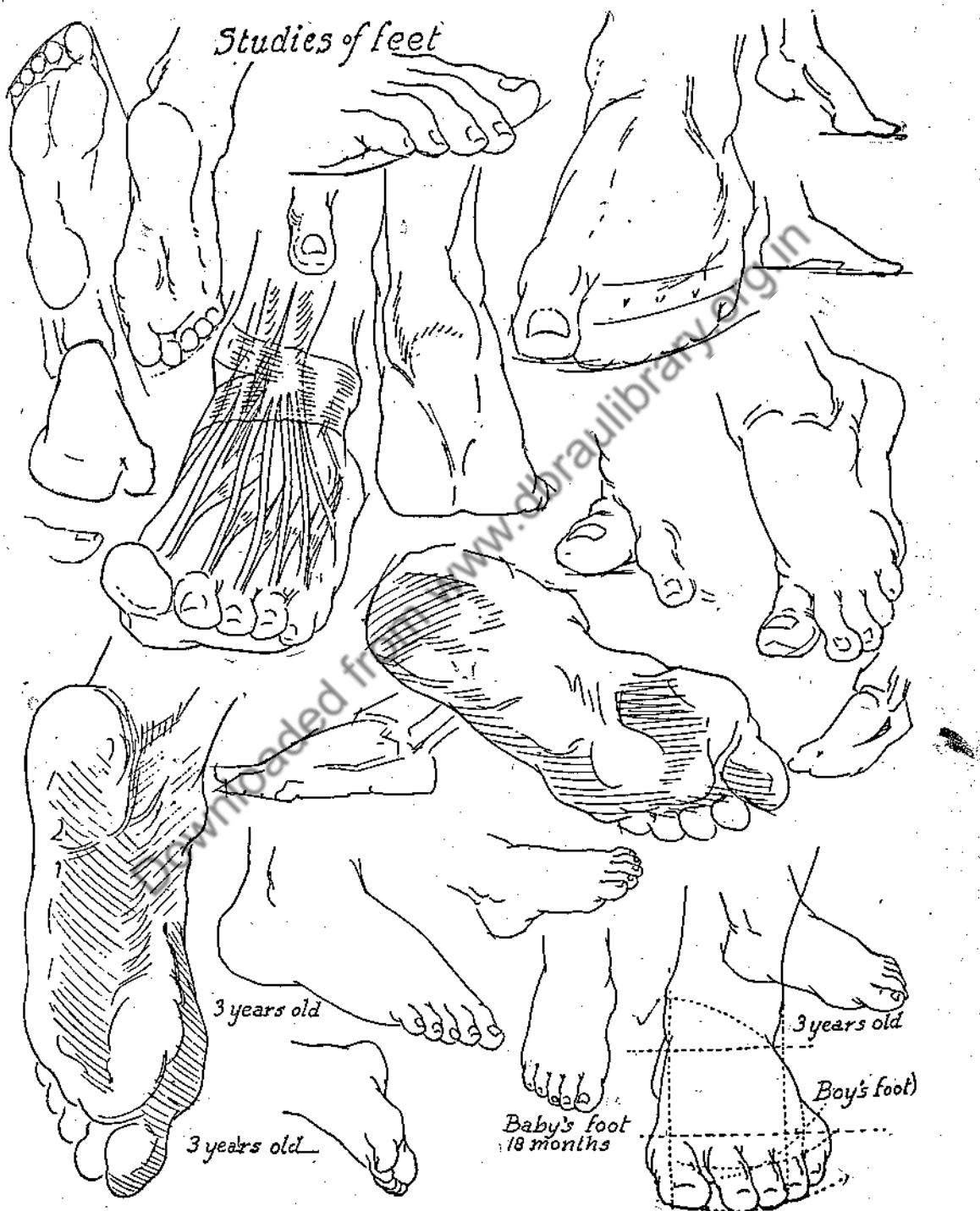


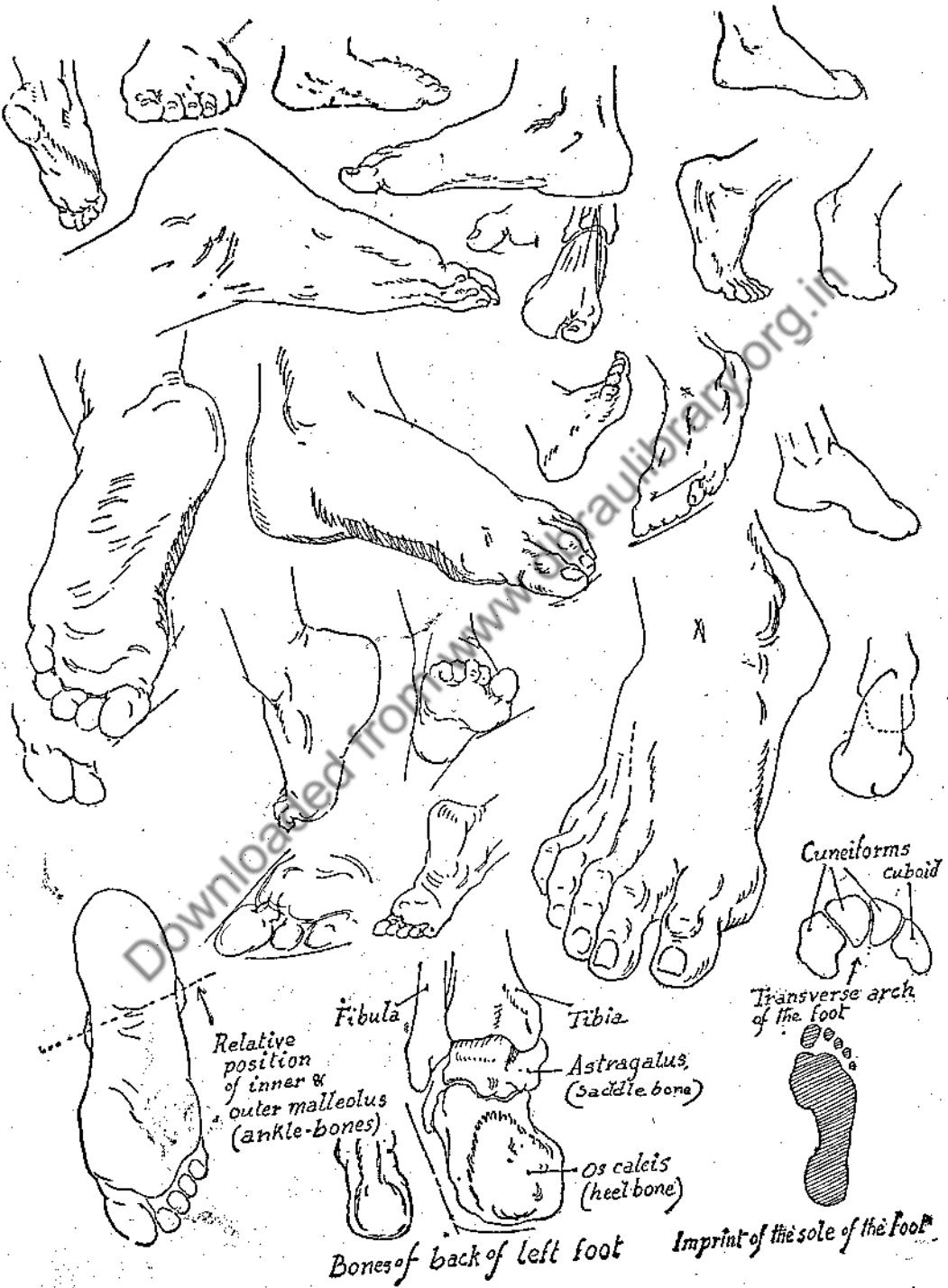


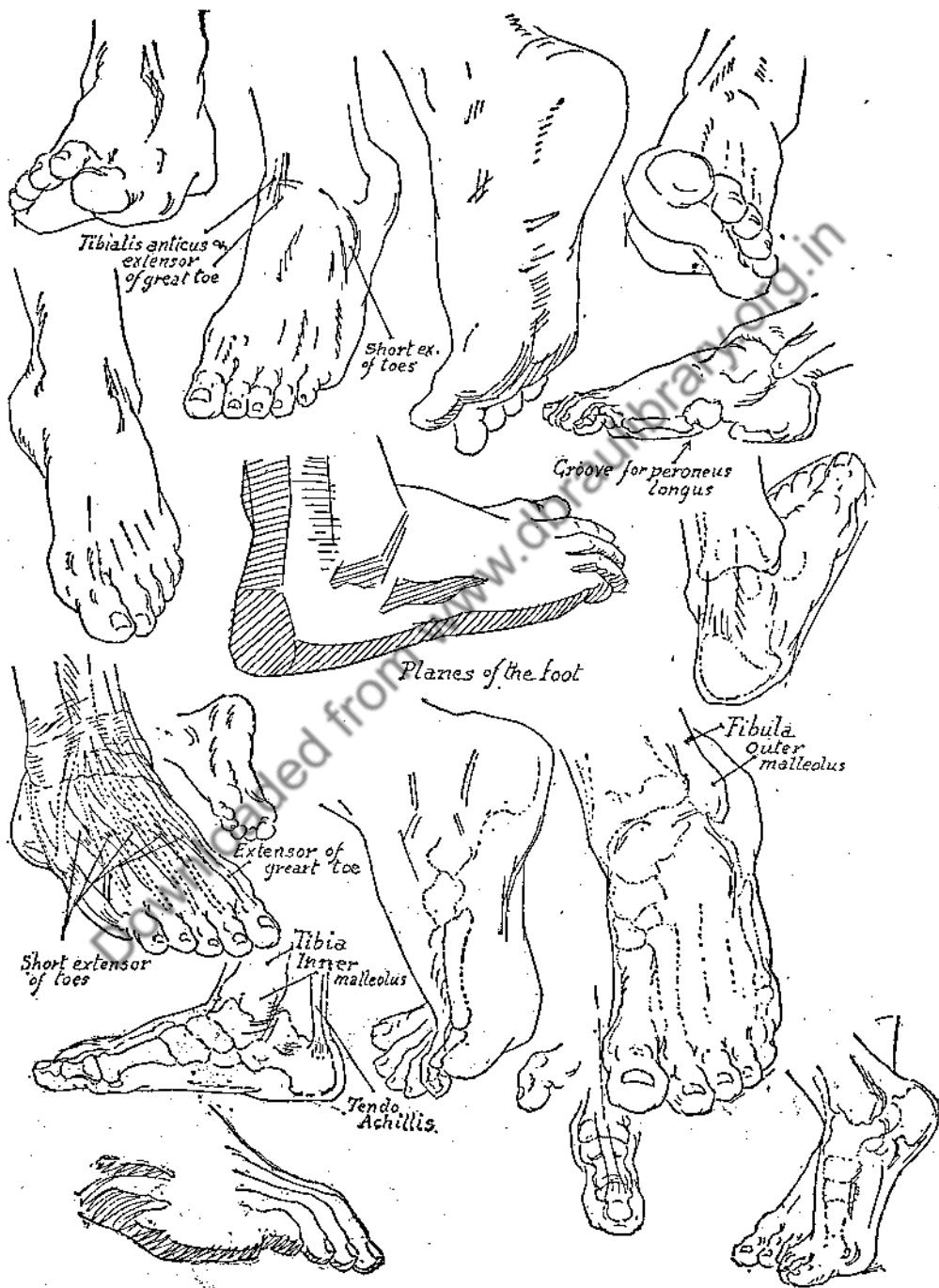


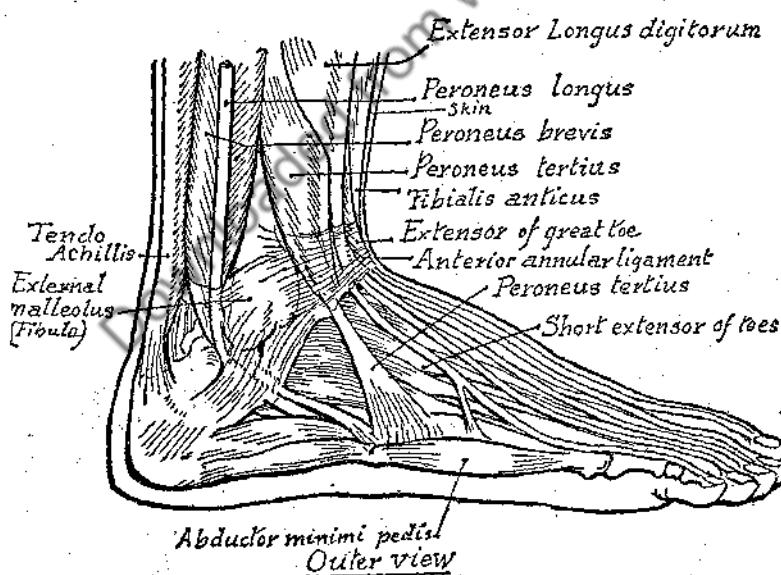
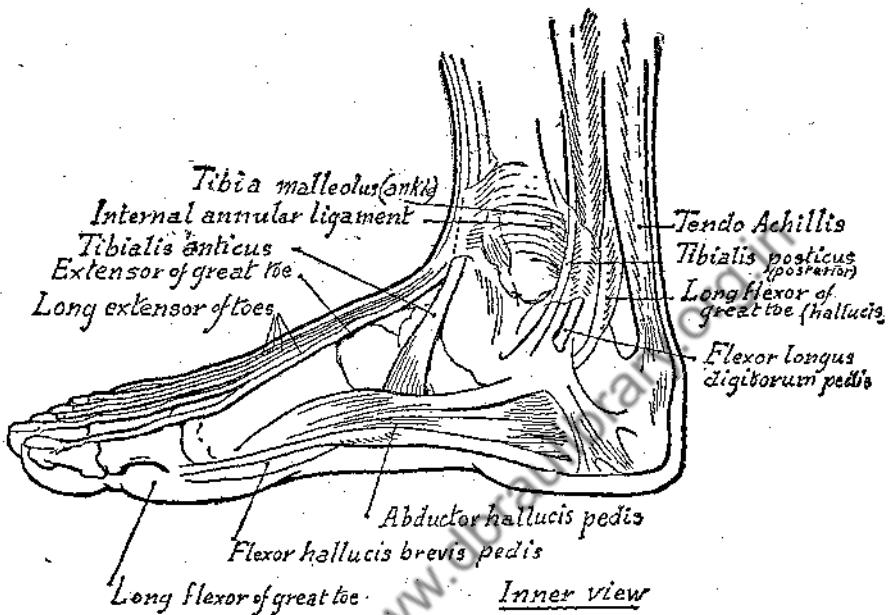
Plantar View of Foot

Studies of feet





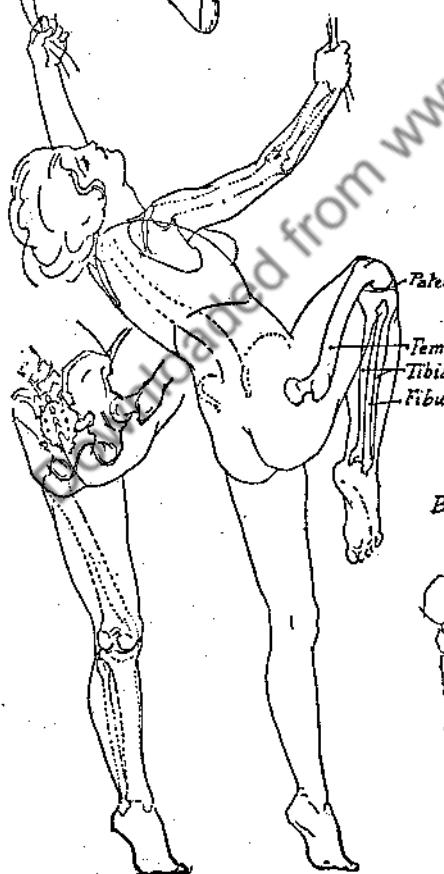
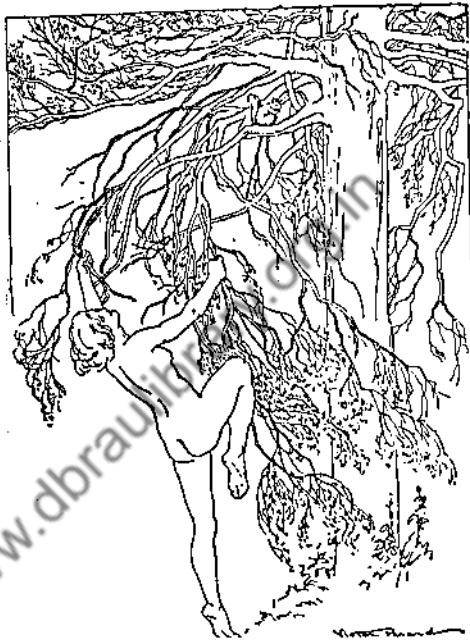
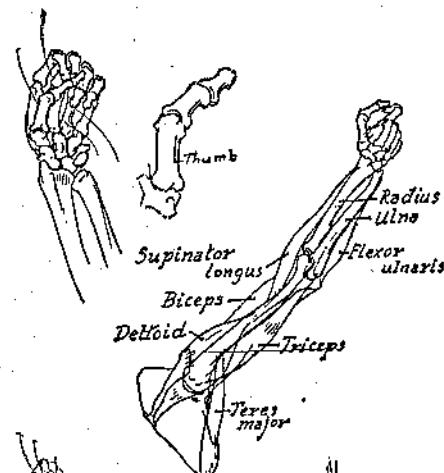






PART NINE
THE ECORCHE
AND MUSCLES OF THE BODY

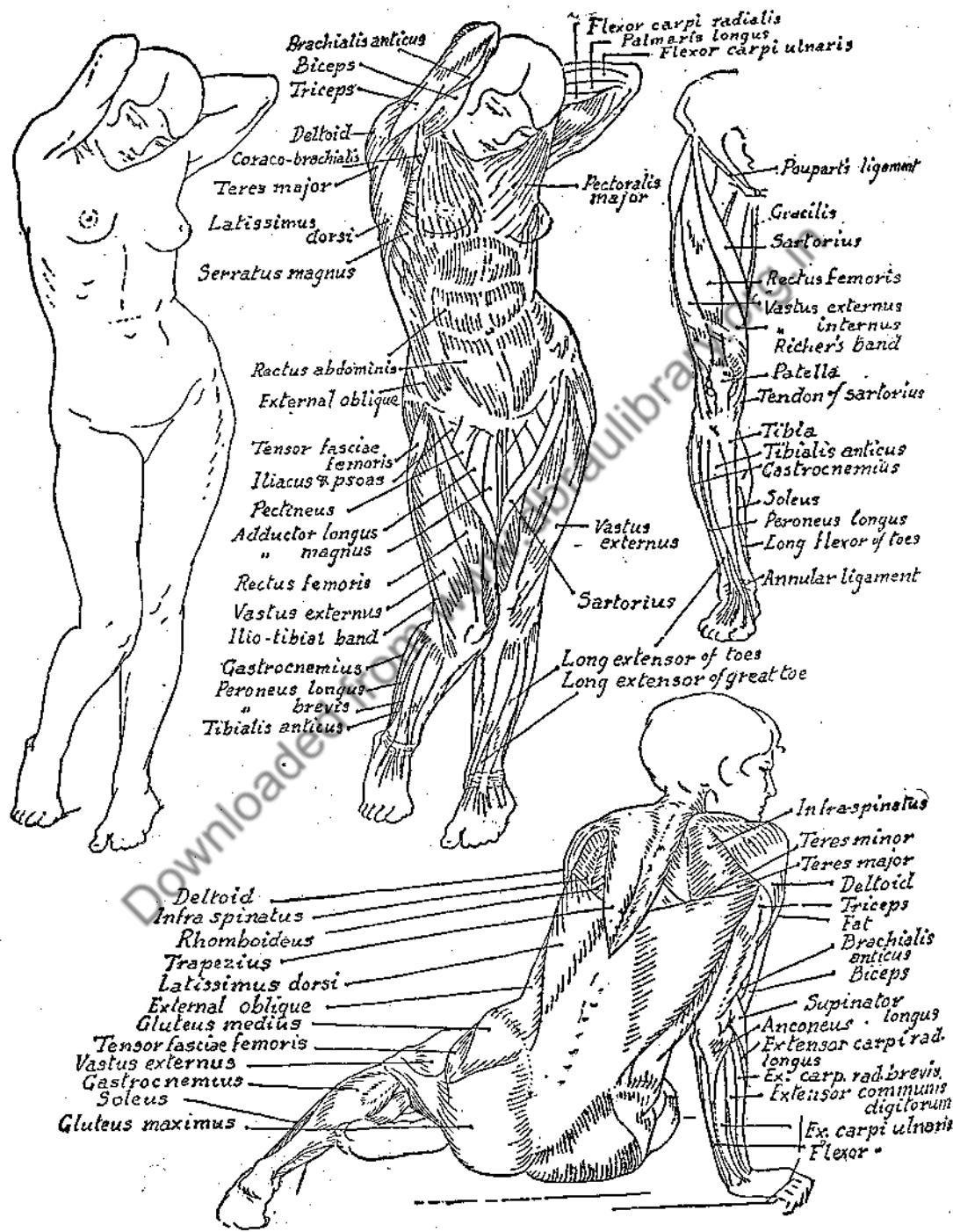


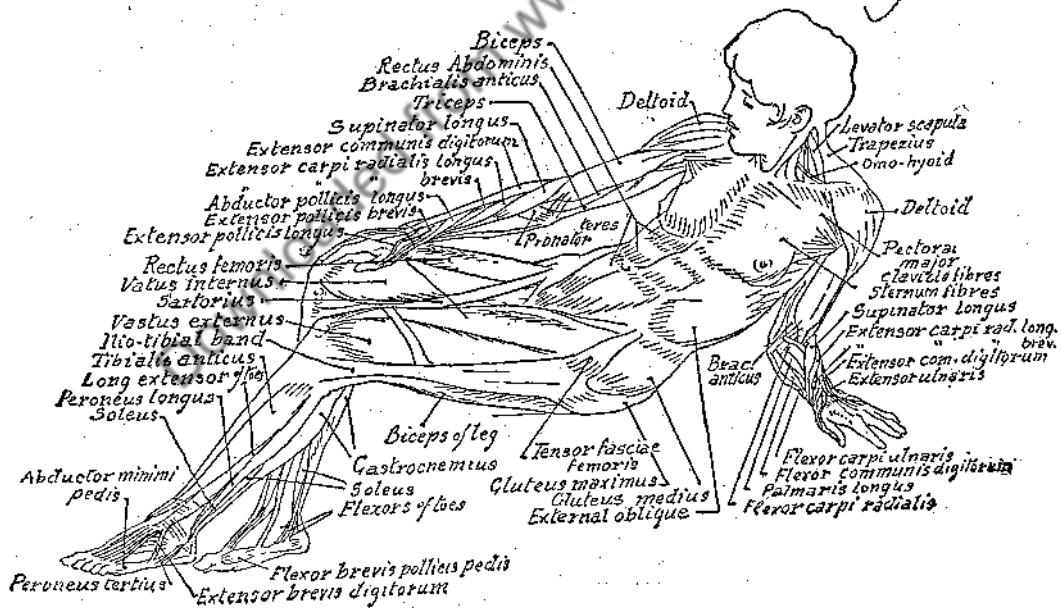
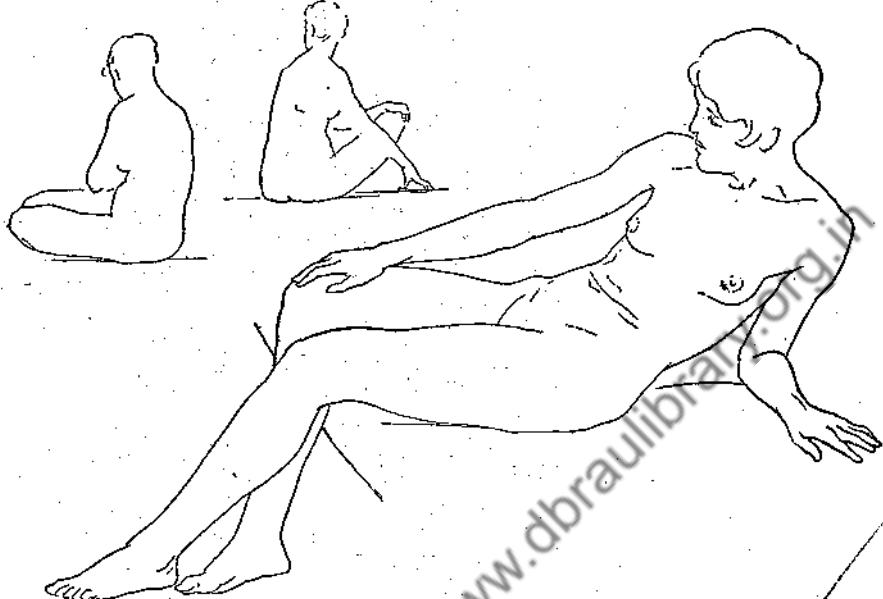


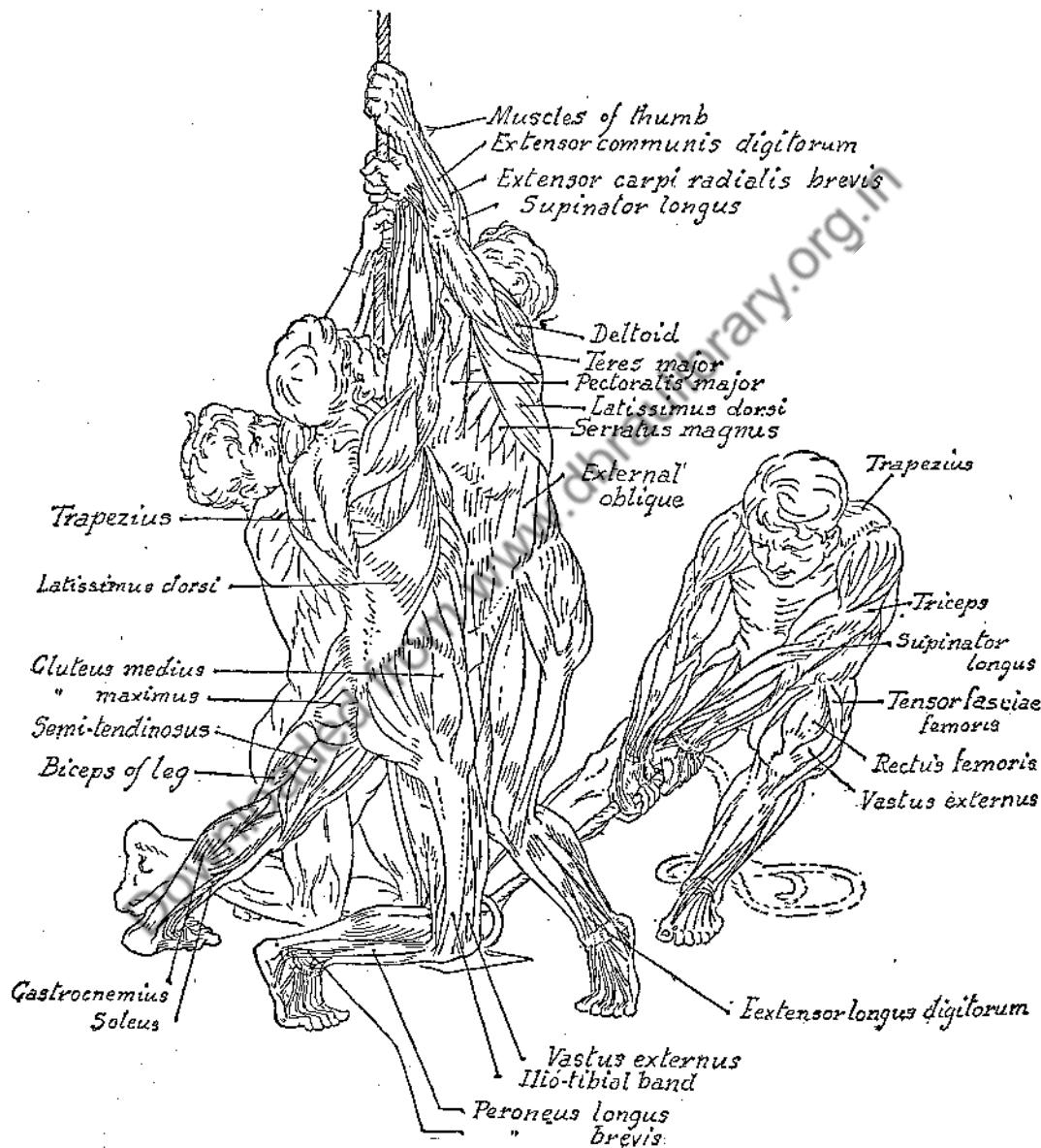


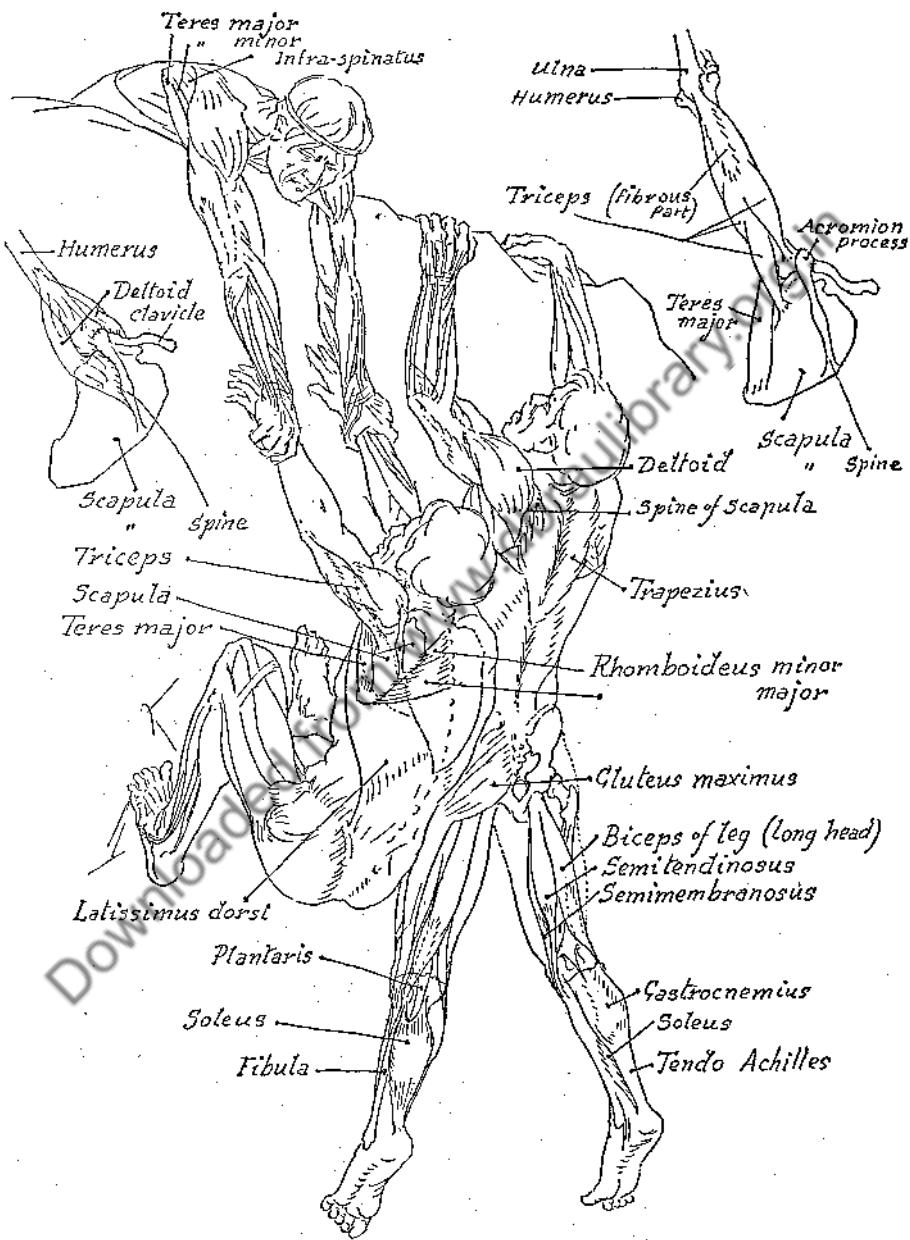
*Application of anatomy
to composition*

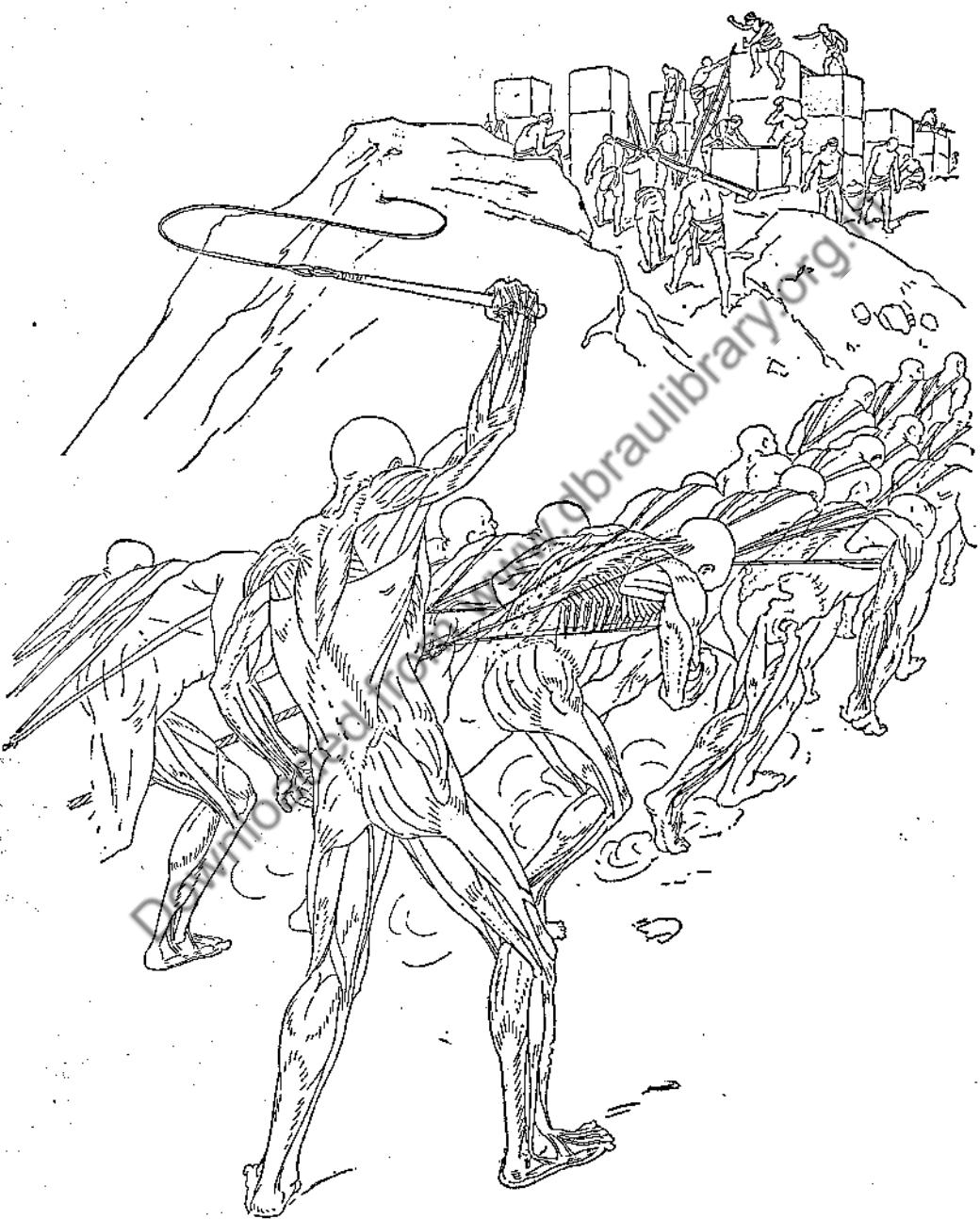


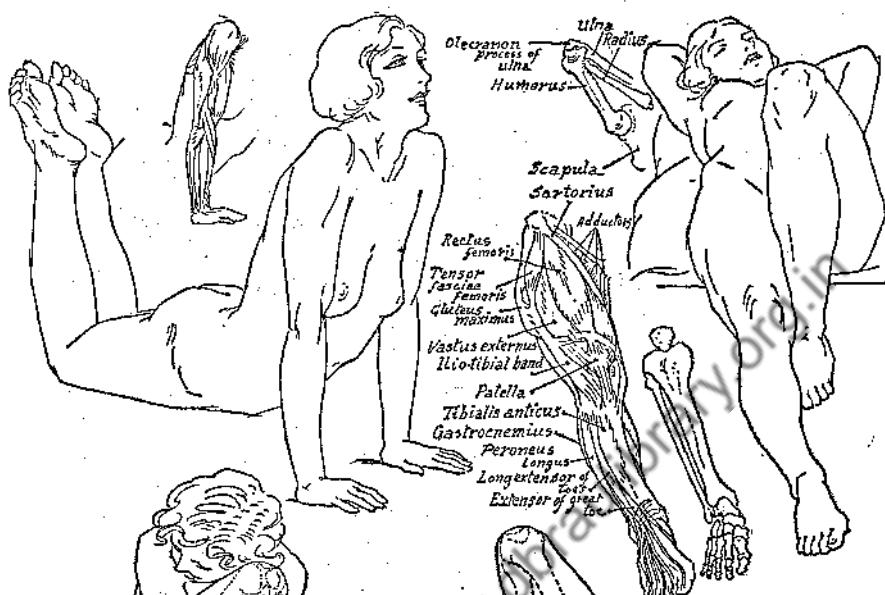




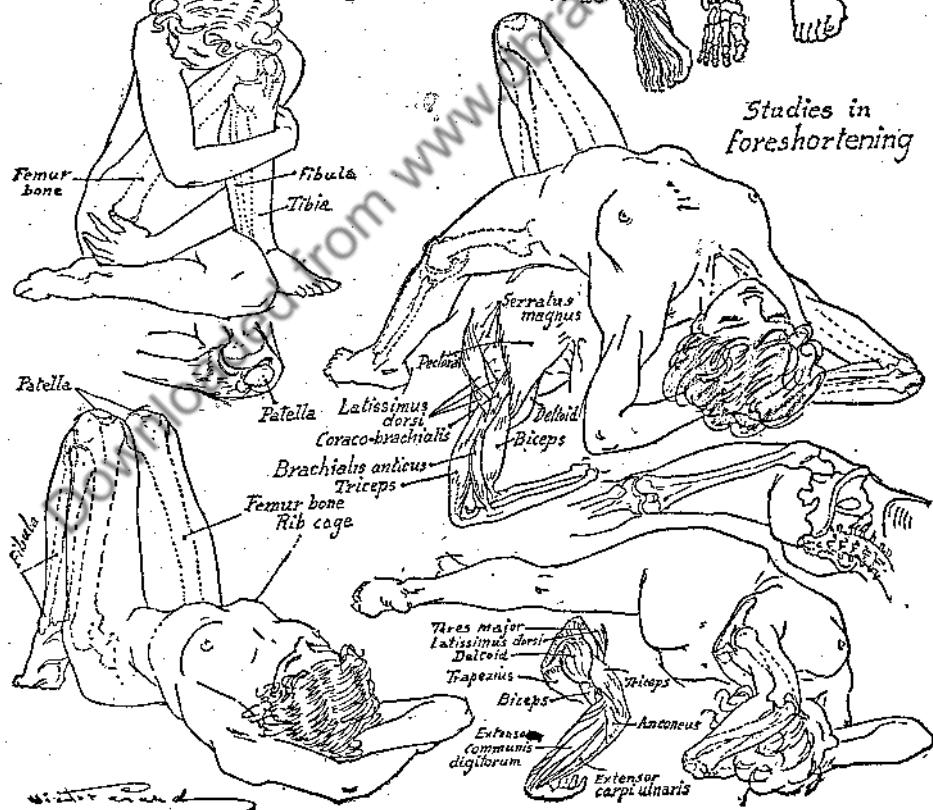


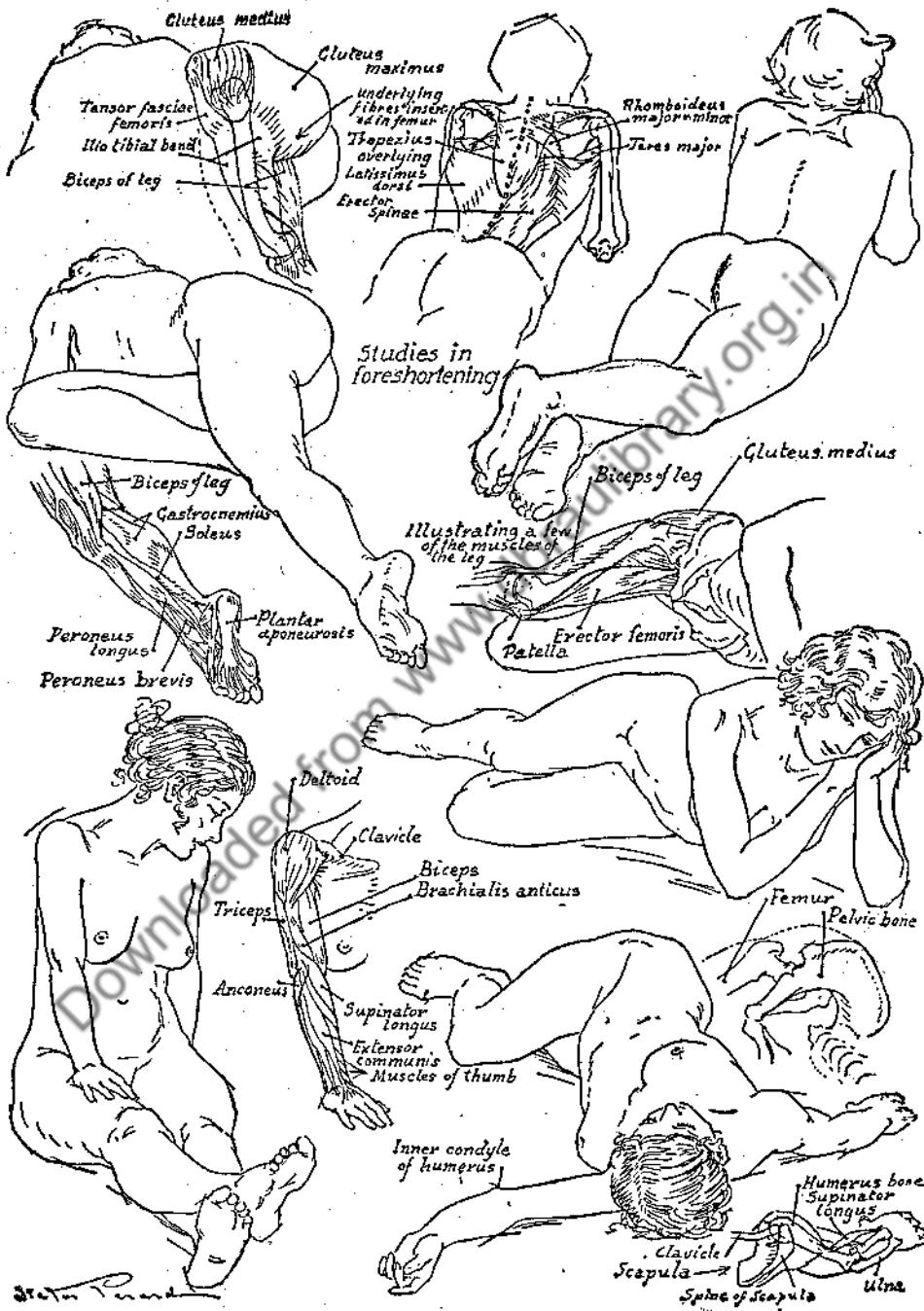


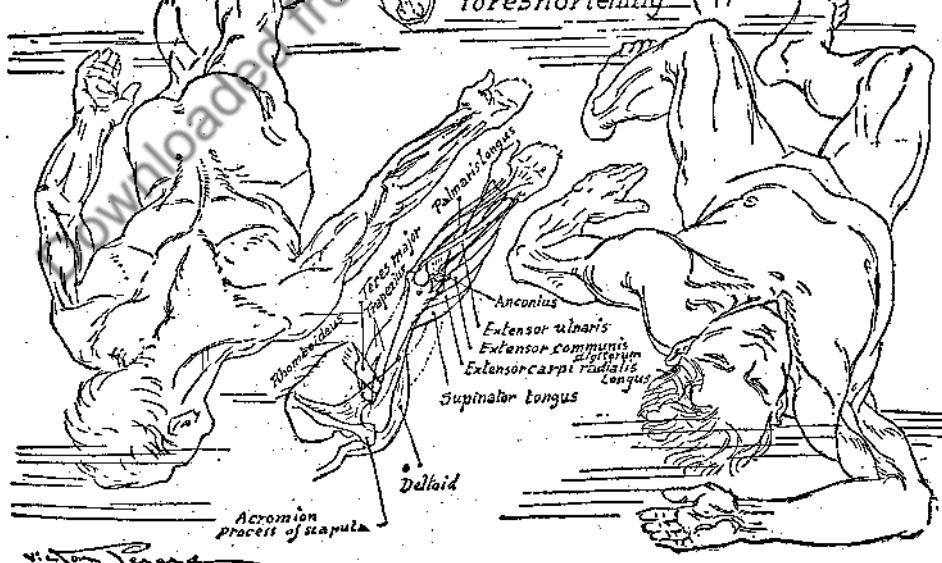
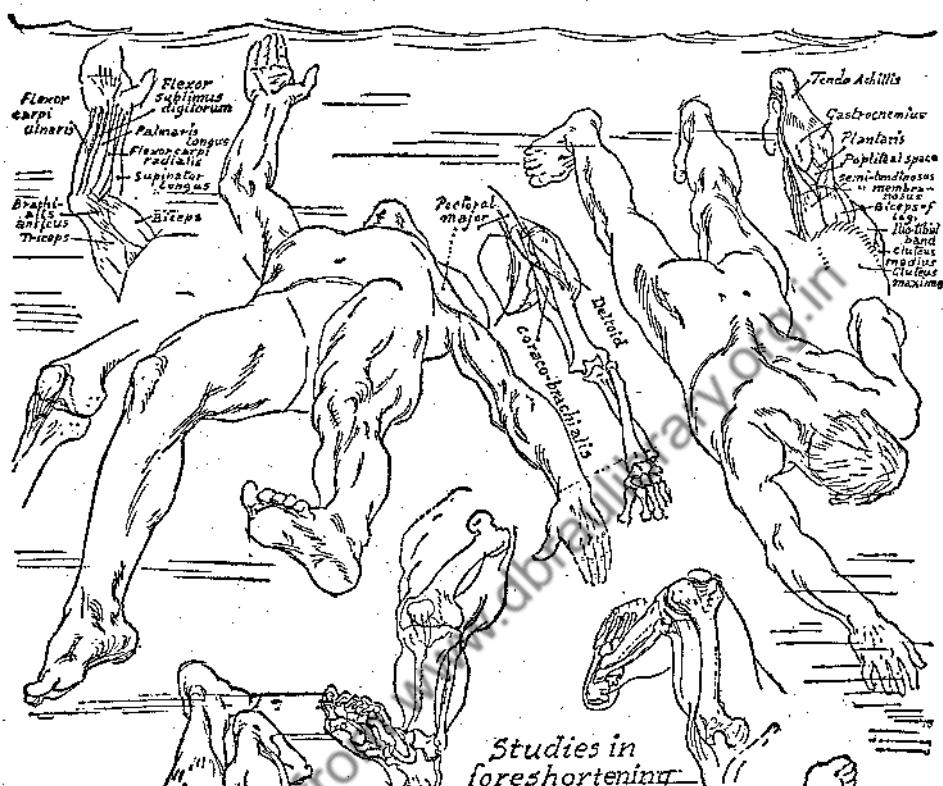


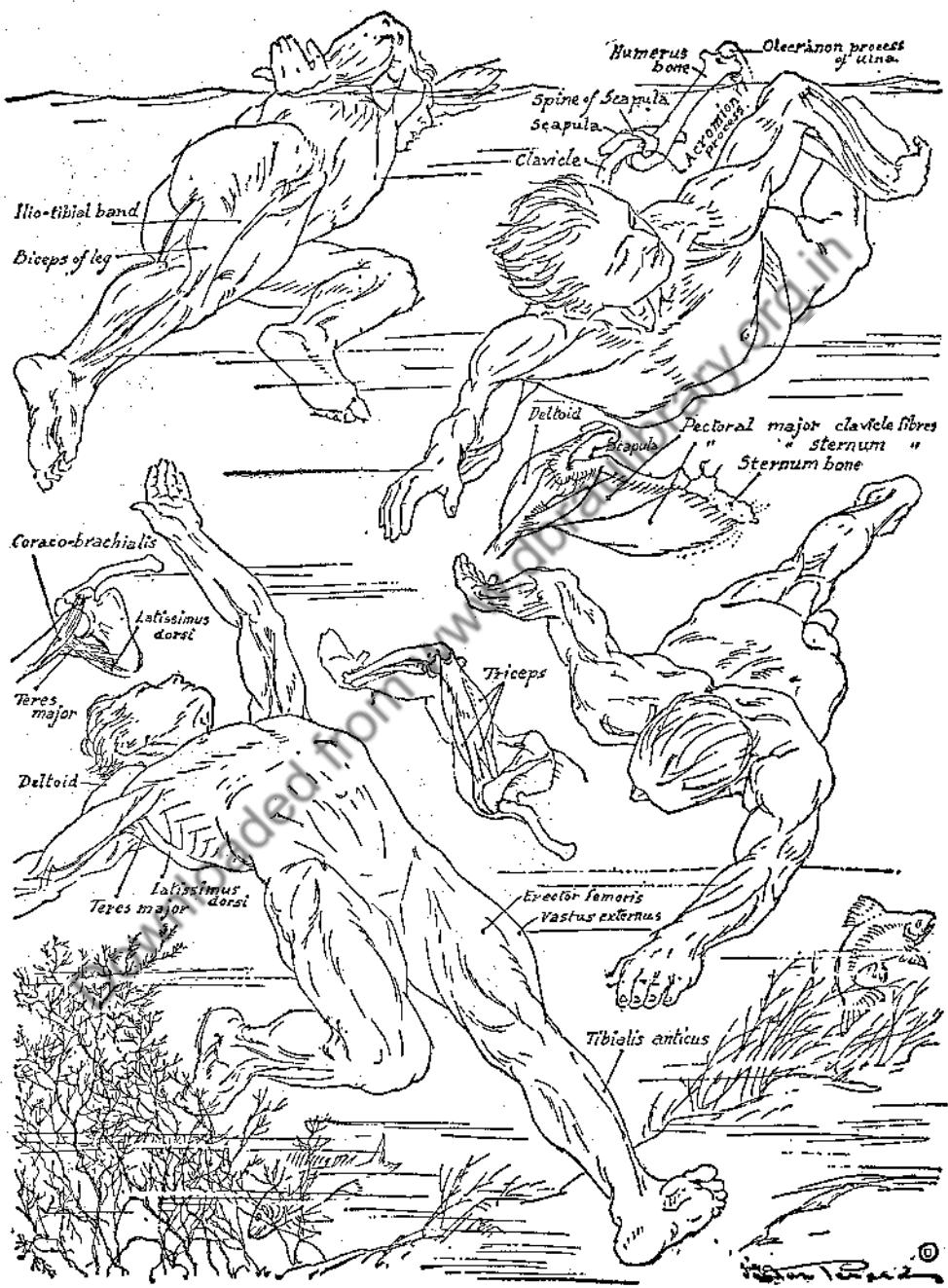


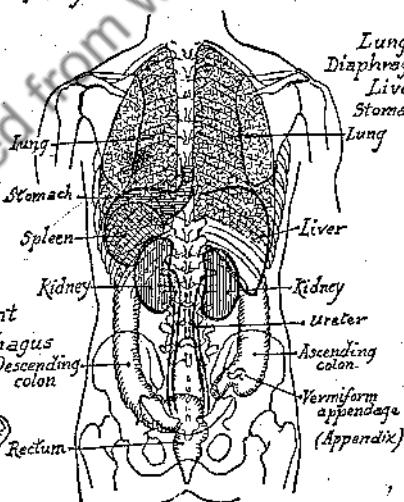
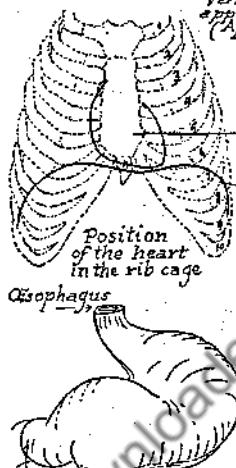
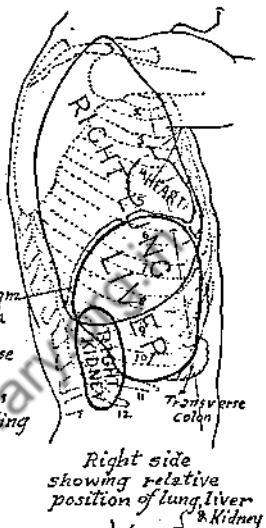
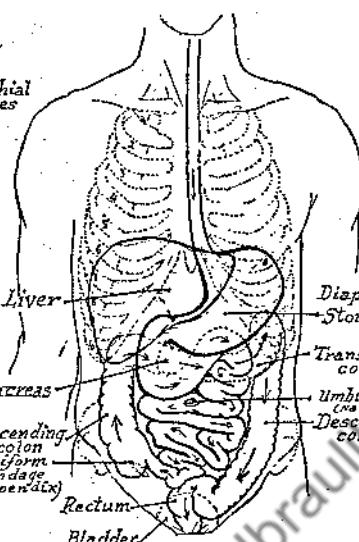
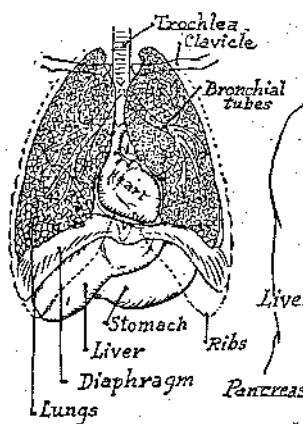
Studies in
foreshortening





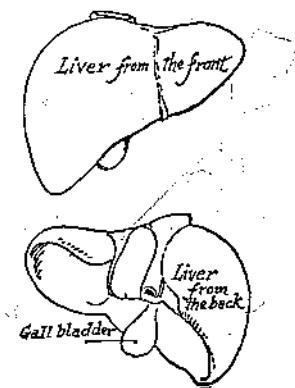
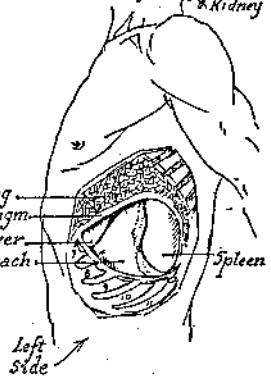


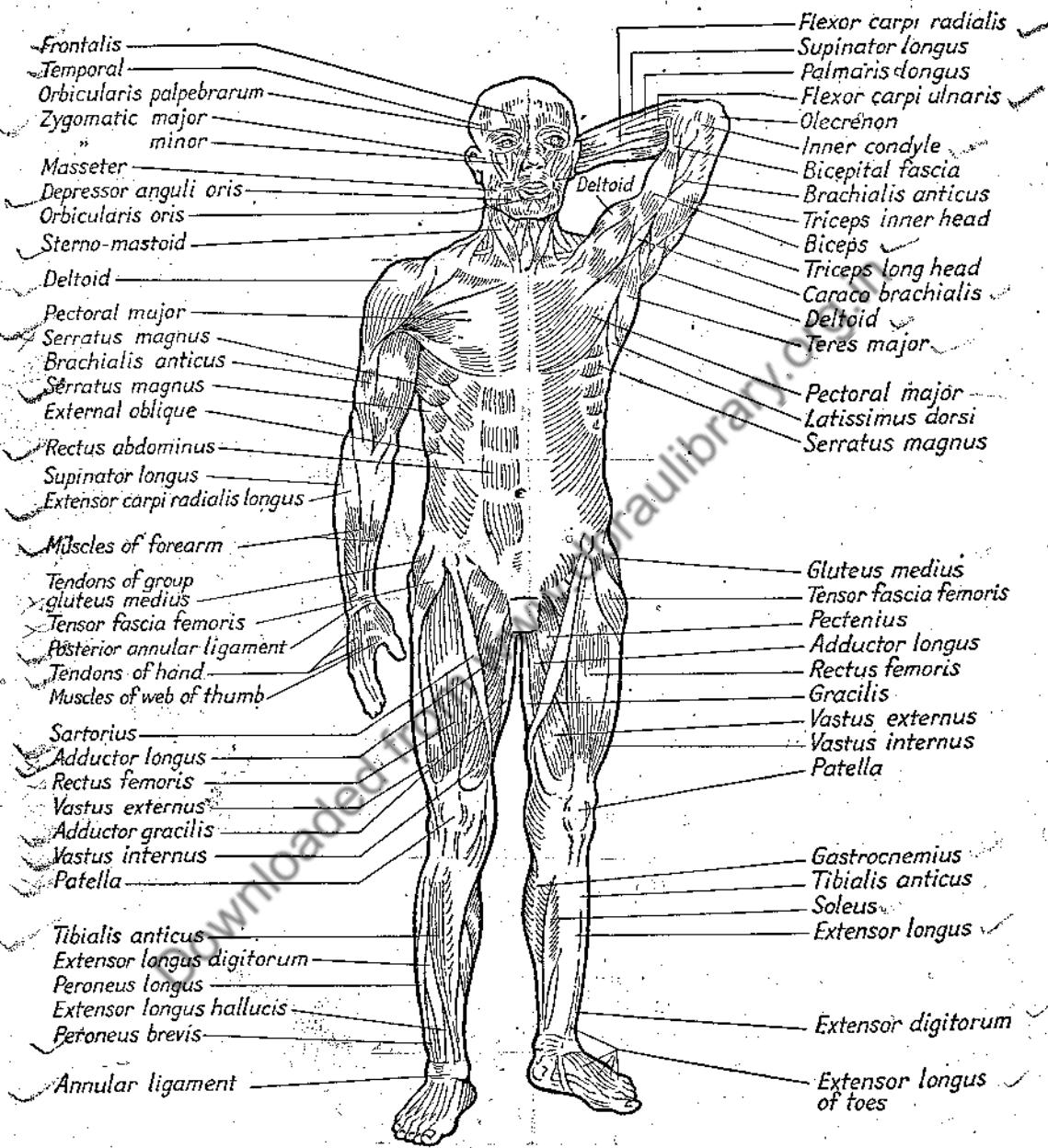




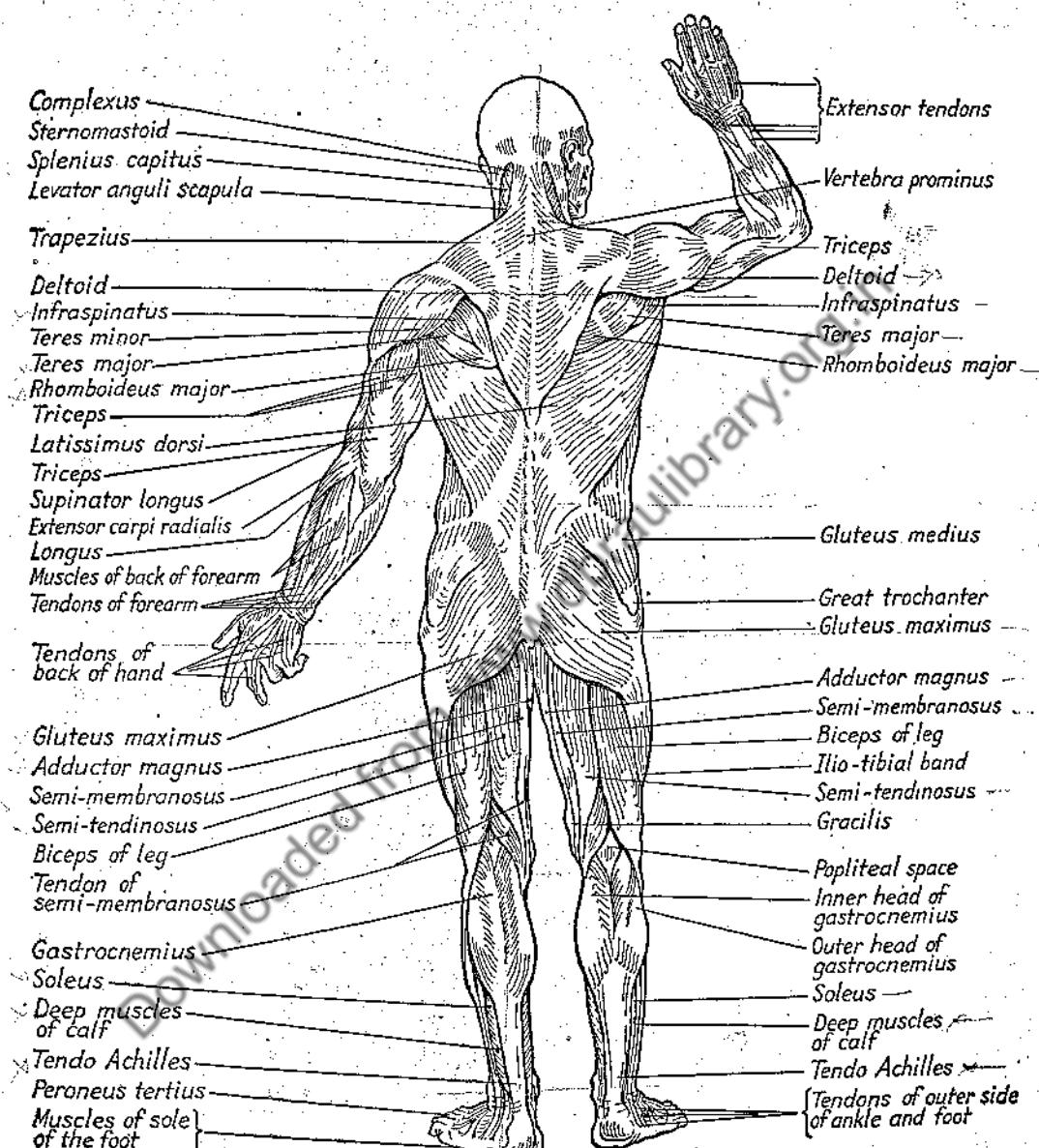
Stomach from the back

Back view.
Illustrating relative positions
of internal organs





MUSCLES OF BODY (front view)



MUSCLES OF BODY (back view)

Compend of Anatomy

Muscles of the head, face and neck

NAME OF MUSCLE	ORIGIN	INSERTION	ACTION
Auricular Posterior and superior	Aponeurosis	Helix of ear	Moves scalp
Buccinator	Processes of both maxillary bones	Orbicular muscle of mouth	Presses cheek against teeth
Complexus	Transverse process of first three dorsals and articular processes of last three cervical vertebrae	Occipital below curved line	Draws head backwards
Compressor naris	Superior maxilla	Opposite muscle	Narrows nostrils
Depressor anguli oris	External oblique line of lower maxilla	Angle of mouth	Draws down angle of mouth
Depressor labii inferior	External oblique line at lower maxillary	Lower lip	Draws lower lip downward
Digastric anterior and posterior	Posterior surface of lower jaw and the mastoid process	Hyoid bone	Depresses jaw raises hyoid bone and tongue
External rectus	Two heads from outer margin of optic foramen	Sclerotic coat	Turns eyeball outward
Frontalis	Nasal and internal angular process of frontal bone	Aponeurosis scalp over bone of forehead	Wrinkles forehead and raises eyebrows
Inferior constrictor	Cricoid and thyroid cartilage	Posterior medium line	Contracts caliber of pharynx
Levator menti	Mandible	Integument of chin	Raises the chin
Levator palpebrarum superioris	Lesser wing of sphenoid	Upper tarsal cartilage	Lifts upper lid of eye
Levator scapula	Transverse process of 4 upper cervical vertebrae	Border of scapula below upper angle	Raises upper angle of scapula
Levator labii superioris	Nasal process of upper maxillary	Nasal cartilage and tip	Draws up lip and opens nostrils
Levator labii superioris alaeque nasi	Root of nose and frontalis muscle	Wing of nose and upper tip	Dilates nostril and lifts upper lip
Levator orbicularis oris	Lower margin of orbit	Upper lip	Raises lip
Longus capitis	Occipital bone	3rd, 4th, 5th, 6th, 7th, cervical vertebrae	Draws head to the side
Longus colli	Base of skull	Upper four thoracic vertebrae	Draws head back
Masseter	Zygomatic arch	Ramus and angle of jaw	Brings molar teeth together
Middle constrictor	Both horns of hyoid stylo-hyoid and ligament	Posterior median line	Contracts caliber of pharynx
Mylo-hyoid	Mylo-hyoid ridge of lower jaw	Body of hyoid and middle line	Draws hyoid up and forward
Occipital	Superior curved line of occiput	Aponeurosis of scalp	Moves scalp
Omo-hyoid	Upper border of scapula	Body of hyoid	Draws hyoid bone downward
Orbicularis palpebrarum (eye)	Internal margin of orbit	Outer margin of orbit	Closes eyelids
Orbicularis oris (mouth)	Nasal septum and bone below lower maxillary	Forms bulk of lip	Closes the mouth

Muscles of head, face and neck (continued)

NAME OF MUSCLE	ORIGIN	INSERTION	ACTION
Oblique inferior	Orbital plate of upper maxillary	Sclerotic coat	Rotates eyeball
Oblique superior	Above optic foramen	Sclerotic coat	Rotates eyeball
Platysma myoides	Clavicle, acromion and fascia	Jaw beneath oblique	Wrinkles skin draws mouth down
Pyramidalis	Frontal bone	Compressor of nose	Draws down eye brow
Rectus inferior	Lower margin of optic foramen	Sclerotic coat	Turns eyeball downward
Rectus lateralis	Two heads from outer margin of optic foramen	Sclerotic coat	Turns eyeball outward
Rectus superior	Upper margin of optic foramen	Sclerotic coat	Turns eyeball upward
Risorius	Fascia over masseter	Angle of mouth	Draws out angle of mouth
Scalenus anterior	Tubercle of first rib	Transverse process of third, seventh cervical vertebrae	Bends neck to side
Scalenus medius and posterior	First rib and second rib	Transverse process of three lower cervical vertebrae	Bends neck to side
Semispinalis	Articular process of lower cervicals	Spinous process of upper cervicals	Keeps neck erect
Splenius capitus of neck	Half of ligament of nape and spinous process of six upper dorsal vertebrae	Occiput and mastoid, transverse process of the four upper cervical vertebrae	Draws head back keeps neck erect
Sterno-hyoid	Clavicle and first piece of sternum bone	Body of hyoid bone	Draws down hyoid bone
Sterno-mastoid	Sternum and inner end of clavicle	Mastoid process	Bends head down and rotates it
Sterno-thyroid	First piece of sternum	Side of thyroid cartilage	Draws down larynx
Stylo-hyoid	Styloid process of temporal	Body of hyoid	Draws hyoid up and back
Temporal	Temporal fossa and fascia	Coronoid process of jaw	Brings teeth together
Trapezius	Superior line of occipital, all spinous processes to twelfth dorsal	Clavicle and spine of scapula	Draws head back and shoulders together
Thyro-hyoid	Side of thyroid cartilage	Body of great horn of hyoid	Raises larynx
Zygomatic major	Malar bone	Angle of mouth	Raises and draws outward the upper lip
Zygomatic minor	Malar bone	Angle of mouth	Raises and draws outward the upper lip

The muscles of the face are muscles of expression whose duty is to cause such motion of the eyelids, nose, and mouth, and to produce such wrinkles in the integument that the mental emotions may be exhibited. About the mouth a number of small muscles are inserted into a large one, and, as it relaxes, pull it in various directions. The mouth is, therefore a most expressive feature.

Muscles of arm and hand

NAME OF MUSCLE	ORIGIN	INSERTION	ACTION
Abductor pollicis longus	Radius and ulna	Head of metacarpal of thumb	Extends thumb
Abductor pollicis brevis	Trapezium	First phalanx of thumb	Draws thumb away from hand
Abductor digiti quinti (fifth)	Pisiform bone	First phalanx of little finger	Draws finger away from the rest
Adductor pollicis oblique head	Carpals and first and second metacarpals	First metacarpal of thumb	Draws thumb to oppose fingers
Adductor pollicis transverse head	Third metacarpal	First phalanx	Draws thumb to oppose fingers
Anconeus	Posterior surface of external condyle of humerus bone	Olecranon and posterior part of ulna	Extends forearm
Annular ligament posterior and anterior	Surrounds wrist	Holds tendons down	Keeps extensor and flexor tendons in place
Biceps	Coracoid process and top of glenoid cavity	Back of tuberosity of radius bone	Flexes and supinates forearm
Brachialis anticus	Lower part of front of humerus	Base of coronoid process of ulna	Flexes forearm
Coraco-brachialis	Coracoid process of scapula	Inside of shaft of humerus	Draws arm forward and inward
Deltoid	Clavicle and acromion process and spine of scapula	Outside of shaft of humerus bone	Raises arm to side back and front
Dorsal interossei (four)	Sides of metacarpal bones	Back of phalanges	Abducts fingers from middle line of middle finger
Extensor carpi radialis brevis	Outer condyle of humerus	Inner side of metacarpal bone of middle finger	Extends and lifts hand up
Extensor carpi radialis longus	External condyloid ridge of humerus	Base of second metacarpal	Extends wrist
Extensor carpi ulnaris	External condyle of humerus	Base of metacarpal of little finger	Extends hand toward ulnar side
Extensor communis digitorum	Outer condyle of humerus	Last phalanges of four fingers	Extends fingers
Extensor digitorum quinti communis	External condyle of humerus	Phalanx of little finger	Extends little finger
Extensor of index	Lower third of ulna	End of phalanx of index	Extends index
Extensor pollicis brevis	Back of ulna and interosseous membrane	Base of second phalanx of thumb	Extends thumb
Extensor pollicis longus	Back of radius	Base of metacarpal of thumb	Extends thumb
Extensor radialis brevis	External condyle ridge of humerus	Base of third metacarpal (middle finger)	Extends wrist
Flexor carpi ulnaris	Internal condyle of humerus	Base of metacarpal and pisiform bone	Flexes wrist
Flexor carpi radialis longus	Inner condyle of humerus	Metacarpal bone of index finger	Flexes wrist and bends hand up
Flexor pollicis brevis	Trapezium and os magnum and three metacarpals	First phalanx	Flexes thumb
Flexor pollicis longus	Shaft of upper half of radius	Last phalanx of thumb	Flexes thumb

Muscles of arm and hand (continued)

NAME OF MUSCLE	ORIGIN	INSERTION	ACTION
<i>Flexor profundis digitorum</i>	Upper section of ulna and radius	End of four phalanges of fingers	Flexes fingers
<i>Flexor digitorum sublimus</i>	Inner condyle of humerus and shaft of radius	Side of second phalanx	Flexes finger and also the hand
<i>Flexor digiti quinti brevis</i>	Unciform bone	First phalanx of little finger	Flexes little finger
<i>Infra spinatus</i>	Infraspinatus fossa	Great tuberosity of humerus	External rotator
<i>Lubricans (four)</i>	Tendon of deep flexor	Back of phalanges	Flex first phalanges
<i>Opponens digiti quinti</i>	Unciform bone of carpal group	Metacarpal of little finger	Pulls little finger away from center of hand
<i>Opponens pollicis</i>	Trapezium	Metacarpel of thumb	Draws thumb up and inward
<i>Palmaris brevis</i>	Annular ligament and palmar facia	Skin of palm	Wrinkles skin and helps to close hand
<i>Palmaris longus</i>	Inner condyle of humerus	Dense fascia of the palm of hand	Flexes wrist and hand
<i>Palmar aponeurosi</i>	Tendon of palmaris longus	Tendon sheaths of fingers	Protects structures of blood vessels and nerves
<i>Palmar interossei</i>	Palmar surface of metacarpals	Side of phalanges	Adducts fingers toward middle of hand
<i>Pronator radii teres</i>	Internal condyle of humerus	Outside of shaft of radius	Pronates hand
<i>Pronator quadratus</i>	Lower part of ulna	Lower part of radius	Pronates hand
<i>Subscapularis</i>	Subscapular fossa	Lesser tuberosity of humerus	Internal rotator of arm
<i>Supinator longus</i>	External condyloid ridge of humerus	Styloid process of radius	Supinates hand and flexes elbow
<i>Supinator radii teres</i>	External condyle of humerus and back of ulna	Neck and back of radius	Supinates hand
<i>Supinator radii brevis</i>	Side of upper half of radius	Upper part of ulna	Brings hand to supine position
<i>Supra spinatus</i>	Supraspinatus fossa	Great tuberosity of humerus	Holds head of humerus in socket of scapula
<i>Teres major</i>	Inferior angle of scapula	Posterior bicepital ridge of humerus	Draws arm down and back
<i>Teres minor</i>	Auxiliary border of scapula	Great tuberosity of humerus	External rotator
<i>Transverse carpal ligament</i>	Attached to navicular and multangular (carpals)	Pisiform and os hamatum (carpals)	Binds down flexor tendons of fingers
<i>Triceps outer head</i>	-- Humerus	Olecranon of ulna	Extends the forearm
<i>Triceps middle head</i>	-- Scapula		
<i>Triceps inner head</i>	-- Humerus		

The shoulder girdle comprising the collar bone (clavicle) and shoulder blade (scapula) plays a large part in the form and action of the upper arm. The study of the humerus articulating with the scapula is most interesting.

Muscles of leg and foot

NAME OF MUSCLE	ORIGIN	INSERTION	ACTION
Abductor pollicis pedis (big toe)	Inner tubercle of os calcis	First phalanx of big toe	Draws big toe away from others
Abductor minimi pedis (little toe)	Outer tubercle of os calcis	First phalanx of little toe	Draws toe away from others
Adductor brevis	Ramus of pubes	Upper part of rough line of femur	Flexes and draws thigh inward
Adductor hallucis oblique head (big toe)	Os calcis	Second phalanx of big toe	Draws big toes toward the others
Adductor longus	Front of pubes	Middle of rough line of femur	Flexes and draws thigh inward
Adductor magnus	Ramus of pubes and of ischium	Entire length of rough line of femur	Draws thigh inward
Biceps of leg long and short head	Tuberosity of ischium outer bifurcation of rough line of femur	Head of fibula	Flexes leg and rotates it outward
Extensor of big toe (Hallucis)	Middle of shaft of fibula	Last phalanx of great toe	Extends toe
Extensor brevis digitorum pedis	Outer side of os calcis	First phalanx of big toe and tendons of long extensors	Extends toes
Extensor longus digitorum communis	Head of tibia and shaft of fibula	Second and third phalanges of toes	Extends toes
Flexor brevis digitorum pedis	Inner tubercle of os calcis and plantar fascia	Second phalanges of toes	Flexes toes
Flexor brevis pollicis pedis (big toe)	Cuboid	Base of first phalanx of big toe	Flexes big toe
Flexor brevis minimi digiti	Base of 5th. metatarsal	Base of first phalanx of little toe	Flexes little toe
Flexor longus digitorum pedis	Shaft of tibia	Last phalanges of toes	Flexes toes
Flexor hallucis brevis (big toe)	Cuboid	Base of first phalanx of big toe	Flexes big toe
Flexor longus hallucis (big toe)	Shaft of fibula	Last phalanx of big toe	Flexes toes
Gastrocnemius inner and outer head	Two heads above condyles of femur	Os calcis	Extends foot
Gemellus superior gracilis	Spine and tuberosity of ischium and ramus of pubes	Great trochanter upper and inner part of tibia	Flexes and draws leg inward
Gluteus maximus	Back of illium behind superior line of sacrum and coccyx	Fascia and below great trochanter	Extends and draws thigh outward
Gluteus medius " minimus	Ilium between superior and middle lines	Oblique line of great trochanter	Draws thigh outward and rotates leg
Ilio-tibial band	Conjoined flattened tendon of gluteus maximus tensor fascia femoris	External tuberosity of tibia	Supports knee joint in extension
Iliacus	Iliac fossa and base of sacrum	Below lesser trochanter	Flexes and rotates thigh outward
Ilio-psoas	Radius and transverse process of last dorsal and all lumbar vertebra	Lesser trochanter of femur	Flexes and rotates thigh outward
Lubricals (four)	Tendons of long flexor	Base of first phalanges	Flexes toes and gathers them together
Obturator externus and gemelli	Outside of obturator membrane and bony margin	Digital fossa of femur	External rotator of thigh

Muscles of leg and foot (continued)

NAME OF MUSCLE	ORIGIN	INSERTION	ACTION
Obturator internus	Inside of obturator membrane and bony margin	Top of great trochanter	External rotator of thigh
Pectineus	Ilio-pectenial line and body of pubes	Below lesser trochanter	Flexes thigh on pelvis and rotates outward
Peroneus brevis	Outside of shaft of fibula	Base of fifth metatarsal	Extends ankle
Peroneus longus	Head and outside of shaft of fibula	Base of metatarsus of big toe	Extends ankle
Peroneus tertius	Outside of shaft of fibula	Base of fifth metatarsal	Extends ankle
Piriformis	Front of sacrum through great sciatic notch	Top of great trochanter	Extends and rotates thigh
Plantar interossei (three)	Under surface of metatarsal	Back of first phalanges	Draws toe toward middle line of 2nd toe
Plantaris	Above outer condyle of femur	Os - calcis	Extends foot with tendons of Achilles
Popliteus	Outside of external condyle of femur	Tibia above oblique line	Flexes leg
Psoas major	Bodies and transverse processes of last dorsal and all lumbar vertebrae	Lesser trochanter of femur	Flexes and rotates thigh outward
Psoas minor	Bodies of last dorsal and first lumbar vertebrae	Iliac fascia	Flexes and rotates thigh outward
Quadratus femoris	Tuberosity of ischium	Quadratus line of femur	Extends and rotates thigh
Rectus femoris	Anterior inferior spine and top of acetabulum	Patella	Extensor of leg
Sartorius	Anterior superior spine of ilium	Upper and inner part of tibia	Flexes and crosses legs
Semi-tendinosus	Tuberosity of ischium	Upper and inner part of tibia	Flexes leg
Semi-membranosus	Tuberosity of ischium	Back of inner tuberosity of tibia	Flexes leg, rotates inward
Soleus	Shaft of fibula and oblique line of tibia	Os - calcis	Extends foot with tendon of Achilles
Superior gemellus and inferior	Spine of ischium	Great trochanter	External rotator of thigh
Tendo Achilles	Tendon of the muscle of the calf	Os - calcis	Lifts heel in walking
Tensor fascia femoris	Anterior extremity of iliac crest	Front of great trochanter of femur	Helps lift leg outward
Tibialis anticus	Outside of head and shaft of tibia	Internal cuneiform and first metatarsal	Flexes ankle and inverts foot
Tibialis posterior	Back of tibia and fibula	Sole of foot, navicular, cuneiform and metatarsal bones	Extends foot
Transversalis pedis	Head of metatarsal	First phalanx of great toe	Brings great toe towards middle line
Vastus externus	External lip of rough line of femur and base of great trochanter	Patella	Extends leg
Vastus internus	Back and inner side of tibia	Patella	Extends leg

Muscles of the torso

NAME OF MUSCLE	ORIGIN	INSERTION	ACTION
Erector spinae	Crest of ilium, back of sacrum and six lower ribs	Transverse process of four cervical and six upper thoracic ribs	Straightens spine and draws head back
External oblique	Eight lower ribs	Middle line and crest of ilium, and pourparts ligament	Compresses viscera and flexes thorax
Infra spinatus	Infraspinous fossa	Great tuberosity of humerus	External rotator of humerus
Intercostal and two external intercostal	Inner lip of lower border of ribs and outer lip second of ribs	Upper border of ribs	Draws ribs together when exhaling two when inhaling
Internal oblique	Pourparts ligament, crest of ilium and lumbar fascia	Middle line and crest of pubes plus four lower ribs	Compresses viscera and flexes thorax
Latissimus dorsi	Spinal processes of six lower dorsal, lumbar vertebrae and crest of ilium	Bicepital groove of humerus	Draws arm back and down
Levator scapula	Transverse processes of four upper cervical vertebrae	Border of scapula below upper angle	Raises upper angle of scapula
Ligamentum Nuchae	Spinous processes of spine	Base of skull	By its elasticity it braces the spine
Pectoralis major	Clavicle sternum and costal cartilage	Anterior bicepital ridge of humerus	Draws arm down and across the chest
Pectoralis minor	Third, fourth and fifth rib	Coracoid process of scapula	Depresses point of shoulder
Rectus abdominis	Crest of pubis bone	Cartilage of fifth, sixth and seventh rib	Bends chest forward
Rhomboideus major	Spinal processes of five upper dorsal vertebrae	Border of scapula to lower angle	Draws scapula forward
Rhomboideus minor	Spinal process of last cervical and first dorsal	Border of scapula at lower margin	Draws scapula forward
Serratus magnus	Eight upper ribs	Posterior border of scapula	Draws shoulder blade and arm forward
Serratus posticus inferior	Spinal process of last two dorsal and first two lumbar vertebrae	Four lower ribs	Depresses ribs in expiration
Supra spinatus	Supra-spinous fossa of scapula	Great tuberosity of humerus	Holds head of humerus in socket
Teres major	Inferior angle of scapula	Posterior bicepital ridge of humerus	Draws arm down and back
Teres minor	Axillary border of scapula	Great tuberosity of humerus	Rotates laterally
Transversus abdominis	Pourparts ligament, crest of ilium and six lower ribs	Middle line and crest of pubic bone	Compresses viscera and flexes thorax
Trapezius	Superior line of occipital, all spinous processes to twelfth dorsal vertebra	Clavicle and spine of scapula	Draws head back and shoulders together

The Spine. The amount of movement between the vertebrae is very limited yet the total range of movement reached is considerable. Flexion forward and backward is freer and most of the action occurs in the neck and the lumbar region. The lumbar vertebrae are larger than the others and have more space between them thus allowing freer movement.